

**NUCLEAR REGULATORY COMMISSION  
ISSUANCES**

**OPINIONS AND DECISIONS OF THE  
NUCLEAR REGULATORY COMMISSION  
WITH SELECTED ORDERS**

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January 1, 2019 – June 30, 2019

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Volume 89  
Pages 1 - 506



Prepared by the  
Office of Administration  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001  
(301-415-0955)

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## PREFACE

This is the eighty-ninth volume of issuances (1–506) of the Nuclear Regulatory Commission and its Atomic Safety and Licensing Boards, Administrative Law Judges, and Office Directors. It covers the period from January 1, 2019, to June 30, 2019.

Atomic Safety and Licensing Boards are authorized by Section 191 of the Atomic Energy Act of 1954. These Boards, comprised of three members, conduct adjudicatory hearings on applications to construct and operate nuclear power plants and related facilities and issue initial decisions which, subject to internal review and appellate procedures, become the final Commission action with respect to those applications. Boards are drawn from the Atomic Safety and Licensing Board Panel, comprised of lawyers, nuclear physicists and engineers, environmentalists, chemists, and economists. The Atomic Energy Commission (AEC) first established Licensing Boards in 1962 and the Panel in 1967.

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On June 29, 1990, however, the Commission voted to abolish the Atomic Safety and Licensing Appeal Panel, and the Panel ceased to exist as of June 30, 1991. Since then, the Commission itself reviews Licensing Board and other adjudicatory decisions, as a matter of discretion. *See* 56 FR 29403 (1991).

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Issuances are referred to as follows: Commission (CLI), Atomic Safety and Licensing Boards (LBP), Administrative Law Judges (ALJ), Directors' Decisions (DD), and Decisions on Petitions for Rulemaking (DPRM).

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

**Kristine L. Svinicki**, Chairman  
**Jeff Baran**  
**Stephen G. Burns**  
**Annie Caputo**  
**David A. Wright**

**In the Matter of**

**Docket No. 40-9075-MLA**

**POWERTECH (USA), INC.**  
**(Dewey-Burdock *In Situ* Uranium**  
**Recovery Facility)**

**January 31, 2019**

**NATIONAL ENVIRONMENTAL POLICY ACT**

**REMAND**

The U.S. Court of Appeals for the D.C. Circuit’s ruling precluded the NRC from applying the standards governing a stay to the question whether a license should be suspended while a NEPA deficiency is cured by the agency. The appeals court described the scope of its ruling against the NRC as follows: “To be clear, today we hold only that, once the NRC determines there is a significant deficiency in its NEPA compliance, it may not permit a project to continue in a manner that puts at risk the values NEPA protects simply because no intervenor can show irreparable harm.” *Oglala Sioux Tribe v. NRC*, 896 F.3d 520, 538 (D.C. Cir. 2018).

**NATIONAL ENVIRONMENTAL POLICY ACT**

**REMAND**

The U.S. Court of Appeals for the D.C. Circuit did not hold that the NRC could never leave a license in place after a post-license-issuance adjudication finds a NEPA deficiency. The appeals court recognized that a NEPA deficiency could be harmless error or that the Commission could impose “protective conditions” during an administrative remand intended to cure a NEPA deficiency.

## NATIONAL ENVIRONMENTAL POLICY ACT

### REMAND

The Commission decided to leave the license in place while the NEPA deficiency is under remand to the Licensing Board, based on licensee's representation that it cannot get other necessary approvals while the NRC adjudication is pending. The Commission ordered the licensee, while the Board proceeding is pending, to notify the Board and the parties no later than 60 days prior to performing any activities at the license site.

## MEMORANDUM AND ORDER

We have received the views of the parties to this proceeding regarding how the agency should respond to the remand from the U.S. Court of Appeals for the District of Columbia Circuit in *Oglala Sioux Tribe v. NRC*, 896 F.3d 520 (D.C. Cir. 2018). For the reasons explained below, we leave the license previously issued to Powertech (USA), Inc. (Powertech) in place for now, consistent with the court's choice of remedy. We also order Powertech to notify the Atomic Safety and Licensing Board (Board) and the parties 60 days in advance of conducting any activities at the site under its NRC license should this adjudication still be pending at that time. This notification will allow the Board to take any necessary action regarding Powertech's license before such activities at the site would commence.

### I. BACKGROUND

At the time the Board issued its Partial Initial Decision in this proceeding, the NRC Staff had already issued a license to Powertech for an *in situ* uranium recovery facility in Custer and Fall River Counties, South Dakota. The Staff took this action, consistent with NRC regulations, after completing its review of Powertech's application — a review that included a full safety review and the issuance of a draft site-specific environmental impact statement for public comment, a final site-specific environmental impact statement, and a record of decision.<sup>1</sup> In its Partial Initial Decision, the Board found that the Staff had not sufficiently considered the potential impacts of the proposed facility on Oglala

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<sup>1</sup> See LBP-15-16, 81 NRC 618, 630-32 (2015); CLI-16-20, 84 NRC 219, 223-24 (2016). Under 10 C.F.R. §§ 2.1202(a) and 2.340(e)(2)(ii), for certain types of applications, the NRC Staff may "issue its approval or denial" of an application before the Presiding Officer has issued an Initial Decision. Applications for uranium recovery facilities are one such type of application.

Sioux Tribe (Tribe) cultural resources under the National Environmental Policy Act (NEPA).<sup>2</sup>

The Board, despite identifying this NEPA-analysis deficiency (and one other related deficiency, under a different statute),<sup>3</sup> chose not to suspend Powertech's license, but it did retain jurisdiction to ensure the deficiency would be properly addressed.<sup>4</sup> On appeal, we left undisturbed both the Board's finding and its remedy.<sup>5</sup>

The Tribe petitioned for review of the Commission's order in the D.C. Circuit and challenged, *inter alia*, the Commission's decision not to order immediate vacatur of Powertech's license in light of the Board's findings. Of relevance here, the D.C. Circuit held that it was inconsistent with NEPA for the NRC to allow Powertech's "project to continue in a manner that puts at risk the values NEPA protects simply because no intervenor can show irreparable harm," once the NRC had identified, during the adjudicatory hearing process, "a significant deficiency" in the NRC's NEPA compliance.<sup>6</sup>

The court did not, however, vacate Powertech's license. Instead, the court remanded the case to the Commission "for further proceedings consistent with [the court's] opinion," basing its choice of remedy on the court's remand-without-vacatur doctrine under *Allied-Signal, Inc. v. NRC*, 988 F.2d 146 (D.C. Cir. 1993).<sup>7</sup> In analyzing the pertinent facts under *Allied-Signal*, the court explained that it had "not been given any reason to expect that the agency will be unable to correct [the Board-identified NEPA] deficiencies," and it also cited Powertech's reliance on NRC's "ruling and settled practice" permitting the license to remain in place and Powertech's representations regarding financial harm that would

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<sup>2</sup> LBP-15-16, 81 NRC at 653-55; *see also* CLI-16-20, 84 NRC at 243-44.

<sup>3</sup> The Tribe and the Consolidated Intervenors also originally prevailed on the merits before the Board on a related contention (Contention 1B) regarding the Staff's consultations with the Tribe under the National Historic Preservation Act (NHPA). *See* CLI-16-20, 84 NRC at 244. The Board has since granted summary disposition on that contention in favor of the Staff and found that additional efforts subsequent to the initial ruling cured the NHPA deficiency. LBP-17-9, 86 NRC 167, 188-90 (2017).

<sup>4</sup> LBP-15-16, 81 NRC at 658; *see also* CLI-16-20, 84 NRC at 244 ("[T]he Board . . . retained jurisdiction over the proceeding pending the Staff's curing of the deficiencies in the FSEIS and consultation with the Tribe."); *id.* at 244 n.151 ("The Board noted that it could have suspended Powertech's license, and it attributed its decision to leave the license in place to the Tribe's incomplete participation in the consultation process.").

<sup>5</sup> CLI-16-20, 84 NRC at 245-51.

<sup>6</sup> 896 F.3d at 538. Based on the Board's summary disposition ruling on Contention 1B, the court in *Oglala Sioux Tribe* limited its holding to Contention 1A. 896 F.3d at 527 n.4. The court also declined to decide the remainder of the issues the Tribe raised in its review petition and found that it lacked jurisdiction to review those issues because "the Commission's order did not end the agency proceeding as to all issues." *Id.* at 527.

<sup>7</sup> *Id.* at 538-39.

befall it should action be taken against its license.<sup>8</sup> Further, and “[m]ore important,” the court referenced Powertech’s representation “that a South Dakota permitting requirement independently bars it from moving forward with construction on the site until the NRC completes its compliance with NEPA.”<sup>9</sup> Based on the latter consideration, the court concluded that “it appears that the Tribe will not suffer harm — irreparable or otherwise — from a disposition that leaves the license in effect *for now*.”<sup>10</sup>

In response to this remand from the court, the Commission issued an order inviting the parties to provide their views on how the agency should proceed.<sup>11</sup> The order specifically requested that “[t]he parties should address, at a minimum, the question of what legal standard the NRC should use” when considering the status of Powertech’s license, “to ensure consistency with the court’s opinion going forward.”<sup>12</sup> The parties have provided their views in response to that order, and the Tribe, Powertech, and the Consolidated Intervenors have also filed responses to those initial filings.<sup>13</sup>

The Tribe relies on 5 U.S.C. § 706, which generally provides the standard for judicial review of agency action, and related federal court precedent to argue that, unless an analysis undertaken pursuant to *Allied-Signal* warrants rebutting the presumption of vacatur, the Commission should vacate Powertech’s license based on the finding of a NEPA violation.<sup>14</sup> That *Allied-Signal* analysis, the Tribe asserts, would look to “the seriousness of the order’s deficiencies (and thus the extent of doubt whether the agency chose correctly) and the disruptive consequences of an interim change that may itself be changed.”<sup>15</sup> The Tribe argues that the record in this proceeding does not currently support any remedy other than vacating the license, and it therefore recommends principally that the

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<sup>8</sup> *Id.* at 538.

<sup>9</sup> *Id.*

<sup>10</sup> *Id.*

<sup>11</sup> Order of the Secretary (Aug. 30, 2018) (unpublished).

<sup>12</sup> *Id.* at 1.

<sup>13</sup> Oglala Sioux Tribe’s Response to the Commission’s August 30, 2018 Order (Sept. 24, 2018) (Tribe’s Views); Powertech (USA), Inc’s Response to Commission Inquiry on Legal Standards (Sept. 24, 2018) (Powertech’s Views); NRC Staff’s Response to Order Dated August 30, 2018 (Sept. 24, 2018) (Staff’s Views); Consolidated Intervenors’ Views on Agency Response to U.S. Court of Appeals (D.C. Cir) Remand (Sept. 24, 2018) (Consolidated Intervenors’ Views); Oglala Sioux Tribe’s Response to the Parties’ Views Regarding the Commission’s August 30, 2018 Order (Oct. 19, 2018) (Tribe’s Responsive Views); Powertech (USA), Inc’s Response to Pleadings on Legal Standards (Oct. 19, 2018) (Powertech’s Responsive Views); Consolidated Intervenors Response to Powertech & NRC Staff Views (Oct. 19, 2018) (Consolidated Intervenors’ Responsive Views).

<sup>14</sup> Tribe’s Views at 2-4.

<sup>15</sup> *Id.* at 2 (quoting *Allied-Signal*, 988 F.2d at 151).

Commission vacate the license now.<sup>16</sup> The Tribe also argues in the alternative that “should the Commission consider leaving the license in effect, any such decision should be preceded by briefing and an opportunity for the parties (through the ASLB or otherwise) to establish competent evidence on all [*Allied-Signal*] considerations, especially Powertech and NRC Staff’s burden to demonstrate disruptive effect.”<sup>17</sup> The Consolidated Intervenors expressly adopt the Tribe’s views and reiterate their support for 5 U.S.C. § 706 and *Allied-Signal* as supplying the appropriate legal standard.<sup>18</sup> The Staff similarly supports relying on *Allied-Signal* and also cites to *Public Employees for Environmental Responsibility v. Hopper*, 827 F.3d 1077 (D.C. Cir. 2016), another case in which the D.C. Circuit remanded without vacating the underlying agency action, though in that case the court did require the agency to supplement the relevant EIS before the project moved forward.<sup>19</sup>

Powertech presents an alternative view, arguing that the Commission should apply the stay standard set forth at 10 C.F.R. § 2.1213(d).<sup>20</sup> That standard considers: (1) irreparable injury to the stay requestor; (2) the likelihood of the stay requestor prevailing on the merits in the adjudication; (3) the harm a stay would inflict on the other participants in the adjudication; and (4) the public interest.<sup>21</sup> Powertech also references the “no harm, no foul” rationale utilized in another recent D.C. Circuit *in situ* uranium recovery licensing case — involving the Strata Ross facility — and describes that case as “provid[ing] a good substantive comparison” to this one.<sup>22</sup>

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<sup>16</sup> *Id.* at 2-4.

<sup>17</sup> *Id.* at 4.

<sup>18</sup> Consolidated Intervenors’ Views at 1-2.

<sup>19</sup> Staff’s Views at 3-4; *Hopper*, 827 F.3d at 1084. Elaborating on its recommendation, the Staff suggests that the proper analysis could “consider and weigh, among other factors, the significance of the remaining NEPA deficiency, the prospects for its timely resolution, the potential disruptive consequences to the parties (including consequences to Powertech in light of its representations both about economic harm and its inability to move forward with licensed activities until the contention is resolved), the nature of the cultural-resource protections that the license imposes on Powertech, and the public interest.” Staff’s Views at 3-4.

<sup>20</sup> Powertech’s Views at 4-8.

<sup>21</sup> *Id.* at 4; 10 C.F.R. § 2.1213(d).

<sup>22</sup> Powertech’s Views at 7-8 (discussing *Nat. Res. Def. Council v. NRC*, 879 F.3d 1202 (D.C. Cir. 2018) (*NRDC*)). Both Powertech and the Staff also argued that the Commission should await the outcome of motions for summary disposition of Contention 1A that, at the time of their filings, were still pending before the Board. They reasoned that the Board could potentially grant summary disposition in response to the motions and terminate the proceedings, thereby mooted the question of interim action on Powertech’s license. *Id.* at 8; Staff’s Views at 2-3. The Board, however, has since ruled on those motions and denied all requests for summary disposition. LBP-18-5, 88 NRC 95 (2018).

The Tribe asserts in its responsive filing that the Staff bears the burden of demonstrating that a remedy other than vacatur is warranted.<sup>23</sup> The Tribe also argues that the D.C. Circuit’s *Oglala Sioux Tribe* decision already considered and rejected the applicability of Powertech’s recommendations to the instant case.<sup>24</sup> Lastly, the Tribe supports the Staff’s reference to the D.C. Circuit’s *Hopper* decision, and it also cites an earlier D.C. Circuit decision — *Public Utilities Commission v. FERC*, 900 F.2d 269 (D.C. Cir. 1990) — in which the court upheld an agency’s issuance of a conditional approval before completing a hearing on environmental issues, based on the agency not allowing that conditional approval to take effect until completion of the environmental hearing.<sup>25</sup>

## II. DISCUSSION

Our analysis of how to proceed on remand in light of the parties’ views necessarily begins with the D.C. Circuit’s opinion in *Oglala Sioux Tribe*. In its opinion, the D.C. Circuit provided only limited direction as to how the NRC should determine proper remedies if NEPA deficiencies are found in post-license-issuance adjudications. Of particular importance here, given the legal-standard recommendations of the Tribe, the Consolidated Intervenors, and the Staff, we observe that the court expressly declined to decide whether the NRC may itself lawfully fashion remedies for NEPA violations based on an analysis of equitable factors in accordance with *Allied-Signal*.<sup>26</sup> This was the case even though the court *itself* relied expressly on *Allied-Signal* in reaching its own decision to remand the case to the NRC without vacating Powertech’s license. Consequently, although we see parallels between the question a court faces when it considers remanding without vacatur and the question we face here, *Oglala Sioux Tribe* did not resolve whether, as a general matter, it would be permissible for the NRC to model its own legal analysis in this context after *Allied-Signal*. As discussed below, we need not resolve the question here to proceed in accordance with the remand.

As to Powertech’s recommendation to apply the stay standard at 10 C.F.R. § 2.1213(d), we agree with the Tribe that *Oglala Sioux Tribe* plainly precludes

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<sup>23</sup> Tribe’s Responsive Views at 2.

<sup>24</sup> *Id.* at 3-6.

<sup>25</sup> See 900 F.2d at 282; see also *Oglala Sioux Tribe*, 896 F.3d at 538 (citing that decision).

<sup>26</sup> See 896 F.3d at 536 (stating that “the agency fails to identify any statute that authorizes it not to comply with NEPA on equitable grounds” but declining, after determining that the NRC had not yet performed an analysis akin to a D.C. Circuit remand-without-vacatur analysis, to decide “whether the absence of statutory authority is sufficient to reject the analogy to judicial remand-without-vacatur”).

us from adopting that recommendation.<sup>27</sup> The court described the scope of its ruling against the NRC as follows: “To be clear, today we hold only that, once the NRC determines there is a significant deficiency in its NEPA compliance, it may not permit a project to continue in a manner that puts at risk the values NEPA protects simply because no intervenor can show irreparable harm.”<sup>28</sup> In light of the clear import of the court’s opinion, we decline to employ a standard that, like 10 C.F.R. § 2.1213(d), turns on the existence of irreparable injury.

We also agree with the Tribe that the D.C. Circuit’s “no harm, no foul” rationale in *NRDC* (involving the Strata Ross facility) cannot govern our analysis here. In that case, the D.C. Circuit declined to impose a remedy for an NRC-identified NEPA-compliance deficiency on the ground that the NRC had already corrected the deficiency itself through the adjudicatory hearing process.<sup>29</sup> Here, in contrast, the NEPA deficiency has not been corrected, and the Board has recently determined that summary disposition of the outstanding NEPA contention is not warranted.<sup>30</sup> Moreover, the D.C. Circuit in *Oglala Sioux Tribe* expressly cited its prior holding in *NRDC*, but it then held the Powertech scenario to be distinguishable.<sup>31</sup> Therefore, we decline to treat the facts before us regarding Powertech as analogous to the facts that supported the D.C. Circuit’s decision in *NRDC*.

Although providing some specific direction on what the NRC must not do, the *Oglala Sioux Tribe* opinion does not expressly set forth what the NRC *should* do, whether on remand in this case or generally for future cases. We have, however, identified certain principles in the court’s opinion that we believe should guide our path forward. First, the court identified Powertech’s near-term inability to move ahead with the project due to the absence of another required permit as the key factor supporting the court’s decision to leave Powertech’s license in place “for now.”<sup>32</sup> The court’s reasoning there squared with the court’s earlier description of the “problem” posed by the NRC action under review.<sup>33</sup>

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<sup>27</sup> See *id.* at 538; 10 C.F.R. § 2.1213(d)(1) (requiring the presiding officer to consider “[w]hether the [stay] requestor will be irreparably injured unless a stay is granted”).

<sup>28</sup> *Oglala Sioux Tribe*, 896 F.3d at 538.

<sup>29</sup> 879 F.3d at 1211-12.

<sup>30</sup> LBP-18-5, 88 NRC at 133-34.

<sup>31</sup> 896 F.3d at 534 n.10 (citing *NRDC*, 879 F.3d at 1211-12) (“This circuit has also sometimes regarded deviations from NEPA as harmless when an agency subsequently completed a comprehensive environmental review before the matter reached our court. . . . In this case, however, the agency has not yet completed a valid review.”).

<sup>32</sup> *Id.* at 538 (emphasis omitted).

<sup>33</sup> See *id.* at 533 (“[T]he nature of the agency action in this case puts the problem in high relief. . . . The Tribe is concerned that mining, as well as the construction and other land disturbances that precede mining, will damage those resources. The purpose of an EIS is, in part, to determine

(Continued)

The court also described its holding as a restriction on the NRC “permit[ting] a project to continue in a manner that puts at risk the values NEPA protects,” and it clarified immediately thereafter that the court was not holding that the NRC’s identification of a NEPA deficiency during a post-license-issuance hearing process necessarily requires that the NRC vacate the license.<sup>34</sup> Specifically, the court declined to hold that the NRC could never, after finding a NEPA deficiency in a post-license-issuance adjudication, permissibly leave a license in place based on a harmless error finding or based on “protective conditions the Commission might impose . . . during an administrative remand intended to cure a NEPA deficiency.”<sup>35</sup> Thus, of particular concern to the court in this case was the potential that the license might actually be used to the detriment of resources before the NRC has remedied the Board-identified NEPA deficiency.

Second, the court’s choice of remedy suggests to us that vacating Powertech’s license will continue to remain inappropriate unless there is some material change in the circumstances the court considered under its *Allied-Signal* analysis. While the court declined to specify whether the NRC may consider equitable factors in the first instance when determining a remedy for a NEPA deficiency, we view our task here as implementing the court’s remedy — which was expressly based on equitable considerations — rather than performing our own equitable analysis *de novo*.

Lastly, the court determined that the NRC “placing the burden on the Tribe to show harm” in order to obtain vacatur of the license was “especially inappropriate” here, “because the inadequate EIS may well make doing so impossible.”<sup>36</sup> Accordingly, whatever approach we adopt on remand must not require, as a prerequisite to NRC action regarding Powertech’s license, that the Tribe identify specific risks to cultural resources before the NRC has met its own legal burden under NEPA to identify such risks.

Applying the principles discussed above in light of the parties’ filings, we find the proper course to be to preserve the court’s choice of remedy by continuing to leave the license in place for now, while imposing a protective measure to prevent harm to the Tribe’s cultural resources while the identified NEPA deficiency is remedied. Based on the parties’ statements of views, the key facts supporting the court’s choice of remedy do not appear to have changed substantially since the court decided *Oglala Sioux Tribe*, which counsels, in our view, for continuing the court’s remedy for the time being. Powertech continues

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whether the land contains such resources and where they are located, so that damage to them can be avoided or mitigated. If the project is permitted to go forward without the necessary land survey, such damage may well be done.” (citation omitted).

<sup>34</sup> *Id.* at 538.

<sup>35</sup> *Id.*

<sup>36</sup> *Id.* at 534-35.



to represent that action taken against its license would cause Powertech financial harm and that it cannot, in any event, make use of its NRC license yet, given the absence of necessary permits from the U.S. Environmental Protection Agency (EPA) and the State of South Dakota.<sup>37</sup> According to Powertech, South Dakota “awaits action by both NRC and EPA to continue its large-scale mine permit and water rights administrative proceedings, which were stayed pending these two outcomes.”<sup>38</sup> The Tribe disputes Powertech’s assertions regarding the potential financial consequences of the NRC altering the status of the license.<sup>39</sup> But the Tribe does not take specific issue with what the court viewed — and we view — as the more important point: that leaving the license in place for now poses no harm to the Tribe because Powertech is not yet in a position to use its NRC license.<sup>40</sup> Until Powertech can lawfully use its NRC license, the risk of harm occurring to any Tribal cultural resources that is traceable to the identified NEPA deficiency will remain hypothetical. And it may never mature into a non-hypothetical risk, if Powertech is correct that South Dakota’s permitting process is stayed pending the outcome of the NRC adjudicatory proceeding. Continuing to leave Powertech’s license in place for now thus appears to us to be the approach most consistent with the court’s opinion.

We must also account for the possibility that these circumstances could change. The court’s determination that Powertech’s project cannot currently move forward because South Dakota is waiting for the NRC’s NEPA proceedings to conclude was based on representations made by Powertech’s counsel. We consider it fair and appropriate to hold Powertech to these representations. In addition, the burden naturally should rest with Powertech to notify the NRC and the parties if there are material new developments. And to safeguard the NRC’s interest in faithfully and fully complying with NEPA and the court’s ruling, this notice must occur before Powertech engages in any activity at the Dewey-Burdock site under its NRC license that could potentially put Tribal resources at risk.<sup>41</sup>

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<sup>37</sup> Powertech’s Views at 7-8; Powertech’s Responsive Views at 2-5; *see also* Staff’s Views at 2 (“The license is not currently (and to date, has never been) in use.”). Powertech also added, in its Responsive Views, that a necessary Bureau of Land Management approval for the project is still outstanding. Powertech’s Responsive Views at 3-4.

<sup>38</sup> Powertech’s Views at 7.

<sup>39</sup> Tribe’s Views at 2-4.

<sup>40</sup> *See generally* Tribe’s Views; Tribe’s Responsive Views. Relatedly, we note that Powertech’s NRC license itself prohibits operations at any production area at the site until Powertech has “obtain[ed] all necessary permits, licenses, and approvals from the appropriate regulatory authorities.” Ex. NRC-12 at 12 (Standard Condition 12.1).

<sup>41</sup> We recognize that not all activities Powertech might undertake at the site would necessarily require an NRC license. *See* LBP Order (Removing Temporary Stay and Denying Motions for

*(Continued)*

Accordingly, we order Powertech to notify the Board and the parties no later than 60 days prior to performing any activities at the Dewey-Burdock site that would require an NRC license, unless this adjudicatory proceeding is no longer pending at the time. Upon receipt of such a notice, the Board is directed to proceed expeditiously in soliciting the parties' views and considering, in light of the proceeding's status and consistent with this order, whether the Board must take action regarding Powertech's NRC license to preserve the environmental status quo.<sup>42</sup>

Finally, we observe that our decision in this matter is tied to the particular facts before us. Certainly, we consider it a key element of our task on remand to monitor the facts the court identified, under *Allied-Signal*, as supporting its decision not to vacate Powertech's license so that we can take prompt action consistent with the court's opinion if those facts materially change. Yet, we do not address today the question, left expressly open by the court, of whether, or under what circumstances, an NRC presiding officer should perform an *Allied-Signal*-style equitable analysis in the first instance upon finding a significant NEPA deficiency.<sup>43</sup> We also are not questioning today — and the court expressly did not opine upon — the propriety of relying on a harmless error standard in different circumstances.<sup>44</sup> This order also does not revisit the remedial approach employed in the Strata Ross proceeding, under a different factual scenario, that the D.C. Circuit upheld in *NRDC*. In sum, we do not attempt here to set forth a comprehensive formula for addressing any future circumstances in which significant NEPA deficiencies are found through our hearing process after staff

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Stay of Materials License Number SUA-1600) (May 20, 2014), at 7 (unpublished) (ML14140A470) (Board's Stay Denial Order) ("At oral argument, counsel for Powertech stated, without contradiction, that the ground disturbing work contemplated for the next few months could be accomplished without the NRC license."). Powertech is, however, still bound by its NRC license so long as that license remains in effect, including the license's requirement to comply with the Programmatic Agreement entered into under the NHPA. *See* Ex. NRC-12 at 5-6 (License Condition 9.8 addressing "Cultural Resources"); *see also* CLI-16-20, 84 NRC at 260 (referencing the Programmatic Agreement's protections for cultural resources discovered during project activities).

<sup>42</sup> Because the outstanding NEPA contention may be resolved before Powertech obtains all other necessary permits to proceed with the project — meaning that the eventuality requiring Powertech to provide notice may never come to pass — we decline to order the addition of an express new condition to Powertech's license. Nonetheless, Powertech's license already states that it is "subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect," Ex. NRC-12 at 1 (emphasis added), which would include the order we issue today.

<sup>43</sup> *See Oglala Sioux Tribe*, 896 F.3d at 536.

<sup>44</sup> *See id.* at 538 ("[W]e do not decide that there is no version of a harmless error rule that the Commission may apply."); CLI-16-20, 84 NRC at 235-37 (finding harmless error in connection with Tribe's contention challenging lack of site-specific scoping, where Tribe received comparable notice and participation opportunities via other means).

issuance of a license under 10 C.F.R. § 2.1202(a).<sup>45</sup> Nonetheless, we expect that the principles discussed in this order, and in the court's *Oglala Sioux Tribe* opinion, will help to frame and inform consideration of any future questions regarding remedy that may arise in those limited categories of NRC hearings for which post-license-issuance hearings are permissible under § 2.1202(a).

### III. CONCLUSION

For the foregoing reasons, we leave Powertech's license in place for now, but we order Powertech to notify the Board and the parties no less than 60 days prior to commencing any activities at the Dewey-Burdock site under its NRC license, if the adjudicatory proceeding regarding Contention 1A remains pending at the time, so that the Board may consider expeditiously whether action is necessary to ensure full compliance with NEPA.

IT IS SO ORDERED.

For the Commission

Annette L. Vietti-Cook  
Secretary of the Commission

Dated at Rockville, Maryland  
this 31st day of January 2019.

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<sup>45</sup> Further, while *Oglala Sioux Tribe* and this order plainly restrict the use of the 10 C.F.R. § 2.1213(a) stay standard where a significant NEPA deficiency has already been found through our hearing process, neither we nor the court in *Oglala Sioux Tribe* has deemed that standard, or its associated burdens, inapplicable to the scenario for which it is traditionally used — i.e., for requests to stay a staff action taken under 10 C.F.R. § 2.1202(a) that are filed *before* the presiding officer has decided the pertinent contention(s) on the merits. *See, e.g.*, Board's Stay Denial Order (denying Tribe's request to stay Powertech's license after license issuance but before the Board decided Contentions 1A and 1B on the merits).

### Commissioner Baran, Dissenting

As the Commission has observed many times, NEPA is a procedural statute.<sup>1</sup> It establishes a process to ensure that, when an agency makes a decision that could affect the environment, that decision is informed by a thorough evaluation of the expected environmental impacts. A basic premise of the statute is that informed decisionmaking will help protect the environment by forcing agencies to consider the consequences of potential actions as well as alternatives that could be less environmentally damaging. That commonsense approach simply does not work if the agency decision precedes the environmental review. Thus, a core requirement of NEPA is that an agency decisionmaker must consider an adequate environmental review *before* making a decision on a licensing action.<sup>2</sup> When the Commission allows a Board to correct an inadequate NEPA document through augmentation *after* the agency has already made a licensing decision, then this fundamental purpose of NEPA is frustrated.

In two recent cases, the D.C. Circuit made it clear that it does not approve of the Commission's current practice of allowing for the augmentation of an inadequate NEPA environmental review after the decision to issue a license has already been made. In *NRDC v. NRC*, the Court examined this practice. While the Court of Appeals found that there was no concrete harm in that particular case, the Court stated:

We do not mean to imply the procedure the Board followed was ideal or even desirable. Certainly it would be preferable for the FEIS to contain all relevant information and the record of decision to be complete and adequate before the license is issued.<sup>3</sup>

The second case is the one before us now on remand. In *Oglala Sioux Tribe*, the Court of Appeals went even further than it had in *NRDC v. NRC* in broadly criticizing the agency's practice. The Court explained:

The National Environmental Policy Act, however, obligates every federal agency to prepare an adequate environmental impact statement *before* taking any major action, which includes issuing a uranium mining license. The statute does not permit an agency to act first and comply later. Nor does it permit an agency to condition performance of its obligation on a showing of irreparable harm.<sup>4</sup>

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<sup>1</sup> See e.g., *Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 and 3), CLI-11-14, 74 NRC 801, 813 (2011).

<sup>2</sup> *Oglala Sioux Tribe v. NRC*, 896 F.3d 520 (D.C. Cir. 2018).

<sup>3</sup> *NRDC v. NRC*, 879 F.3d 1202, 1212 (D.C. Cir. 2018).

<sup>4</sup> *Oglala Sioux Tribe v. NRC*, 896 F.3d 520, 523 (D.C. Cir. 2018).

The Court added:

The agency's decision in this case and its apparent practice are contrary to NEPA. The statute's requirement that a detailed environmental impact statement be made for a "proposed" action makes clear that agencies must take the required hard look *before* taking that action.<sup>5</sup>

The Court of Appeals held that "once the NRC determines there is a significant deficiency in its NEPA compliance, it may not permit a project to continue in a manner that puts at risk the values NEPA protects simply because no intervenor can show irreparable harm."<sup>6</sup> It then remanded the case to the Commission to decide whether to leave Powertech's license in place. In order to allow the Commission time to make that decision, the Court weighed the equitable factors and opted to leave "the license in effect *for now*."<sup>7</sup>

The Commission's decision states that our task is "implementing the court's remedy . . . rather than performing our own equitable analysis *de novo*."<sup>8</sup> I disagree. Performing a *de novo* review of whether to vacate, suspend, modify, or leave in place Powertech's license is precisely our role on remand. Though the Court did not immediately vacate the Commission's prior ruling that the license should remain in effect, the Commission can and should further consider the appropriate remedy for the agency's violation of NEPA in this case. That is the very purpose of the remand.

In my view, we should not make a determination about the appropriate remedy based solely on the representations of the parties. Unlike the Court of Appeals, we are in a position to hold an evidentiary hearing, at which the parties could provide evidence of the real-world consequences of each of the potential remedies. The development of a factual record would enable the Commission to weigh the equities at stake and make a fact-based decision about whether to leave the license in place prior to the NRC Staff's completion of an adequate NEPA analysis.

Therefore, I respectfully dissent from the Commission's decision. Instead of making a decision about whether to leave Powertech's license in place without the benefit of a full factual record, I believe the Commission should find that a focused evidentiary hearing is necessary.

The Commission's decision also should address the broader question of how the agency will ensure that it is complying with NEPA in cases where the adjudicatory process occurs after the issuance of a license. The Court of Appeals

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<sup>5</sup> *Id.* at 532.

<sup>6</sup> *Id.* at 538.

<sup>7</sup> *Id.*

<sup>8</sup> Memorandum and Order at 9.

decisions are a strong signal that the Commission must act to bring the agency's doctrine and practice into compliance with NEPA. The Staff's practice has been to issue materials licenses before the completion of contested hearings on environmental matters. Our regulations governing materials licenses provide:

During the pendency of any hearing under this subpart, consistent with the NRC staff's findings in its review of the application or matter which is the subject of the hearing and as authorized by law, the NRC Staff is expected to promptly issue its approval or denial of the application . . . .<sup>9</sup>

The Staff has read this provision to require it to issue a license once it completes its safety review and issues a final NEPA environmental analysis. This interpretation of the regulation has been paired with a Commission adjudicatory doctrine that permits the NEPA environmental analysis to be augmented by adjudicatory decisions occurring *after* issuance of a materials license. By allowing the significant deficiencies of NEPA analyses to be corrected by adjudicatory proceedings *after* a license has already been issued, the Commission has put NRC on course to repeatedly and predictably violate a core requirement of NEPA.

We have a responsibility to avoid this result. There are at least two ways to address this problematic interaction between our regulation and our augmentation doctrine: we could initiate a rulemaking to change the regulation or refine the adjudicatory doctrine. This case is not the appropriate venue for a decision about whether to initiate a rulemaking, but it is the proper vehicle for revising the augmentation doctrine. We should take this opportunity to change the Commission's current practice of allowing for the augmentation and correction of a significantly inadequate NEPA environmental review after the decision to issue a license has already been made. The Commission should hold that the Board cannot correct any significant deficiencies of a NEPA environmental review through the hearing process after a licensing action has already been taken in reliance on the deficient NEPA analysis.<sup>10</sup>

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<sup>9</sup> 10 C.F.R. § 2.1202(a).

<sup>10</sup> This approach would not require completing the hearing before making a licensing decision, and it would not change Commission jurisprudence allowing for augmentation of the environmental record *before* a licensing action is taken. Rather, if a licensing decision is based on an environmental review that the Board or Commission later finds to be significantly deficient, then after-the-fact augmentation of the environmental review with the hearing record would not be available as an option to correct the deficiency.

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

**ATOMIC SAFETY AND LICENSING BOARD**

**Before Administrative Judges:**

**William J. Froehlich**, Chairman  
**Ronald M. Spritzer**  
**Dr. Anthony J. Baratta**

In the Matter of

**Docket No. 55-63784-SP**  
**(ASLBP No. 19-961-01-SP-BD01)**

**ANDRES PAEZ**  
**(Denial of Senior Reactor Operator**  
**License)**

**February 8, 2019**

**ORDER**  
**(Granting Joint Motion and Terminating Proceeding)**

On January 29, 2019, the U.S. Nuclear Regulatory Commission staff (NRC Staff) and Mr. Andres Paez filed a joint motion with this Atomic Safety and Licensing Board (Board) to terminate this appeal of the denial of a senior reactor operator (SRO) license. The joint motion indicates the matters at issue in this proceeding have been resolved.

Mr. Paez took the license examination to become an SRO at Florida Power & Light Company's St. Lucie Nuclear Plant, located near Jensen Beach, Florida. The SRO license examination consists of a written test and a simulator test.<sup>1</sup> To be granted an SRO license by the NRC, an applicant must pass both the

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<sup>1</sup> See Office of New Reactors, Office of Nuclear Reactor Regulation, NRC, "Operator Licensing Examination Standards for Power Reactors," Final Report, NUREG-1021 (Rev. 11, Feb. 2017) (ADAMS Accession No. ML17038A432) [hereinafter NUREG-1021].

requisite written examination and the operating (simulator) examination.<sup>2</sup> When Mr. Paez received the preliminary results of his SRO examination, he was informed that he had passed the written portion of the examination but did not pass the simulator test portion.<sup>3</sup> Mr. Paez then requested an informal NRC Staff review of the preliminary results of his SRO license examination. By letter dated November 20, 2018, Mr. Paez was informed that the preliminary results of his operating test were finalized.<sup>4</sup> Mr. Paez was informed of his right to demand a hearing under 10 C.F.R. § 2.103(b)(2).

On December 5, 2018, Mr. Paez filed for a hearing to challenge a performance deficiency that had been assessed against him during the simulator portion of his SRO examination.<sup>5</sup> He alleged that the NRC Staff review “reassigned a critical performance deficiency” and that the reassigned performance deficiency “was assessed without consideration of objective criteria.”<sup>6</sup> He further alleged that the NRC Staff’s review did not conform to NUREG-1021 Examiner Standard (ES) 502, which requires that “in the unlikely event a new error is identified as a direct result of the contested item review, the uncontested error and its effect, if any, on the applicant’s pass/fail result should be determined and documented.”<sup>7</sup> On December 14, 2018, the Atomic Safety and Licensing Board Panel Chief Administrative Judge established this Board to preside over the requested proceeding.<sup>8</sup>

On December 20, 2018, the NRC Staff filed a response to Mr. Paez’s hearing demand.<sup>9</sup> The NRC Staff’s response indicated that after reviewing the information in the hearing demand, the NRC Staff “determined that the operating test performance deficiency disputed by Mr. Paez [was], in fact, not a performance deficiency. With the deletion of this performance deficiency, Mr. Paez has achieved a passing grade on the operating test.”<sup>10</sup> The NRC Staff stated that it would approve Mr. Paez’s application for an SRO license and that it had informed Mr. Paez of this determination on December 20, 2018.<sup>11</sup> The NRC

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<sup>2</sup> See 10 C.F.R. § 55.33(a)(2).

<sup>3</sup> Joint Motion to Terminate Proceeding at 1 (Jan. 29, 2019) (ADAMS Accession No. ML19029-B330) [hereinafter Joint Motion].

<sup>4</sup> Andres Paez Request for Hearing at 1 (Dec. 6, 2018) (ADAMS Accession No. ML18340A058).

<sup>5</sup> *Id.*

<sup>6</sup> *Id.* at 1-2.

<sup>7</sup> *Id.* at 1, 4 (quoting NUREG-1021, ES-502, at p. 3 of 4).

<sup>8</sup> Establishment of Atomic Safety and Licensing Board: Andres Paez, 83 Fed. Reg. 65,369 (Dec. 20, 2018).

<sup>9</sup> NRC Staff’s Response to Mr. Paez’s Hearing Demand (Dec. 20, 2018) (ADAMS Accession No. ML18354B154).

<sup>10</sup> *Id.*

<sup>11</sup> *Id.*



Staff's response further indicated that the NRC Staff would notify the Board when the license was issued and requested that, upon notification, the Board terminate this proceeding.<sup>12</sup>

On January 29, 2019, the NRC Staff and Andres Paez filed a joint motion requesting that this Board terminate the proceeding because the matters at issue in the proceeding have been resolved.<sup>13</sup> The joint motion stated that in response to the hearing demand, "the Staff determined that the challenged performance deficiency was not a performance deficiency and, therefore, should be deleted. With the deletion of the performance deficiency, Mr. Paez achieved a passing grade on the operating test."<sup>14</sup> The joint motion further stated, "Pursuant to 10 C.F.R. § 55.33, since Mr. Paez also passed the requisite written examination and satisfies the health requirement, the Staff approved his application for a senior reactor operator license and issued this license effective January 2, 2019."<sup>15</sup>

Because the NRC Staff has concluded that the challenged performance deficiency is not a performance deficiency, and, with the deletion of this performance deficiency Mr. Paez achieved a passing score on the SRO examination, and because the NRC Staff has issued a SRO license to Mr. Paez, we GRANT the joint motion and TERMINATE this proceeding.

It is so ORDERED.

THE ATOMIC SAFETY AND  
LICENSING BOARD

William J. Froehlich, Chairman  
ADMINISTRATIVE JUDGE

Ronald M. Spritzer  
ADMINISTRATIVE JUDGE

Dr. Anthony J. Baratta  
ADMINISTRATIVE JUDGE

Rockville, Maryland  
February 8, 2019

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<sup>12</sup> *Id.*

<sup>13</sup> Joint Motion at 1.

<sup>14</sup> *Id.* at 2.

<sup>15</sup> *Id.*

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

**ATOMIC SAFETY AND LICENSING BOARD**

**Before Administrative Judges:**

**G. Paul Bollwerk, III, Chairman**  
**Dr. Richard E. Wardwell**  
**Dr. Thomas J. Hirons**

**In the Matter of**

**Docket No. 40-8943-MLA-2**  
**(ASLBP No. 13-926-01-MLA-BD01)**

**CROW BUTTE RESOURCES, INC.**  
**(Marsland Expansion Area)**

**February 28, 2019**

In this proceeding concerning the license amendment application of Crow Butte Resources, Inc. (CBR), seeking authorization to operate a satellite in situ uranium recovery (ISR) facility within the Marsland Expansion Area, in Dawes County, Nebraska, in this initial decision the Licensing Board rules in favor of CBR and the Nuclear Regulatory Commission (NRC) Staff on the merits of intervenor Oglala Sioux Tribe's (OST) Contention 2 raising four concerns about the adequacy of various aspects of the CBR application and the Staff's environmental assessment (EA) with respect to hydrogeological matters.

**RULES OF PRACTICE: EXPERT WITNESS(ES) (OPINIONS  
REGARDING LEGAL CONCLUSIONS)**

Expert testimony regarding legal conclusions, as opposed to factual matters, generally would not be appropriate. *See, e.g., United States v. McIver*, 470 F.3d 550, 561-62 (4th Cir. 2006) (“[O]pinion testimony that states a legal standard or draws a legal conclusion by applying law to the facts is generally inadmissible.”); *cf. Nieves-Villanueva v. Soto-Rivera*, 133 F.3d 92, 99-100 (1st Cir. 1997)

(noting that the “well-recognized exception” to excluding expert testimony on purely legal issues is for questions of foreign law).

**ATOMIC ENERGY ACT: CONTENTIONS (MIGRATION TENET AS APPLICABLE TO SAFETY-RELATED CONTENTIONS)**

The Atomic Energy Act of 1954 (AEA) authorizes the NRC to issue licenses for the possession and use of source and byproduct material, *see* AEA §§ 62, 81, 42 U.S.C. §§ 2092, 2111, such as is involved in the ISR process and which the NRC regulates under 10 C.F.R. Part 40. The AEA further requires the NRC to ensure that facilities associated with the licensed possession and use of such materials meet regulatory requirements developed to protect public health and safety from radiological hazards as set forth in 10 C.F.R. Part 20.

**SOURCE MATERIAL LICENSE: APPLICABLE RULES (IN SITU RECOVERY FACILITIES)**

ISR license amendment applications require a safety review to determine if a license applicant has met all relevant criteria in 10 C.F.R. Part 40. These safety requirements include certain criteria in Appendix A to Part 40 that provide specific standards for uranium mill operation and waste material disposal, although not all criteria in Appendix A are applicable because an ISR facility is not a conventional uranium mill.

**STANDARD REVIEW PLAN(S): APPLICATION (ADJUDICATORY PROCEEDINGS)**

NUREG-1569 is the standard review plan guidance document for the Staff’s safety review of an application for an ISR uranium recovery facility. The provisions of this and other standard review plans are “guidance” to an applicant about approaches to demonstrating compliance with the agency’s regulatory requirements that the Staff generally deems acceptable, with the caveat that an applicant may take a different approach to compliance so long as the application information provided allows the Staff to make the requisite finding of environmental acceptability and regulatory compliance. While recognizing the “guidance” nature of such review plans, the Commission has also indicated that, having been developed to assist an applicant in complying with applicable regulations, such plans are entitled to “special weight.” *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-01-22, 54 NRC 255, 264 (2001). By the same token, and in the absence of an applicant showing that it is attempting to reach regulatory compliance by some other means, the degree to

which an application reflects adherence to such guidance is a legitimate subject of inquiry, both at the contention admissibility and merits stages of a licensing adjudication.

#### **NEPA: ENVIRONMENTAL ANALYSIS (HARD LOOK); RULE OF REASON**

The National Environmental Policy Act (NEPA) requires federal agencies to take a “hard look” at the environmental impacts of a proposed action. *See Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 87-88 (1998). This “hard look” is intended to “foster both informed decision-making and informed public participation” so as to ensure that the agency does not act upon “incomplete information, only to regret its decision after it is too late to correct.” *Id.* at 88 (quoting *Marsh v. Or. Nat. Res. Council*, 490 U.S. 360, 371 (1989)). This “hard look” is, however, subject to a “rule of reason” in that consideration of environmental impacts need not address “all theoretical possibilities,” but rather only those that have some “reasonable possibility” of occurring. *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-156, 6 AEC 831, 836 (1973).

#### **NEPA: SCOPE OF ENVIRONMENTAL ANALYSIS**

With regard to such reasonably foreseeable impacts, NEPA “does not call for certainty or precision, but an *estimate* of anticipated (not unduly speculative) impacts.” *Louisiana Energy Services, L.P.* (National Enrichment Facility), CLI-05-20, 62 NRC 523, 536 (2005). As a consequence, agencies are given broad discretion “to keep their inquiries within appropriate and manageable boundaries,” *Claiborne*, CLI-98-3, 47 NRC at 103, because an EA “is not intended to be ‘a research document,’” *Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-22, 72 NRC 202, 208 (2010) (quoting *Town of Winthrop v. FAA*, 535 F.3d 1, 13 (1st Cir. 2008)).

#### **NEPA: ADJUDICATORY RECORD (LICENSING BOARD FINDINGS SUPPLEMENT ENVIRONMENTAL ASSESSMENT)**

“[I]n the context of an NRC adjudicatory proceeding, even if an [EA] prepared by the Staff is found to be inadequate in certain respects, the Board’s findings, as well as the adjudicatory record, ‘become, in effect, part of the [final EA].’ Thus, the Board’s ultimate NEPA judgments can be made on the basis of the entire adjudicatory record in addition to the Staff’s [final EA].” *Southern*

*Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), LBP-09-7, 69 NRC 613, 632 (2009) (quoting *Hydro Resources, Inc.* (P.O. Box 15910, Rio Rancho, NM 87174), CLI-01-4, 53 NRC 31, 53 (2001), and citing *Louisiana Energy Services, L.P.* (National Enrichment Facility), LBP-05-13, 61 NRC 385, 404 (2005), *aff'd*, CLI-06-22, 64 NRC 37 (2006), *petition for review denied sub nom. Nuclear Info. & Res. Serv. v. NRC*, 509 F.3d 562 (D.C. Cir. 2007)), *petition for review denied*, CLI-10-5, 71 NRC 90 (2010); *see Nat. Res. Def. Council v. NRC*, 879 F.3d 1202, 1209-13 (D.C. Cir. 2018).

### **NEPA: ENVIRONMENTAL IMPACT APPRAISAL (IMPACT CATEGORIZATION/QUANTIFICATION)**

In formulating its draft and final conclusions regarding the environmental impacts of a proposed licensing action, the Staff uses as guidance a standard scheme to categorize or quantify the impacts. This standard regime was created using the approach outlined in Council on Environmental Quality regulations indicating that agencies should consider both the context and intensity of impacts. *See* Office of Nuclear Material Safety and Safeguards (NMSS), NRC, Environmental Review Guidance for Licensing Actions Associated with NMSS Programs, NUREG-1748, at 4-13 to -14 (Aug. 2003) (citing 40 C.F.R. § 1508.27). This benchmark employs three levels of impacts — SMALL, MODERATE, and LARGE — that are defined as follows:

- SMALL — environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.
- MODERATE — environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
- LARGE — environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

*Id.* at 4-14.

### **RULES OF PRACTICE: BURDEN OF PROOF (AEA MATTERS)**

As the proponent of the agency action at issue, an applicant generally has the burden of proof in a licensing proceeding. *See* 10 C.F.R. § 2.325. This is clearly the case relative to AEA-related safety issues in that, while the Staff conducts its own independent safety review, parties may not litigate the adequacy of the Staff's safety review. *See AmerGen Energy Co., LLC* (Oyster Creek Nuclear Generating Station), CLI-08-23, 68 NRC 461, 476-77 (2008). Thus, the

primary responsibility to address and comply with the agency's safety-related requirements lies with the applicant that, in turn, has the burden of proof for a safety-related contention challenging the sufficiency of the application. *See id.* at 477.

#### **RULES OF PRACTICE: BURDEN OF PROOF (NEPA MATTERS)**

In contrast, the statutory obligation for complying with NEPA rests with the NRC Staff. *See, e.g., Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), CLI-83-19, 17 NRC 1041, 1049 (1983). Consequently, when a NEPA-based contention is involved, the burden of proof is on the Staff. *See Progress Energy Florida, Inc.* (Levy County Nuclear Power Plant, Units 1 and 2), CLI-10-2, 71 NRC 27, 34 (2010); *see also Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), CLI-07-17, 65 NRC 392, 395 (2007) (“[W]hereas NRC hearings on safety issues concern the adequacy of the license application, not the NRC Staff’s work, NRC hearings on NEPA issues focus entirely on the adequacy of the NRC Staff’s work.”). At the same time, “because the Staff, as a practical matter, relies heavily upon the Applicant’s ER in preparing the [EA], should the Applicant become a proponent of a particular challenged position set forth in the [EA], the Applicant, as such a proponent, also has the burden on that matter.” *Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), LBP-96-25, 44 NRC 331, 339 (1996) (citing *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-471, 7 NRC 477, 489 n.8 (1978)), *rev’d on other grounds*, CLI-97-15, 46 NRC 294 (1997).

#### **RULES OF PRACTICE: BURDEN OF PROOF**

And relative to factual matters arising in connection with either a safety or environmental issue, to carry that burden, the Staff and/or the applicant must establish that its position is supported by a preponderance of the evidence. *See Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-763, 19 NRC 571, 577 & n.22 (citing cases), *petition for review declined*, CLI-84-14, 20 NRC 285 (1984).

#### **TECHNICAL ISSUES DISCUSSED**

The following technical issues are discussed: Affected Surface and Subsurface Environment Description (Groundwater Restoration Standards, Regional Hydrology and Groundwater Flow, Structural Geology Characterization, Wastewater Disposal); Aquifer Containment (Aquifer Pumping Test Data Interpretation, Contaminant Pathways, Heterogeneity and Anisotropy from Fracturing/

Faulting); Site Hydrogeology Description (Aquifer Thickness, Data Selectivity, Homogeneity and Isotropy Assumptions, Monitoring Well Screen Intervals, Off-Site Influences, Theis and Cooper-Jacob Methodologies); Site Hydrologic Conceptual Model.

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## ACRONYMS AND ABBREVIATIONS

ACL	Alternate Concentration Limit
AEA	Atomic Energy Act
ALARA	As Low as Reasonably Achievable
amsl	Above Mean Sea Level
AOR	Area of Review
ASTM	American Society for Testing and Materials
BC/CPF	Basal Chadron/Chamberlain Pass Formation
bgs	Below Ground Surface
BMPs	Best Management Practices
BPT	Best Practicable Technology
BS	Bachelor of Science
CBR	Crow Butte Resources, Inc.
C.F.R.	Code of Federal Regulations
cfs	cubic feet per second
cm/sec	centimeters per second
DDW	Deep Disposal Well
EA	Environmental Assessment
EHD	Electronic Hearing Docket
EPA	Environmental Protection Agency
ER	Environmental Report
FONSI	Finding of No Significant Impact
FSDWA	Federal Safe Drinking Water Act
ft	feet
ft/d	feet per day
ft/ft	feet per foot
ft <sup>2</sup> /d	square feet per day
ft <sup>3</sup> /d	cubic feet per day
gpm	gallons per minute
gal./ft <sup>2</sup>	gallons per square foot
ha	hectare
HCM	Hydrologic Conceptual Model
ISR	In Situ Uranium Recovery

LCU	Lower Confining Unit
MBA	Master of Business Administration
MCL	Maximum Concentration Limit
MEA	Marsland Expansion Area
mg/L	milligram per liter
MIT	Mechanical Integrity Test
MS	Master of Science
MU	Mine Unit
NDEQ	Nebraska Department of Environmental Quality
NDNR	Nebraska Department of Natural Resources
NEPA	National Environmental Policy Act
NMSS	Office of Nuclear Material Safety and Safeguards
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission
NTEA	North Trend Expansion Area
OST	Oglala Sioux Tribe
PDF	Portable Document Format
PG	Professional Geologist
Ph.D.	Doctoral Degree (Doctor of Philosophy)
ROI	Radius of Influence
SER	Safety Evaluation Report
SHEQMS	Safety, Health, and Environment Quality Management System
SPCC	Spill Prevention, Control, and Countermeasures
SWPPP	Storm Water Pollution Prevention Plan
TCEA	Three Crow Expansion Area
TDS	Total Dissolved Solids
Th	Thorium
Tr.	Transcript
TR/Tech. Rep.	Technical Report
U	Uranium
U <sub>3</sub> O <sub>8</sub>	Triuranium Octoxide
UCU	Upper Confining Unit

UIC	Underground Injection Control
UMTRCA	Uranium Mill Tailings Radiation Control Act
USBR	United States Bureau of Reclamation
USDW	Underground Source of Drinking Water
USGS	United States Geological Survey
XRD	X-Ray Diffraction

**INITIAL DECISION**  
**(Ruling on Intervenor Oglala Sioux Tribe's Contention 2)**

**I. INTRODUCTION**

On May 16, 2012, Crow Butte Resources, Inc. (CBR/Applicant/Crow Butte), filed an application with the Nuclear Regulatory Commission (NRC) to amend its current in situ uranium recovery (ISR) license for the existing Crow Butte ISR facility to permit CBR to construct and operate a satellite ISR facility in the Marsland Expansion Area (MEA), which is located in Dawes County, Nebraska.<sup>1</sup> This initial decision presents the Licensing Board's findings and conclusions relative to the sole remaining admitted contention in this proceeding, which was the subject of a fall 2018 evidentiary hearing.

For the reasons set forth below, upon consideration of intervenor Oglala Sioux Tribe's (OST/Intervenor/Tribe) Contention 2 challenge to the NRC Staff's environmental assessment (EA) and CBR's application, including its Technical Report (TR/Tech. Rep.), the Board finds that the Staff and CBR have carried their respective burdens of proof to demonstrate that the EA and the MEA application satisfy the National Environmental Policy Act (NEPA), the Atomic Energy Act (AEA), and the agency's implementing regulations. The Board thus concludes that Intervenor's contention, along with the four associated "concerns" that provided a more detailed statement of OST's claims, cannot be sustained and we therefore enter a ruling on the merits regarding OST Contention 2 in favor of the Staff and CBR.

But before beginning our discussion of the merits of OST Contention 2, we provide a brief explanation regarding the organization of this somewhat lengthy initial decision, which is arranged into ten sections starting with this introduction. Sections II and III explain the procedural background and applicable legal standards for both the environmental and safety reviews associated with the MEA application. Section IV summarizes undisputed background information relating to Crow Butte's proposed ISR operations for the MEA, the local geologic setting, and the regional hydrogeologic conditions surrounding the MEA, followed by section V, which presents an analysis of the three overarching geologic and hydrogeologic disputes framed by OST. That, in turn, is followed by sections VI to IX, which address the four individual concerns associated with Contention 2, which are described in more detail in section I.A. Finally, the

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<sup>1</sup> See LBP-13-6, 77 NRC 253, 265-66 (2013), *aff'd*, CLI-14-2, 79 NRC 11 (2014). Throughout this initial decision, when referring to the currently licensed ISR area and the Central Processing Facility, both located just southeast of Crawford, Nebraska, we will use the term "existing CBR ISR facility."

decision concludes with a statement of the Board's legal conclusions in section X.

The discussion regarding each of the overarching issues and the particular OST concerns is organized to reflect the Intervenor's position, specifically addressing the allegations raised in its written initial and rebuttal testimony, along with the written initial and rebuttal testimony providing the CBR and Staff positions and responses and the additional pertinent information obtained by the Board in questioning the parties' witnesses during the evidentiary hearing. And notwithstanding the somewhat overlapping nature of OST's concerns and the Tribe's associated evidentiary presentations, the Board has chosen to treat separately the overarching geologic and hydrogeologic issues and each of the individual concerns in an effort to ensure that each of the Intervenor's claims and underlying evidentiary bases have been fully aired. As a consequence, there is a corresponding overlap in the discussion in the different sections, particularly with respect to the last two OST concerns in sections VIII and IX.<sup>2</sup>

#### **A. Contention 2 Description**

In its final form, Contention 2, a hybrid safety and environmental contention proffered by OST that raises issues regarding the adequacy of the application's "hydrogeologic characterization of the MEA site and its environs,"<sup>3</sup> provides as follows:

OST Contention 2: Failure to Include Adequate Hydrogeological Information to Demonstrate Ability to Contain Fluid Migration

The application and final environmental assessment fail to provide sufficient information regarding the geological setting of the area to meet the requirements of 10 C.F.R. part 40, Appendix A, Criteria 4(e) and 5G(2); the National Environmental Policy Act; and NUREG-1569 section 2.6. The application and final environmental assessment similarly fail to provide sufficient information to establish potential effects of the project on the adjacent surface and ground-water resources, as required by NUREG-1569 section 2.7, and the National Environmental Policy Act.<sup>4</sup>

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<sup>2</sup>This reiteration has twin advantages. Besides providing a comprehensive, standalone ruling on each of these Intervenor claims, the reader, casual or otherwise, can approach each section with the assurance that it will afford a comprehensive discussion regarding the matter in controversy without needing to delve extensively into the discussion in another section to understand the basis for the parties' positions or the Board's ruling on the particulars of the OST hydrogeological challenge at issue.

<sup>3</sup>LBP-13-6, 77 NRC at 294-95.

<sup>4</sup>Notice of Hearing (Notice of Evidentiary Hearing and Opportunity to Provide Oral, Written, and Audio-Recorded Limited Appearance Statements); In the Matter of Crow Butte Res., Inc. (Marsland Expansion Area), 83 Fed. Reg. 37,828, 37,828 (Aug. 2, 2018).

More specifically, within the scope of Contention 2 are four OST-identified “concerns” regarding

(1) the adequacy of the descriptions of the affected environment for establishing the potential effects of the proposed MEA operation on the adjacent surface water and groundwater resources; (2) exclusively as a safety concern, the absence in the applicant’s technical report, in accord with NUREG-1569 section 2.7, of a description of the effective porosity, hydraulic conductivity, and hydraulic gradient of site hydrogeology, along with other information relative to the control and prevention of excursions such as transmissivity and storativity; (3) the failure to develop, in accord with NUREG-1569 section 2.7, an acceptable conceptual model of site hydrology that is adequately supported by site characterization data so as to demonstrate with scientific confidence that the area hydrogeology, including horizontal and vertical hydraulic conductivity, will result in the confinement of extraction fluids and expected operational and restoration performance; and (4) whether the final EA contains unsubstantiated assumptions as to the isolation of the aquifers in the ore-bearing zones.<sup>5</sup>

For each of these four concerns, which for the purpose of this decision we will reference as Concerns 1 through 4, we have considered all the written initial and rebuttal testimony and the associated documentary evidence,<sup>6</sup> the evidence presented at the hearing by the parties’ witnesses in response to Board questions, and the parties’ proposed initial and rebuttal findings of facts and conclusions of law. Insofar as the parties’ evidence directly relates to and impacts our decision,

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<sup>5</sup> LBP-18-3, 88 NRC 13, 53 (2018).

<sup>6</sup> As entered into the record and incorporated into the electronic hearing docket (EHD) associated with the agency’s ADAMS document management system, the official exhibit number for each evidentiary item in this proceeding reflects a three-letter party or Licensing Board identifier (i.e., CBR, NRC, OST, BRD) followed in some instances by another alpha character (i.e., -R) to indicate that the exhibit was revised after its original submission as a prefiled exhibit (e.g., admitted exhibit CBR001-R would be a revised version of prefiled exhibit CBR001); followed by a two-character numeric identifier (i.e., 00) that identifies the exhibit as being used in a contested case (as opposed to a mandatory/uncontested proceeding (i.e., MA)); followed by the designation BD01, which indicates that this Licensing Board (i.e., BD01) was involved in its identification and/or admission. Accordingly, the official designation for prefiled exhibit CBR001-R, as ultimately admitted, is CBR001-R-00-BD01. For ease of reading, however, we will refer initially to all exhibits identified for the record in this proceeding without the final six characters that make up their official designation.

Additionally, we note that while each of the identified exhibits in this proceeding includes a cover sheet that provides the prefiled exhibit number for the document, for purposes of citing an exhibit we will disregard the cover sheet and use the pagination marked on the exhibit or, in instances when there is no marked pagination for the exhibit, the pagination for the portable document format (PDF) file version of the exhibit that is found in the EHD, designated as such (e.g., Ex. XXXYYY at PDF 1).



it is summarized for each concern. If, however, we deemed the evidence to be of little or no relevance to our decision, we did not summarize or otherwise discuss it. And if there was an evidentiary dispute, we made any necessary factual findings based on the preponderance of the evidence standard that governs this proceeding.<sup>7</sup>

## B. Parties' Witnesses

A total of eleven witnesses testified about the four concerns raised in connection with OST Contention 2. There was only one challenge to the qualifications of a witness. In a motion in limine, the Staff challenged, among other things, Dr. Hannan LaGarry's qualifications to proffer rebuttal testimony regarding the requirements of NEPA, arguing he had not demonstrated any expertise in that area.<sup>8</sup> Although the Board did not strike Dr. LaGarry's rebuttal testimony,<sup>9</sup> the Board nonetheless questioned Dr. LaGarry about his qualifications to give such testimony at the hearing,<sup>10</sup> and concluded that he possesses sufficient familiarity with NEPA to proffer the general opinions about NEPA-associated factual matters that he expressed in his written testimony and during the hearing.<sup>11</sup>

Three witnesses testified for Intervenor OST: Dr. Hannan LaGarry, Michael Wireman, and Dr. David Kreamer. Dr. LaGarry received his doctoral degree (Ph.D.) in Geology from the University of Nebraska-Lincoln and is a conservation biology instructor/researcher and co-chair in the Department of Math, Science, and Technology at Oglala Lakota College in South Dakota.<sup>12</sup> Mr. Wireman, who received a Master of Science (MS) degree from Western Michigan University, is a hydrogeologist with over 30 years of experience, including serving as a National Ground-Water Expert in the United States Environmental Protection Agency's (EPA) Region VIII.<sup>13</sup> Dr. Kreamer received his Ph.D. in

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<sup>7</sup> See *infra* section III.C.

<sup>8</sup> See NRC Staff Motion in Limine to Exclude Portions of [OST's] Testimony and Exhibits (Sept. 12, 2018) [hereinafter Staff Motion in Limine].

<sup>9</sup> See Licensing Board Memorandum and Order (Granting in Part and Denying in Part Staff Motion in Limine) (Sept. 24, 2018) at 18 (unpublished) [hereinafter Board In Limine Ruling].

<sup>10</sup> See Tr. at 577-84.

<sup>11</sup> Of course, expert testimony regarding legal conclusions, as opposed to factual matters, generally would not be appropriate. See, e.g., *United States v. McIver*, 470 F.3d 550, 561-62 (4th Cir. 2006) (“[O]pinion testimony that states a legal standard or draws a legal conclusion by applying law to the facts is generally inadmissible.”); cf. *Nieves-Villanueva v. Soto-Rivera*, 133 F.3d 92, 99-100 (1st Cir. 1997) (noting that the “well-recognized exception” to excluding expert testimony on purely legal issues is for questions of foreign law).

<sup>12</sup> See Ex. OST013, at 1 (Hannan E. LaGarry, Curriculum Vitae).

<sup>13</sup> See Ex. OST002, at 1 (Michael Wireman, Curriculum Vitae).

hydrology from the University of Arizona and is a professor of hydrology and geoscience at the University of Nevada, Las Vegas.<sup>14</sup>

Four witnesses testified for the NRC Staff: David Back, Dr. Elise Striz, Thomas Lancaster, and Jean Trefethen. Mr. Back received his MS degree in geology with a hydrogeology concentration from Oklahoma State University and is a hydrogeologist at an environmental consulting firm.<sup>15</sup> Dr. Striz received her Ph.D. in petroleum engineering from the University of Oklahoma and is a hydrogeologist in the NRC's Uranium Recovery Licensing Branch.<sup>16</sup> Mr. Lancaster, who pursued graduate studies in geophysical and hydrogeological science at Old Dominion University and has a Master of Business Administration (MBA) degree from George Mason University, is a hydrogeologist and regulatory project manager in the NRC's Uranium Recovery Licensing Branch.<sup>17</sup> Ms. Trefethen received her Bachelor of Arts degree in Biology from Carroll College and is an environmental project manager in the NRC's Environmental Review Branch.<sup>18</sup>

Four witnesses testified for Crow Butte: Robert Lewis, James Shriver, Douglas Pavlick, and Walter Nelson. Mr. Lewis, who received his MS degree in geology (hydrogeology) from the Colorado School of Mines, is a certified PG and the owner and principal hydrogeologist of an environmental consulting firm.<sup>19</sup> Mr. Shriver received his BS in geology from the University of Wyoming and is a senior geologist for Cameco Resources.<sup>20</sup> Mr. Pavlick has a BS degree in geophysical engineering from the Montana College of Mineral Science and Technology and is the general manager of United States operations for Cameco Resources.<sup>21</sup> Mr. Nelson received his BS in environmental biology from Chadron State College and is the CBR safety, health, environmental, and quality coordinator.<sup>22</sup>

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<sup>14</sup> See Ex. OST001, at 1 (David Kenneth Kreamer, Curriculum Vitae).

<sup>15</sup> See Ex. NRC002, at 1 (David Back, Hydrogeologist, Statement of Professional Qualifications).

<sup>16</sup> See Ex. NRC004, at 1 (Elise A. Striz, Ph.D., Statement of Professional Qualifications).

<sup>17</sup> See Ex. NRC003, at 1 (Thomas R. Lancaster, MBA, [Bachelor of Science (BS)], [Professional Geologist (PG)], Statement of Professional Qualifications).

<sup>18</sup> See Ex. NRC005, at 1 (Jean A. Trefethen, Statement of Professional Qualifications).

<sup>19</sup> See Ex. CBR002, at PDF 3 (Aff. of Robert Lewis (Aug. 16, 2018)).

<sup>20</sup> See Ex. CBR037, at PDF 3 (Aff. of James Shriver (Sept. 7, 2018)).

<sup>21</sup> See Ex. CBR004, at PDF 3, 4 (Aff. of Doug Pavlick (Aug. 16, 2018)).

<sup>22</sup> See Ex. CBR003, at PDF 3, 4 (Aff. of Walter Nelson (Aug. 16, 2018)).

## II. PROCEDURAL BACKGROUND

### A. Contention Admissibility, Summary Disposition, Migration, and New and Amended Contention Admissibility

On January 29, 2013, OST submitted an intervention petition seeking to challenge CBR's application, including portions of CBR's TR and its environmental report (ER).<sup>23</sup> CBR and the Staff opposed the hearing request on the grounds that OST had failed to establish its standing and had not submitted an admissible contention.<sup>24</sup> On May 10, 2013, the Licensing Board concluded that OST had standing and had submitted two admissible contentions: Contention 1, which challenged the ER's review of historical and cultural resources on the MEA site,<sup>25</sup> and Contention 2, which asserted that CBR's ER and TR had failed to include adequate hydrogeological information.<sup>26</sup> After the Staff and CBR appealed the Board's decision, the Commission affirmed the ruling as to standing and the admissibility of these two contentions.<sup>27</sup>

Subsequently, the Staff issued the cultural resources section of its draft EA in June 2014,<sup>28</sup> but OST did not submit new or amended contentions regarding that section of the draft EA. The Staff then filed a motion for summary disposition of Contention 1.<sup>29</sup> In an October 22, 2014 ruling, the Board agreed with the Staff that Contention 1 had been resolved based on the draft EA section, and dismissed Contention 1.<sup>30</sup>

The Staff issued the remainder of the draft EA on December 11, 2017, and OST again did not submit any new or amended contentions or the Board-requested migration declaration regarding Contention 2. Thereafter, the Staff challenged the migration of the environmental portions of Contention 2, arguing that the environmental concerns raised had been addressed in the draft EA.<sup>31</sup>

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<sup>23</sup> See Petition to Intervene and Request for Hearing of [OST] (Jan. 29, 2013). In addition to OST, two organizations and three individuals filed a consolidated intervention petition that the Board denied based on their lack of standing, a determination that was not appealed. See CLI-14-2, 79 NRC at 13 n.4.

<sup>24</sup> See NRC Staff Response to [OST's] Request for Hearing and Petition to Intervene (Feb. 25, 2013) at 1; Applicant's Response to Petition to Intervene Filed by [OST] (Feb. 25, 2013) at 1.

<sup>25</sup> See LBP-13-6, 77 NRC at 286.

<sup>26</sup> See *id.* at 289.

<sup>27</sup> See CLI-14-2, 79 NRC at 12.

<sup>28</sup> See Letter from Marcia J. Simon, NRC Staff Counsel, to Licensing Board (June 30, 2014).

<sup>29</sup> See NRC Staff's Motion for Summary Disposition of Contention 1 (Aug. 6, 2014) at 1, 3-4.

<sup>30</sup> See Licensing Board Memorandum and Order (Ruling on Motion for Summary Disposition Regarding [OST] Contention 1) (Oct. 22, 2014) at 2 (unpublished).

<sup>31</sup> See NRC Staff's Motion to Deny Migration of Environmental Portion of Contention 2 (Jan. 26, 2018) at 1-3.

The Board denied the motion in part and allowed the majority of Contention 2 to migrate from a challenge to CBR's ER to a dispute with the Staff's draft EA; however, the Board granted the motion as to the environmental aspects of Concern 2.<sup>32</sup>

The Staff's safety evaluation report (SER) was published on January 31, 2018,<sup>33</sup> and the final EA was issued on April 30, 2018.<sup>34</sup> With publication of the final EA,<sup>35</sup> OST again had an opportunity to file new or amended contentions,<sup>36</sup> and on May 30, 2018, OST submitted fourteen new or "renewed" contentions and a migration declaration for Contention 2.<sup>37</sup> The Board found that migration of Contention 2 as a challenge to the final EA was appropriate,<sup>38</sup> but denied admission of the new and "renewed" contentions.<sup>39</sup>

## B. Evidentiary Hearing

In preparation for the 10 C.F.R. Part 2, Subpart L evidentiary hearing on Contention 2, CBR, the Staff, and OST filed initial position statements and supporting exhibits (including their witnesses' written initial testimony) on or about

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<sup>32</sup> See LBP-18-2, 87 NRC 21, 27-28, 35-36 (2018).

<sup>33</sup> See Ex. NRC008 (Division of Decommissioning, Uranium Recovery & Waste Programs, NRC Office of Nuclear Material Safety and Safeguards (NMSS), [SER], License Amendment for the [CBR] [MEA] In-Situ Recovery Project, Dawes County, Nebraska (Jan. 2018)) [hereinafter SER].

<sup>34</sup> See Ex. NRC006 (Division of Fuel Cycle Safety, Safeguards & Environmental Review, NRC NMSS, [EA] for the [MEA] License Amendment Application (Apr. 2018)) [hereinafter EA]. In contrast to instances when a new ISR facility license application has been the subject of agency review, triggering the preparation of an environmental impact statement, see *Strata Energy, Inc.* (Ross In Situ Uranium Recovery Project), CLI-16-13, 83 NRC 566, 570-71 (2016), *petition for review denied sub nom. Nat. Res. Def. Council v. NRC*, 879 F.3d 1202 (2018), for this amendment to CBR's license for its existing ISR facility that would authorize ISR operations in the MEA, the Staff developed an EA, accompanied by a finding of no significant impact (FONSI), see EA at xiv-xv; see also [CBR, MEA], 83 Fed. Reg. 19,576 (May 3, 2018) (providing notice of issuance of EA and FONSI).

<sup>35</sup> On May 24, 2018, the Staff notified the Board and the other parties that, in accord with 10 C.F.R. § 2.1202(a), the CBR license amendment authorizing MEA construction and operation had been issued, effective immediately. See Letter from Emily Monteith, NRC Staff Counsel, to Licensing Board at 1-2 & n.1 (May 24, 2014). Although section 2.1213(a) afforded OST the opportunity to seek a stay of this Staff action, no such request was filed pursuant to that provision.

<sup>36</sup> See Licensing Board Memorandum and Order (Revised General Schedule) (Apr. 20, 2017) app. A, at 2 (unpublished) [hereinafter General Schedule].

<sup>37</sup> See [OST] Migrated, Renewed, and New Marsland Expansion Final [EA] Contentions (May 30, 2018).

<sup>38</sup> See LBP-18-3, 88 NRC at 25.

<sup>39</sup> See *id.* at 53.

August 17, 2018.<sup>40</sup> The Staff filed its rebuttal position statement and supporting exhibits (including its witnesses' written rebuttal testimony) on September 5, 2018, while CBR and OST filed their respective rebuttal position statements and supporting exhibits (including their witnesses' written rebuttal testimony) on September 7, 2018.<sup>41</sup> Relative to this prefiled evidentiary material, as was noted previously,<sup>42</sup> the Staff filed a motion in limine seeking to exclude portions of OST's witnesses' testimony and exhibits.<sup>43</sup> The Board determined that portions of the witness testimony in four prefiled exhibits should be excluded, and struck in toto three of OST's prefiled exhibits.<sup>44</sup> The Board also ordered OST to submit new versions of the testimony, revised in conformance with its issuance, and asked that OST submit, as exhibits, the documents referred to in rebuttal testimony submitted by OST witness Dr. LaGarry if OST wanted to avoid having the testimony stricken.<sup>45</sup>

Pursuant to the proceeding's general schedule, on October 30-November 1, 2018, the Board held an evidentiary hearing regarding Contention 2 in Crawford, Nebraska.<sup>46</sup> After providing the parties with an opportunity to submit proposed joint transcript corrections, on November 26, 2018, the Board issued an order that adopted transcript corrections, provided a list of the identified exhibits in the evidentiary record denoting their evidentiary status, and closed the evidentiary record.<sup>47</sup>

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<sup>40</sup> See [CBR's] Initial Statement of Position (Aug. 17, 2018); NRC Staff's Initial Statement of Position (Aug. 17, 2018); [OST's] Initial Position Statement (Aug. 18, 2018) (dated August 17, 2018, but filed at 13:17 EDT on August 18, 2018) [hereinafter OST Initial Position Statement].

<sup>41</sup> See NRC Staff's Rebuttal Statement of Position (Sept. 5, 2018); [CBR's] Rebuttal Statement of Position (Sept. 7, 2018); [OST's] Rebuttal Statement (Sept. 7, 2018).

<sup>42</sup> See *supra* section I.B.

<sup>43</sup> See Staff Motion in Limine at 1.

<sup>44</sup> See Board in Limine Ruling, at 1 n.1, 6-7, 11, 15 n.11, 18-19 (unpublished). Stricken in full were the following OST prefiled exhibits: Prefiled ex. OST009 (OST Hearing Petition); Prefiled ex. OST011 (Susan Hall, Groundwater Restoration at Uranium In-situ Recovery Mines, South Texas Coastal Plain, U.S. Geological Survey On-File Report 2009-1143 (2009)); Prefiled ex. OST012 (J.K. Otten & S. Hall, In-situ Recovery Uranium Mining in the United States: Overview of Production and Remediation Issues, IAEA-CN-175/87).

<sup>45</sup> See Board In Limine Ruling at 19-20. Refiled as revised prefiled exhibits were the following: Prefiled ex. OST004-R (Expert Opinion Testimony of [Michael] Wireman (rev. Oct. 3, 2018)); Prefiled ex. OST014-R (Rebuttal Testimony of David K. Kreamer (rev. Oct. 3, 2018)); Prefiled ex. OST015-R (Rebuttal Testimony of [Michael] Wireman (rev. Oct. 3, 2018)); Prefiled ex. OST016-R (Rebuttal Opinion of Hannon LaGarry (rev. Oct. 3, 2018)).

<sup>46</sup> See Tr. at 300-1039. In addition, the Board conducted a 10 C.F.R. § 2.315(a) limited appearance session in Chadron, Nebraska, on October 28, 2018, *see* Tr. at 1-83 (Oct. 28, 2018), and participated in a site visit to the existing CBR ISR facility on October 29, 2018.

<sup>47</sup> See Licensing Board Memorandum and Order (Adopting Transcript Corrections, Providing Final  
(Continued)

In accord with 10 C.F.R. § 2.1209 and this proceeding's general schedule,<sup>48</sup> on December 3, 2018, the parties filed their proposed findings of fact and conclusions of law, with the parties' reply findings of fact and conclusions following on January 4, 2019.<sup>49</sup>

### III. APPLICABLE LEGAL STANDARDS

Contention 2 is a hybrid safety and environmental contention, raising concerns under both NEPA and the AEA, as well as the NRC's regulations implementing an applicant's and the agency's responsibilities pursuant to both statutes. For their part, the AEA and the agency's implementing regulations govern the applicant's duty to comply with safety-related strictures. NEPA and the NRC's implementing regulations likewise govern an applicant's information-gathering and other responsibilities associated with consideration of the environmental effects of a proposed agency licensing action, but define the Staff's central role in identifying and analyzing such impacts as well. Moreover, as we outline in section III.C *infra*, as a consequence of the Staff's role under NEPA, the burden of proof relative to AEA and NEPA issues is somewhat different.

#### A. Safety Requirements — AEA and Implementing Regulations

The AEA authorizes the NRC to issue licenses for the possession and use of source and byproduct material,<sup>50</sup> such as is involved in the ISR process and which the NRC regulates under 10 C.F.R. Part 40. The AEA further requires the NRC to ensure that facilities associated with the licensed possession and use of such materials meet regulatory requirements developed to protect public health and safety from radiological hazards as set forth in 10 C.F.R. Part 20.

ISR license amendment applications such as that submitted by CBR thus require a safety review to determine if a license applicant has met all relevant

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Exhibit List, and Closing Evidentiary Record) (Nov. 26, 2018) (unpublished) at 2-3. In citing to the evidentiary hearing transcript in this decision, we are referencing the transcript as modified by the corrections adopted by the Board. *See id.* app. A.

<sup>48</sup> *See* General Schedule app. A, at 3; *see also* Licensing Board Memorandum and Order (Schedule for Post-Evidentiary Hearing Submissions) (Nov. 6, 2018) at 2 (unpublished).

<sup>49</sup> [CBR] Proposed Findings of Fact and Conclusions of Law (Dec. 3, 2018); NRC Staff's Proposed Findings of Fact and Conclusions of Law (Dec. 3, 2018); [OST] Proposed Findings of Fact and Conclusions of Law (Dec. 3, 2018) [hereinafter OST Proposed Findings]; [CBR] Reply Findings of Fact and Conclusions of Law (Jan. 4, 2019); NRC Staff's Reply Findings of Fact and Conclusions of Law (Jan. 4, 2019); [OST] Reply to CBR and NRC Proposed Findings of Fact and Conclusions of Law (Jan. 4, 2019).

<sup>50</sup> *See* AEA §§ 62, 81, 42 U.S.C. §§ 2092, 2111.

criteria in 10 C.F.R. Part 40. These safety requirements include certain criteria in Appendix A to Part 40 that provide specific standards for uranium mill operation and waste material disposal, although, in this instance, not all criteria in Appendix A are applicable because the MEA is not a conventional uranium mill.<sup>51</sup> In this regard, Intervenor asserts in Contention 2 that the application has failed to provide sufficient information about the ability of the underlying geologic strata to control contaminant and solution transport as required by Appendix A, Criterion 5G(2).<sup>52</sup> The Intervenor also maintains in Contention 2 that the application has failed to fulfill the provisions of NUREG-1569, sections 2.6 and 2.7, regarding the geologic and hydrologic circumstances associated with the proposed ISR facility.<sup>53</sup> NUREG-1569 is the standard review plan guidance document for the Staff's safety review of an application for an ISR uranium recovery facility.<sup>54</sup>

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<sup>51</sup> Because 10 C.F.R. Part 40 lacks ISR-specific regulatory provisions, in 2006 the agency initiated a rulemaking to provide clarity and consistency to the licensing and regulation of ISR facilities. That effort was suspended in 2010 in deference to an Environmental Protection Agency proposed rule that would have promulgated generally applicable ISR standards. With the withdrawal of that proposed rule in 2018, the NRC is now considering whether to proceed with its earlier ISR-specific rulemaking. *See* Ground Water Protection at Uranium [ISR] Facilities, 84 Fed. Reg. 574, 576 (Jan. 31, 2019).

<sup>52</sup> As supporting its contention, OST also cited 10 C.F.R. Part 40, App. A, Criteria 4(e) and 5G(2). In its initial testimony, however, the Staff asserted that neither criterion is applicable to the MEA because the former provision concerns the location of permanent tailings or waste disposal impoundments relative to a capable earthquake fault and CBR does not propose any surface impoundments for the MEA nor is there any evidence of capable faults in the vicinity of the MEA, while the latter relates to tailings disposal system proposals at conventional uranium mines and so has no application to an ISR facility. *See* NRC001, at 8 (NRC Staff's Initial Testimony (Aug. 17, 2018)) (Lancaster, Striz) [hereinafter Staff Initial Test.]. Given that OST makes reference to these two Appendix A provisions only in the context of quoting or referencing the language of its Contention 2, *see* OST Initial Position Statement at 1, 39; OST Proposed Findings at 19, 23, we find no basis for further discussion of either criterion in this decision.

<sup>53</sup> *See supra* note 5 and accompanying text.

<sup>54</sup> *See* Ex. NRC010, at 1 (Office of Nuclear Material Safety and Safeguards (NMSS), NRC, Standard Review Plan for In Situ Leach Uranium Extraction License Applications, NUREG-1569 (June 2003)) [hereinafter NUREG-1569]. As the Staff points out in its initial testimony, *see* Staff Initial Test. at 9 (Back, Lancaster, Striz), the provisions of this and other standard review plans are "guidance" to an applicant about approaches to demonstrating compliance with the agency's regulatory requirements that the Staff generally deems acceptable, with the caveat that an applicant may take a different approach to compliance so long as the application information provided allows the Staff to make the requisite finding of environmental acceptability and regulatory compliance. While recognizing the "guidance" nature of such review plans, the Commission has also indicated that, having been developed to assist an applicant in complying with applicable regulations, such plans are entitled to "special weight." *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-01-22, 54 NRC 255, 264 (2001). By the same token, and in the absence of an

*(Continued)*

## B. Environmental Review Requirements

### 1. NEPA Requirements

NEPA requires federal agencies to take a “hard look” at the environmental impacts of a proposed action.<sup>55</sup> This “hard look” is intended to “foster both informed decision-making and informed public participation” so as to ensure that the agency does not act upon “incomplete information, only to regret its decision after it is too late to correct.”<sup>56</sup> This “hard look” is, however, subject to a “rule of reason” in that consideration of environmental impacts need not address “all theoretical possibilities,” but rather only those that have some “reasonable possibility” of occurring.<sup>57</sup>

With regard to such reasonably foreseeable impacts, NEPA “does not call for certainty or precision, but an *estimate* of anticipated (not unduly speculative) impacts.”<sup>58</sup> As a consequence, agencies are given broad discretion “to keep their inquiries within appropriate and manageable boundaries,”<sup>59</sup> because an EA “is not intended to be ‘a research document.’”<sup>60</sup>

Finally, “in the context of an NRC adjudicatory proceeding, even if an [EA] prepared by the Staff is found to be inadequate in certain respects, the Board’s findings, as well as the adjudicatory record, ‘become, in effect, part of the [final EA].’ Thus, the Board’s ultimate NEPA judgments can be made on the basis of the entire adjudicatory record in addition to the Staff’s [final EA].”<sup>61</sup>

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applicant showing that it is attempting to reach regulatory compliance by some other means, as was the case in this proceeding, the degree to which an application reflects adherence to such guidance is a legitimate subject of inquiry, both at the contention admissibility and merits stages of a licensing adjudication.

<sup>55</sup> See *Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 87-88 (1998).

<sup>56</sup> *Id.* at 88 (quoting *Marsh v. Or. Nat. Res. Council*, 490 U.S. 360, 371 (1989)).

<sup>57</sup> *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-156, 6 AEC 831, 836 (1973).

<sup>58</sup> *Louisiana Energy Services, L.P.* (National Enrichment Facility), CLI-05-20, 62 NRC 523, 536 (2005).

<sup>59</sup> *Claiborne*, CLI-98-3, 47 NRC at 103.

<sup>60</sup> *Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-22, 72 NRC 202, 208 (2010) (quoting *Town of Winthrop v. FAA*, 535 F.3d 1, 13 (1st Cir. 2008)).

<sup>61</sup> *Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), LBP-09-7, 69 NRC 613, 632 (2009) (quoting *Hydro Resources, Inc.* (P.O. Box 15910, Rio Rancho, NM 87174), CLI-01-4, 53 NRC 31, 53 (2001), and citing *Louisiana Energy Services, L.P.* (National Enrichment Facility), LBP-05-13, 61 NRC 385, 404 (2005), *aff’d*, CLI-06-22, 64 NRC 37 (2006), *petition for review denied sub nom. Nuclear Info. & Res. Serv. v. NRC*, 509 F.3d 562 (D.C. Cir. 2007)), *petition for review denied*, CLI-10-5, 71 NRC 90 (2010); see *Nat. Res. Def. Council*, 879 F.3d at 1209-13.



## **2. 10 C.F.R. Part 51 Requirements Associated with Surface Water and Groundwater Information**

The NRC's NEPA-implementing environmental protection regulations are found in 10 C.F.R. Part 51. Acting pursuant to 10 C.F.R. § 51.21, the Staff prepared a draft and final EA in response to CBR's request to amend its license to possess and use source material at its existing ISR facility and thereby authorize the construction and operation of the MEA. And in formulating its draft and final EA conclusions regarding the environmental impacts of that proposed licensing action, the Staff uses as guidance a standard scheme to categorize or quantify the impacts. This standard regime was created using the approach outlined in Council on Environmental Quality regulations indicating that agencies should consider both the context and intensity of impacts.<sup>62</sup> This benchmark employs three levels of impacts — SMALL, MODERATE, and LARGE — that are defined as follows:

- SMALL — environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.
- MODERATE — environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
- LARGE — environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.<sup>63</sup>

### **C. Burden of Proof**

As the proponent of the agency action at issue, an applicant generally has the burden of proof in a licensing proceeding.<sup>64</sup> This is clearly the case relative to AEA-related safety issues in that, while the Staff conducts its own independent safety review, parties may not litigate the adequacy of the Staff's safety review.<sup>65</sup> Thus, the primary responsibility to address and comply with the agency's safety-related requirements lies with the applicant that, in turn, has the burden of proof for a safety-related contention challenging the sufficiency of the application.<sup>66</sup>

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<sup>62</sup> See Ex. NRC011 (NMSS, NRC, Environmental Review Guidance for Licensing Actions Associated with NMSS Programs, NUREG-1748, at 4-13 to -14 (Aug. 2003)) (citing 40 C.F.R. § 1508.27) [hereinafter NUREG-1748].

<sup>63</sup> EA at xiv; see NUREG-1748, at 4-14.

<sup>64</sup> See 10 C.F.R. § 2.325.

<sup>65</sup> See *AmerGen Energy Co., LLC* (Oyster Creek Nuclear Generating Station), CLI-08-23, 68 NRC 461, 476-77 (2008).

<sup>66</sup> See *id.* at 477.

In contrast, the statutory obligation for complying with NEPA rests with the NRC Staff.<sup>67</sup> Consequently, when a NEPA-based contention is involved, the burden of proof is on the Staff.<sup>68</sup> At the same time, “because the Staff, as a practical matter, relies heavily upon the Applicant’s ER in preparing the [EA], should the Applicant become a proponent of a particular challenged position set forth in the [EA], the Applicant, as such a proponent, also has the burden on that matter.”<sup>69</sup>

And relative to factual matters arising in connection with either a safety or environmental issue, to carry that burden, the Staff and/or the applicant must establish that its position is supported by a preponderance of the evidence.<sup>70</sup>

#### IV. UNDISPUTED FACTUAL BACKGROUND<sup>71</sup>

##### A. In Situ Uranium Recovery Operations at the Marsland Expansion Area

The existing CBR ISR facility is authorized to operate in Crawford, Nebraska, under NRC source materials license SUA-1534.<sup>72</sup> The proposed MEA site is located in southwestern Dawes County, Nebraska, approximately 11 miles

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<sup>67</sup> See, e.g., *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), CLI-83-19, 17 NRC 1041, 1049 (1983).

<sup>68</sup> See *Progress Energy Florida, Inc.* (Levy County Nuclear Power Plant, Units 1 and 2), CLI-10-2, 71 NRC 27, 34 (2010); see also *Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), CLI-07-17, 65 NRC 392, 395 (2007) (“[W]hereas NRC hearings on safety issues concern the adequacy of the license application, not the NRC Staff’s work, NRC hearings on NEPA issues focus entirely on the adequacy of the NRC Staff’s work.”).

<sup>69</sup> *Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), LBP-96-25, 44 NRC 331, 339 (1996) (citing *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-471, 7 NRC 477, 489 n.8 (1978)), *rev’d on other grounds*, CLI-97-15, 46 NRC 294 (1997).

<sup>70</sup> See *Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-763, 19 NRC 571, 577 & n.22 (citing cases), *petition for review declined*, CLI-84-14, 20 NRC 285 (1984).

<sup>71</sup> The factual information contained within this section generally was stipulated to by the parties and therefore is considered undisputed. See Ex. BRD001 (Joint Stipulation) [hereinafter Joint Stipulation]; see also Joint Response Accepting Revisions to Stipulated Factual Background (Oct. 16, 2018).

<sup>72</sup> The renewal of CBR’s license in 2014 is the subject of a hearing before a different licensing board. While a petition seeking Commission review of that board’s decision in favor of the Staff and CBR regarding hydrogeology and other matters was denied by the Commission, see *Crow Butte Resources, Inc.* (In Situ Leach Facility, Crawford, Nebraska), LBP-16-13, 84 NRC 271 (2016), *petition for review denied*, CLI-18-8, 88 NRC 141 (2018) [hereinafter *Renewal Site*], a petition for Commission review regarding a board initial decision on cultural resources issues remains pending before the Commission, see *Renewal Site*, LBP-16-7, 83 NRC 340 (2016), *petition for Comm’n review pending*.

south-southeast of the existing CBR ISR facility.<sup>73</sup> The proposed MEA license area is approximately 4622 acres,<sup>74</sup> which has the potential to encompass 11 mine units (MUs) based on CBR's current knowledge of available reserves.<sup>75</sup> The total potential disturbed area over the life of the project is estimated to be up to 1754 acres.<sup>76</sup>

Consistent with the configuration at the existing CBR ISR facility, wells within each MU will be arranged in 7-spot patterns with a central production well surrounded by six injection wells spaced at between 65 feet (ft) and 150 ft from each other in a hexagonal pattern.<sup>77</sup> Under an existing license condition that also applies to the MEA, CBR is authorized to inject lixiviant that contains sodium carbonate or sodium bicarbonate, carbon dioxide, oxygen and/or hydrogen peroxide at the existing CBR ISR facility, and CBR has not requested a different lixiviant composition for the MEA.<sup>78</sup> From the MUs subsurface, CBR intends to extract uranium-bearing fluid via a production well and then pipe the uranium-bearing fluid to the satellite facility located within the MEA for processing by loading the uranium onto ion exchange (IX) resins.<sup>79</sup> The loaded resins would then be transported by tanker truck to the central processing facility at the existing CBR ISR facility for elution, drying, and packaging as yellowcake.<sup>80</sup> Barren resin would be returned to the MEA satellite building by tanker truck for reuse.<sup>81</sup> CBR would begin aquifer restoration activities in an active MEA MU when uranium recovery permanently ceases in that wellfield.<sup>82</sup>

## **B. Undisputed Local Geologic Setting**

### **1. General Stratigraphic Units**

Starting from the youngest to oldest and including the thickness of the units

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<sup>73</sup> See Ex. CBR006 (CBR, [TR], [MEA] at 1-3 (June 2017) (consolidated)) [hereinafter Tech. Rep.]; SER at 19.

<sup>74</sup> See Ex. CBR005-R (CBR, Application for Amendment of USNRC Source Materials License SUA-1534, [MEA], Crawford, Nebraska, [ER] at 1-3, tbl. 3.5-2 (rev. Apr. 25, 2014) (consolidated)) [hereinafter ER]; EA at 1-1, 2-5, 3-42.

<sup>75</sup> See ER at 1-3; EA at 2-5.

<sup>76</sup> See EA at 2-5.

<sup>77</sup> See Tech. Rep. at 3-11; SER at 66.

<sup>78</sup> See SER at 72.

<sup>79</sup> See Tech. Rep. at 3-29; SER at 16; EA at 1-2. "Satellite facility" as used in the EA refers to the 1.8-acre (0.73 hectare (ha)) area shown in EA Figure 1-1. See EA at 1-3 (fig. 1-1), 4-26.

<sup>80</sup> See Tech. Rep. at 1-5.

<sup>81</sup> See *id.* at 1-5, 3-22; SER at 16.

<sup>82</sup> See SER at 150; Ex. NRC009, at 11 (NRC Materials License SUA-1534, amend. 3 (with License Condition Reference Sheet) (May 23, 2018) (License Condition 10.1.5)) [hereinafter CBR License Amend. 3].

underlying the MEA, the geologic strata beneath the MEA are (1) the alluvium (less than 30 ft thick); (2) the Arikaree Group (40 ft to 160+ ft thick); (3) the Brule Formation (350 ft to 550 ft thick); (4) the Upper and Middle Chadron Formations (360 ft to 450 ft thick); (5) the Basal Chadron/Chamberlain Pass Formation (BC/CPF) (20 ft to 90 ft thick), which contains the uranium mineralization for the production zone of the proposed MEA ISR operation;<sup>83</sup> and (6) the Pierre Shale (750 ft to greater than 1000 ft thick).<sup>84</sup> The White River Group, which is referenced in the parties' testimony, includes, from youngest to oldest, the Brule Formation overlying the Upper and Middle units of the Chadron Formation, and the BC/CPF.<sup>85</sup>

These geologic strata are consistent with the generally recognized regional units of northwestern Nebraska.<sup>86</sup> Further details of the hydrostratigraphic functions and properties for each formation are provided below starting with the youngest and ending with the oldest deposits.

## 2. *Hydrogeologic Properties*

The hydraulic conductivity of a formation is a measure of the ease or difficulty for groundwater to flow through the porous geologic media.<sup>87</sup> As such, the stratigraphic units are categorized into "hydrostratigraphic" units based on factors such as hydraulic conductivity, aquifer thickness, and transmissivity (which, in turn, is calculated as hydraulic conductivity multiplied by thickness of the unit).<sup>88</sup> Hydrostratigraphic units that can transmit sufficient quantities of groundwater of sufficient quality to provide beneficial use are described as aquifers.<sup>89</sup> Hydrostratigraphic units of such low transmissivity that they cannot transmit beneficial volumes of groundwater are termed "aquitards," which units, as de-

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<sup>83</sup> Consistent with the *Renewal Site* proceeding, rather than using the historic terminology of the "Basal Chadron" for this formation or the more recent name of "Chamberlain Pass Formation," this formation will be referred to as the "Basal Chadron/Chamberlain Pass Formation." See *Renewal Site*, LBP-16-13, 84 NRC at 288-89 n.43 (2016); *Renewal Site*, CLI-18-8, 88 NRC at 144 n.8; see also *Renewal Site*, LBP-16-13, 84 NRC at 399-403 (indicating parties' experts agreed to use of this nomenclature, recognizing that its use did not affect the operation of the existing CBR ISR facility and demonstrating there was agreement that adopting the BC/CPF label would not change the hydrogeologic characterization of the formation).

<sup>84</sup> See Tech. Rep. at 2-43 to -55; SER at 29-33.

<sup>85</sup> See OST004-R at 3 (Expert Opinion Testimony of Mike Wireman (rev. Oct. 3, 2018)) [hereinafter Wireman Initial Test.]; Tech. Rep. at 2-45; SER at 28.

<sup>86</sup> See SER at 29; see also *id.* at 28.

<sup>87</sup> See EA at 3-6.

<sup>88</sup> See *id.*

<sup>89</sup> See *id.*

scribed in greater detail below, may act as confining units.<sup>90</sup> Definitions of the aquifer parameters are as follows:

- K: hydraulic conductivity — measure of the ability of a porous material to transmit water, expressed as groundwater discharge (volume) per unit area under a unit hydraulic gradient (e.g., ft/day (ft/d), centimeter/second (cm/sec)). Hydraulic conductivity is sometimes referred to as permeability.
- T: transmissivity — the product of the hydraulic conductivity and aquifer thickness with units of distance squared per time (e.g., feet squared per day (ft<sup>2</sup>/d)).
- Q: groundwater discharge — hydraulic conductivity multiplied by the hydraulic gradient and cross-sectional area (e.g., feet cubed per day (ft<sup>3</sup>/d)).
- S: storativity — describes the volume of water released from storage per unit change in hydraulic head per unit area in a confined aquifer (dimensionless number).<sup>91</sup>
- Sy: specific yield — volume of water that an unconfined aquifer releases from storage for a unit drop in the water table level (dimensionless number), i.e., drainable porosity of an unconfined aquifer.
  - i: hydraulic gradient — slope of the water table or potentiometric surface calculated as the difference in water-level elevation over a unit distance (dimensionless number).
- $\phi$ : porosity — ratio of volume of void space to the total volume of the aquifer (dimensionless number).
- $\phi_h$ : hydraulic porosity — applies to turbulent flow in porous media, which is not significant in the operational setting of this application.
- $\phi_e$ : effective porosity — percentage of void space within a rock matrix that is interconnected and allows fluid to flow through it, noting that the remaining porosity consists of isolated or unconnected pores (dimensionless number).<sup>92</sup>

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<sup>90</sup> See *id.*

<sup>91</sup> A confined aquifer is one in which its potentiometric level (i.e., pressure level) rises above its top elevation, thus pressurizing the aquifer. See EA at 3-23.

<sup>92</sup> See EA at 4-16 to -17; Staff Initial Test. at 19-20.

### 3. *Hydrostratigraphic Units*

#### a. *Alluvium and Upper Aquifers*

Surficial alluvium, discontinuous within the MEA, consists of fragments of locally outcropping sedimentary rocks, sand, gravel, and sandy soil horizons and may include weathered portions of the Arikaree Group.<sup>93</sup> Where present, these alluvial deposits for the MEA range from less than 3 ft to approximately 30 ft in thickness.<sup>94</sup>

The Arikaree Group (Arikaree), the surficial unit at the MEA where the alluvium is absent, overlies the Brule Formation (Brule).<sup>95</sup> The Arikaree contains numerous interbedded channel and floodplain deposits along with aeolian volcanoclastics (i.e., wind-blown volcanic particles).<sup>96</sup> Based on grain size analysis of core samples, the interbedded layers within the unit include coarse to fine-grained sandstones with mudstones and siltstones.<sup>97</sup> Over the MEA, the Arikaree Group generally ranges between 40 ft to somewhat over 160 ft in thickness, with an average thickness of 105 ft and increasing thickness from south to north.<sup>98</sup> The coarse- to fine-grained sandstones represent locally water-bearing units that are interbedded with low-permeability mudstone units and vary widely in extent, ranging between 10 ft to several hundred feet wide and up to 50 ft thick.<sup>99</sup> The Arikaree is a surficial aquifer at the MEA.

The Brule Formation in the region overlies the Chadron Formation and, in turn, is overlain by sandstones of the Arikaree Group.<sup>100</sup> The Brule consists of an uppermost Brown Siltstone member underlain by siltstones with isolated beds of sandstone and volcanic ash (the Whitney member).<sup>101</sup> Beneath these upper siltstone layers of the Brule are other clayey siltstones, claystones, sandstones and volcanic ashes (the Orella member).<sup>102</sup> At the MEA, the Brule Formation is predominated by the uppermost Brown Siltstone and Whitney members.<sup>103</sup> At the base of the Brown Siltstone member are thick, fine- to medium-grained

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<sup>93</sup> See Tech. Rep. at 2-42; SER at 33.

<sup>94</sup> See Tech. Rep. at 2-42; SER at 33 (citing Ex. CBR008-R, at 49-62 (figs. 2.6-3a to -3n) (Technical Report Figures) [hereinafter Tech. Rep. Figs.]).

<sup>95</sup> See Tech. Rep. at 2-43; SER at 33.

<sup>96</sup> See Tech. Rep. at 2-43; Tech Rep. Figs. at 49-62 (figs. 2.6-3a to -3n); SER at 33.

<sup>97</sup> See Tech. Rep. at 2-43; SER at 33.

<sup>98</sup> See Tech. Rep. at 2-43; Tech. Rep. Figs. at 72 (fig. 2.6-6); SER at 33.

<sup>99</sup> See Tech. Rep. at 2-80; SER at 33.

<sup>100</sup> See Tech. Rep. at 2-45; Tech. Rep. Figs. at 47 (fig. 2.6-1); SER at 49.

<sup>101</sup> See Tech. Rep. at 2-45 to -46; SER at 32.

<sup>102</sup> See Tech. Rep. at 2-46; SER at 32.

<sup>103</sup> See Tech. Rep. at 2-45; SER at 32.

sandstones, which are present across the entire MEA.<sup>104</sup> These sandstones constitute the first overlying aquifer above the production zone.<sup>105</sup>

The overall thickness of the Brule Formation in the MEA ranges from approximately 350 ft to 550 ft, generally thinning from north to south across the MEA.<sup>106</sup>

*b. Upper Confining Units (UCU)*

The Brule Formation is separated from the underlying BC/CPF by the Upper and Middle Chadron confining units.<sup>107</sup> The Upper Chadron is a bentonitic clay grading downward to green and red clay, with some interbedded sandstone intervals,<sup>108</sup> while the Middle Chadron is clay-rich with interbedded bentonitic clay and sand.<sup>109</sup> The contact between the Upper and Middle Chadron is difficult to ascertain due to similarities in grain size and geophysical log responses.<sup>110</sup>

The thickness of the Upper and Middle Chadron units ranges from approximately 360 ft to 450 ft and generally thins toward the south across the MEA.<sup>111</sup> Geophysical logging indicates that the Upper/Middle Chadron units are laterally continuous throughout the MEA.<sup>112</sup>

Based on grain size analysis from the MEA, the Upper/Middle Chadron samples are classified as siltstone, with more than 50 percent of the sample grain sizes reported to fall in the silt-clay fraction range, indicating the low-permeability nature of these units.<sup>113</sup> X-ray diffraction (XRD) analyses show that the chemical compositions of core samples from the Middle Chadron are highly similar to the Pierre Shale (e.g., predominantly mixed-layered illite/smectite or montmorillonite with quartz), which would be expected if the Pierre Shale was a contributing source of materials for the overlying Middle Chadron.<sup>114</sup>

*c. Basal Chadron/Chamberlain Pass Formation (BC/CPF)*

This formation, which overlies the thick Pierre Shale and hosts the uranium

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<sup>104</sup> See Tech. Rep. at 2-45; SER at 32.

<sup>105</sup> See Tech. Rep. at 2-46; SER at 32.

<sup>106</sup> See Tech Rep. Figs. at 49-62 (figs. 2.6-3a to -3n (cross-section)), 73 (fig. 2.6-7 (isopach map)).

<sup>107</sup> See Tech. Rep. at 2-41; SER at 48.

<sup>108</sup> See Tech. Rep. at 2-48; SER at 31.

<sup>109</sup> See Tech. Rep. at 2-48; SER at 31.

<sup>110</sup> See Tech. Rep. at 2-49; SER at 31.

<sup>111</sup> See Tech. Rep. at 2-49; *see also* Tech. Rep. Figs. at 74 (fig. 2.6-8); SER at 31.

<sup>112</sup> See SER at 31; Tech Rep. Figs. at 49-62 (figs. 2.6-3a to -3n).

<sup>113</sup> See Tech. Rep. at 2-47 to -49; SER at 31-32.

<sup>114</sup> See Tech. Rep. at 2-84.

ore body in localized channels, is a coarse-grained sandstone interbedded with thin silt and clay beds of varying thickness.<sup>115</sup> The BC/CPF is laterally continuous throughout the MEA, occurs at depths ranging from approximately 850 ft to 1200 ft below ground surface (or bgs), and varies from approximately 20 ft to 90 ft in thickness.<sup>116</sup> The MEA production zone is a roll-front deposit with uranium mineral species present at concentrations ranging from 0.11 percent to 0.33 percent triuranium octoxide ( $U_3O_8$ ), with an average ore grade of 0.17 percent.<sup>117</sup> Based on the similarity of regional deposition for the existing CBR ISR facility and the MEA (whereby the ore bodies in the two areas are within the same geologic unit and have the same mineralization source), the MEA ore body is expected to be similar mineralogically and geochemically to that of the ore body at the existing CBR ISR facility.<sup>118</sup>

*d. Pierre Shale Lower Confining Unit (LCU)*

The Pierre Shale is a thick, homogeneous black marine shale with low permeability that represents one of the most laterally extensive formations of northwest Nebraska. It can be up to 1500 ft thick in the Dawes County area.<sup>119</sup> The regional estimates of the Pierre Shale's hydraulic conductivity range from  $10^{-7}$  to  $10^{-12}$  cm/sec<sup>120</sup> and there has been no observed transmissivity between vertical fractures in the Pierre Shale (which appear to be short and not interconnected).<sup>121</sup> During the *Renewal Site* proceeding, there was no dispute among the parties that the very low permeability of the Pierre Shale in the LCU prevents ISR production fluids from flowing downward from the base of the BC/CPF aquifer. As an undisputed regional hydrogeologic condition, the low-permeability Pierre Shale is the base of the BC/CPF aquifer and acts as an LCU for the BC/CPF.<sup>122</sup>

**C. Undisputed Regional Hydrogeologic Conditions**

**1. Surface Water Resources**

The Niobrara River flows easterly through a point approximately 0.4 miles

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<sup>115</sup> See Tech. Rep. at 2-49; SER at 30.

<sup>116</sup> See Tech. Rep. at 2-50; Tech Rep. Figs. at 49-62 (figs. 2.6-3a to -3n), 75 (fig. 2.6-9); SER at 67.

<sup>117</sup> See Tech. Rep. at 2-55; SER at 31.

<sup>118</sup> See Tech. Rep. at 2-55; SER at 31.

<sup>119</sup> See Tech. Rep. at 2-52.

<sup>120</sup> See *id.* at 2-53.

<sup>121</sup> See *id.*; ER at 3-43.

<sup>122</sup> See *Renewal Site*, LBP-16-13, 84 NRC at 296-97.



south of the southernmost MEA mine unit (i.e., MU-F).<sup>123</sup> The Niobrara River originates in eastern Wyoming near Manville, in Niobrara County, and flows in an east-southeast direction into western Nebraska.<sup>124</sup> The river flows across Sioux County in Nebraska, east through Agate Fossil Beds National Monument, passing the town of Marsland and the southern boundary of the MEA, and through the 1600-acre Box Butte Reservoir, the western end of which is located approximately 3 miles to the east of the southeast corner of the MEA license boundary.<sup>125</sup> There are no apparent direct drainages from the MEA to the reservoir.<sup>126</sup> The primary purpose of the reservoir is to facilitate irrigation.<sup>127</sup> The Box Butte Reservoir has altered the hydrology of the Niobrara River by diverting water for irrigation.<sup>128</sup>

From the reservoir, the river flows east across northern Nebraska, and joins the Snake River approximately 13 miles southwest of Valentine, Nebraska.<sup>129</sup> The Niobrara River is a small stream of limited areal extent with an average flow rate of 29 cubic feet per second (or cfs).<sup>130</sup> While stream data indicate that the Niobrara River is gaining water from west to east, the mean average stream flows have decreased with time.<sup>131</sup> Groundwater is the primary source of flow into the Niobrara River in the vicinity of the MEA and, in this area of the river, the discharge of the river is steady and persistent, with overbank flooding uncommon except during winter ice jams.<sup>132</sup>

## 2. *Groundwater Resources*

Descriptions of the regional hydrostratigraphic units underlying the MEA and the region are provided for both the aquifers and confining units underlying the MEA.<sup>133</sup> The relevant regional aquifers are in the Arikaree Group and the

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<sup>123</sup> See Tech. Rep. at 2-77; EA at 3-18.

<sup>124</sup> See Tech. Rep. at 2-77; EA at 3-19.

<sup>125</sup> See Tech. Rep. at 2-77 to -78; EA at 3-19.

<sup>126</sup> See Tech. Rep. at 2-78.

<sup>127</sup> See EA at 3-19.

<sup>128</sup> See *id.*

<sup>129</sup> See SER at 45; see also Tech. Rep. Figs. at 92-93 (figs. 2.7-2 to -3).

<sup>130</sup> See SER at 21.

<sup>131</sup> See *id.*

<sup>132</sup> See *id.*

<sup>133</sup> See Tech. Rep. at 2-79 to -81. Aquifers are geological formations “with sufficient permeability and porosity to significantly transmit and store groundwater,” and confining units are “strata with insufficient permeability (e.g., shale units) that hydraulically separate aquifers.” SER at 48.

Upper Brule Formation (both of which are unconfined, surficial aquifers),<sup>134</sup> and in the deeper, confined BC/CPF.<sup>135</sup> In the vicinity of the MEA, water has been observed in the Arikaree Group, Brule Formation, and the sandstone of the BC/CPF.<sup>136</sup> Alluvial deposits are discontinuous at the MEA and have not been shown to contain usable amounts of water.<sup>137</sup>

Separating the confined BC/CPF sandstone aquifer from the overlying aquifers in the Brule Formation and the Arikaree Group are the remaining members of the Chadron and Brule Formations, which collectively are identified as the UCU for the BC/CPF sandstone aquifer.<sup>138</sup> The LCU beneath the BC/CPF sandstone aquifer is the Pierre Shale.<sup>139</sup>

## V. OVERARCHING HYDROGEOLOGIC CONDITIONS

OST challenges the analyses in CBR's TR, the Staff's EA, and the Staff's SER regarding hydrogeologic issues that apply to several of the stated concerns of Contention 2. In providing support for OST's position, Intervenor's witnesses relied on the premise that CBR's application was deficient insofar as it misinterpreted several hydrogeologic conditions underlying the MEA and, as such, did not correctly assess either the lack of containment of the BC/CPF or CBR's resulting inability to control production fluids during operations and restoration. OST thus criticized the TR, EA, and SER for (1) misinterpreting Crow Butte's aquifer test pumping data; (2) failing to recognize the heterogeneity

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<sup>134</sup> The parties have indicated their general agreement that the unconfined Arikaree and Brule aquifers in the MEA comprise a single aquifer system based on concurrent water table elevations and, therefore, act as one aquifer. *See* Wireman Initial Test. at 4; Tr. at 746-48 (Lewis, Back). Accordingly, any contaminated groundwater migrating into the Brule would also be pumped from Arikaree water wells. As a consequence, when referring to either one of these hydrogeologic formations or in discussing water withdrawal from the High Plains aquifer, the Board generally will use the term Arikaree/Brule aquifer.

<sup>135</sup> *See* SER at 48. To a large extent, Contention 2 deals with OST's allegations questioning CBR's conclusion that the Marsland facility production fluids will be contained within the BC/CPF and that those fluids also can be controlled within the aquifer during operations and restoration by fine-tuning the pumping rates for the production and observation wells. *See* OST Proposed Findings at 20, 40-41, 49-50. The word "confinement" is often used interchangeably in describing this "containment." To avoid confusion with discussions of the BC/CPF as a confined aquifer, the word "containment" will be used exclusively for the hosting and control of production fluids in the BC/CPF and the word "confinement" will be reserved for the description of the potentiometric levels in the BC/CPF aquifer. *See* Tr. at 450-51 (Kreamer).

<sup>136</sup> *See* Tech. Rep. at 2-79.

<sup>137</sup> *See id.*

<sup>138</sup> *See id.* at 2-79, 2-84 to -85.

<sup>139</sup> *See id.* at 2-52, 2-79, 2-84 to -86.

and anisotropy of the BC/CPF and the UCU;<sup>140</sup> and (3) ignoring the variations in the BC/CPF aquifer thickness and lateral extent that allegedly results in reduced containment of the BC/CPF aquifer. According to the Intervenor, these deficiencies demonstrated the lack of hydraulic integrity of the BC/CPF and the UCU that was not quantified by the Applicant or assessed by the Staff in reaching their conclusions about the environmental impact of ISR activities in the Marsland MEA.

Each of these disputed topics is discussed in separate sections below. Given that these critiques all contribute to the Intervenor's overarching premise that the TR, EA, and SER did not adequately address potential pathways by which production zone contaminants will migrate from the proposed MEA, and that this premise underscores the bulk of the Contention 2 issues, we will address these common, disputed facts prior to assessing each of the Intervenor's four Concerns.<sup>141</sup>

#### **A. Misinterpretation of Aquifer Pumping Test Data**

OST contested the accuracy and reliability of CBR's sole aquifer pumping test, which was performed between May 16 and May 20, 2011, during the initial permitting and development activities within the MEA. CBR witnesses Lewis, Nelson, and Pavlick testified regarding the test, as documented by the aquifer pumping test report entitled "Marsland Hydrologic Testing Report — Test #8," which is presented in Appendix F of CBR's TR.<sup>142</sup> According to

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<sup>140</sup> As is the case with the parties' testimony and exhibits, throughout this decision we will use the terms homogeneous/homogeneity and isotropy/isotropic and their counterparts heterogeneous/heterogeneity and anisotropy/anisotropic. Pursuant to the terms of 10 C.F.R. § 2.337(f), the official notice provision of the agency's procedural rules, we consider "homogeneity" to be synonymous with uniformity in space, i.e., a homogeneous medium being one whose hydrologic properties are identical everywhere, while isotropy is the condition in which all significant properties are independent of direction, i.e., an isotropic medium being one whose hydrologic properties are the same in all directions. See Am. Soc'y of Civil Eng'rs, Hydrology Handbook 326, 327 (2d ed. 1996) (glossary definitions of "Homogeneity," "Isotropic," and "Isotropy"). In contrast, heterogeneity means having properties that are not uniform in space, while anisotropic involves having varying properties in different directions.

<sup>141</sup> While, as we note previously, *see supra* note 65 and accompanying text, the adequacy of the Staff's safety review process generally is not subject to challenge in an adjudication before a board, to the degree all the parties cite and rely upon the Staff's SER in discussing or supporting some aspect of their various positions, we do not consider such references as violative of that precept.

<sup>142</sup> See Ex. CBR001-R, at 26 (Initial Written Testimony of Crow Butte Resources Witnesses Robert Lewis, Walter Nelson, and Douglas Pavlick on Contention 2 (Aug. 17, 2018)) [hereinafter CBR Initial Test.]; Ex. CBR016 (Aqui-Ver, Inc., Marsland Hydrologic Testing Report — Test #8, Final Report (rev. Oct. 28, 2015)) [hereinafter Test #8 Rep.]; *see also* Tech. Rep. at 27 (listing Test #8 report as Appendix F).

these witnesses, this so-called groundwater pumping Test #8 was designed to (1) evaluate the degree of hydraulic communication between the production zone, pumping well, and the surrounding production zone observation wells; (2) determine the presence or absence of the production zone aquifer within the test area; (3) assess the hydrologic characteristics of the production zone aquifer within the test area, including the presence or absence of hydraulic boundaries; and (4) demonstrate sufficient containment (hydraulic isolation) between the production zone and the overlying aquifer for the purpose of ISR leaching.<sup>143</sup> While these goals of the pumping test are not in dispute, OST did question CBR's analysis of the aquifer pumping test data as we outline below.

### ***1. Parties' Positions on Misinterpretation of Aquifer Pumping Test Data***

OST challenged CBR's analysis of the aquifer pumping test data, for, among other things, using only one form of data analysis technique, i.e., the Theis methodology,<sup>144</sup> and for selecting only a portion of the data points when determining the aquifer parameters of transmissivity and storage coefficient that result from the use of this technique.

#### ***a. CBR's Use of Only One Method of Data Analysis***

OST's principal critic in this regard was its witness Dr. Kreamer, who challenged CBR for using only the Theis method for analyzing the aquifer pumping test data and, in addition, claimed that CBR made reference to using the Cooper-Jacob data analysis technique, but then failed to present the results of this supplemental analysis.<sup>145</sup> According to Dr. Kreamer, this is significant because the Cooper-Jacob analysis can identify a recharge boundary that indicates a lack of containment of the aquifer.<sup>146</sup>

In response, NRC witnesses Back, Lancaster, and Dr. Striz confirmed that CBR's pumping test report clearly states that the Applicant used both the Theis

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<sup>143</sup> See CBR Initial Test. at 28.

<sup>144</sup> The Theis solution is a mathematical model of transient flow of groundwater to a pumping well that is useful for determining the transmissivity and storativity of nonleaky confined aquifers that involves matching standardized Theis type-curves to drawdown data collected from a pumping test. See generally CBR024, at 4-6 (Charles V. Theis, *The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground Water Storage*, Geological Survey, U.S. Dep't of the Interior, Ground Water Notes No. 7 (Aug. 1952)) [hereinafter Theis Article].

<sup>145</sup> See Ex. OST003, at 6 (Expert Opinion Testimony of David K. Kreamer (Aug. 16, 2018)) [hereinafter Kreamer Initial Test.].

<sup>146</sup> See *id.* at 2.

drawdown and recovery methods and the Cooper-Jacob distance-drawdown method to analyze the aquifer pumping test data,<sup>147</sup> and presented the graphical results of the Cooper-Jacob analysis for the entire duration of the aquifer pumping test in the MEA aquifer pumping test report.<sup>148</sup> Citing the Test #8 report, CBR witnesses Lewis, Nelson, and Pavlick stated that the Cooper-Jacob method determined an estimated average transmissivity of 737 ft<sup>2</sup>/d, a storativity of  $4.9 \times 10^{-5}$ , and an average hydraulic conductivity of 18.4 ft/d (based on a 40 ft average aquifer thickness), and noted that these values are consistent with the Theis drawdown analysis.<sup>149</sup>

During the hearing, Dr. Kreamer acknowledged that a Cooper-Jacob distance-drawdown analysis was performed, but indicated that he was referring to the failure to use a Cooper-Jacob analysis using time-drawdown parameters, as is more typically used in the Theis procedure.<sup>150</sup> CBR witness Lewis maintained, however, that the Cooper-Jacob analysis done by CBR was not inferior as a methodology, but just a different way of showing the information.<sup>151</sup> Additionally, Staff witnesses Back, Lancaster, and Dr. Striz indicated that the distance-drawdown Cooper-Jacob relationship, which was developed because its straight-line fit for the data is easier than the fit for a Theis type-curve, is not necessary to identify a recharge boundary and would not provide any additional information not already available from a Theis type-curve analysis, given the Cooper-Jacob analysis is an approximation to the Theis analysis.<sup>152</sup>

Dr. Kreamer also testified that CBR erred in not addressing the omission of, and the Staff failed in not requiring, other forms of pumping test analysis (e.g., De Glee, Hantush-Jacob, and Walton methods).<sup>153</sup> In support of this criticism, Dr. Kreamer noted that both the Theis and Cooper-Jacob mathematical forms of analysis are considered the simplest forms of aquifer pumping test analyses and require the same fundamental uncontested assumptions (e.g., aquifer homo-

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<sup>147</sup> See Test #8 Rep. at 11.

<sup>148</sup> See Ex. NRC014, at 21 (NRC Staff's Rebuttal Test. (Sept. 5, 2018)) (citing Test #8 Rep. figs. app. at PDF 50 (fig. 18)) [hereinafter Staff Rebuttal Test.].

<sup>149</sup> See Ex. CBR033, at 10 (Written Rebuttal Test. of [CBR] Witnesses Robert Lewis, Walter Nelson, Douglas Pavlick & James [Shriver] on Contention 2 (Sept. 7, 2018)) (citing Test #8 Rep. at 12-13) [hereinafter CBR Rebuttal Test.].

<sup>150</sup> See Tr. at 424-27.

<sup>151</sup> See Tr. at 427.

<sup>152</sup> See Staff Rebuttal Test. at 20-21 (citing Ex. CBR025, at 90-91 (H.H. Cooper, Jr. & C.E. Jacob, *A Generalized Graphical Method of Evaluating Formation Constants and Summarizing Well-Field History*, Geological Survey, U.S. Dep't of the Interior, Ground Water Notes, No. 7 (Jan. 1953)) [hereinafter Cooper-Jacob Article].

<sup>153</sup> See Ex. OST014-R, at 2-3 (Rebuttal Testimony of David K. Kreamer (rev. Oct. 3, 2018)) [hereinafter Kreamer Rebuttal Test.].

geneity, isotropy, uniform thickness, lateral extent) to be fulfilled for accurate results.<sup>154</sup>

Further in this regard, while recognizing CBR's referenced use of the Cooper-Jacob analysis, Dr. Kreamer emphasized that the Theis and Cooper-Jacob analyses are inappropriate in part because these have restrictive assumptions inherent in their solutions. He maintained instead that a leaky aquifer evaluation of the pumping test data should have been performed using the other identified standard analytical methods or a numerical analysis such as MODFLOW.<sup>155</sup> He added that analysis with these more complex methods is required so as to be consistent with the lack of containment indicated by the departure from the Theis type-curve observed during the solitary pumping test.<sup>156</sup>

Concerning the analysis of the pumping test data to derive the hydraulic parameters for the production zone, CBR witnesses Lewis, Nelson, and Pavlick confirmed that both the drawdown and recovery data were graphically analyzed to determine aquifer transmissivity and storativity using the Theis drawdown and recovery methods and the Cooper-Jacob straight-line distance-drawdown method.<sup>157</sup> And these witnesses further opined that "Crow Butte used appropriate analytical techniques for such aquifers, but nevertheless was prepared to use more complex analytical techniques had it been necessary. It was not."<sup>158</sup>

Staff witnesses Back and Lancaster confirmed that CBR used the aquifer pumping test data to obtain information about the connectivity within the BC/CPF sandstone aquifer, the hydraulic properties of that aquifer, and the containment of that aquifer from overlying aquifers.<sup>159</sup> Also, CBR witnesses Lewis, Nelson, and Pavlick testified that the results of Cooper-Jacob distance-drawdown analysis were consistent with the Theis drawdown analyses in the Test #8 report.<sup>160</sup>

As described by CBR witnesses Lewis, Nelson, and Pavlick, the results of the 2011 pumping test within the BC/CPF sandstone indicated a mean hydraulic conductivity of 25 ft/d (ranging from 7 ft/d to 62 ft/d) or  $8.82 \times 10^{-3}$  cm/sec based on an average net sand thickness<sup>161</sup> of 40 ft and a mean transmissivity

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<sup>154</sup> See Kreamer Initial Test. at 6.

<sup>155</sup> See *id.*; Kreamer Rebuttal Test. at 2-3; Tr. at 509.

<sup>156</sup> See Kreamer Rebuttal Test. at 2-3.

<sup>157</sup> See CBR Initial Test. at 29 (citing Theis Article; Cooper-Jacob Article).

<sup>158</sup> CBR Rebuttal Test. at 10.

<sup>159</sup> See Staff Initial Test. at 17 (citing ER at 3-45 to -47; Tech. Rep. at 2-81 to -84; Ex. CBR009, at 72-74 (Technical Report Tables) (tbls. 2.7-2 to -4) [hereinafter Tech. Rep. Tbls.]).

<sup>160</sup> See CBR Rebuttal Test. at 10.

<sup>161</sup> CBR witness Lewis defined "net sand thickness" as total thickness of the BC/CPF minus an allocation for the thickness of interbedded claystone stringers that are part of this unit. See Tr. at 458-59.

of 1012 ft<sup>2</sup>/d.<sup>162</sup> According to these CBR witnesses, aquifer storativity values from the Theis method ranged from  $1.7 \times 10^{-3}$  to  $8.3 \times 10^{-5}$ , with a geometric mean value of  $2.56 \times 10^{-4}$  for the entire test area.<sup>163</sup> Further, they indicated that based on both the drawdown and recovery analyses, hydraulic conductivities of the aquifer materials in the vicinity of the pumping wells (i.e., CPW-1A, CPW-1, and Monitor-3) were approximately 3 to 9 times greater than hydraulic conductivities estimated for other observation wells in the pumping test area.<sup>164</sup> In the opinion of these CBR witnesses, an apparent higher conductivity boundary condition effect in these wells was indicated by a flattening of drawdown and recovery curves,<sup>165</sup> an item that is discussed in greater detail later in this decision.<sup>166</sup>

CBR witnesses Lewis, Nelson, and Pavlick further opined that, given the great thickness, low permeability, and depth of the BC/CPF sandstone confining unit, there is no conceptual basis (i.e., hydrogeological justification) that would support the need for the additional aquifer test analyses called for by OST, and that the local variations in aquifer thickness and hydraulic conductivity are conceptually consistent with observed drawdown responses in a highly confined aquifer. As such, they maintained that the purported need to perform hypothetical aquifer leakage analyses has no conceptual support.<sup>167</sup>

And with respect to the analysis assumptions, these three CBR witnesses indicated that, while at some scale all geologic strata exhibit heterogeneity and anisotropy, at the relevant scale for licensing, CBR assumed homogeneous, isotropic responses and then reviewed the actual test results to determine whether there were significant deviations from the assumed homogeneity and isotropy that, in turn, would establish the need for the use of more complex analysis methods. They indicated, however, that CBR concluded there was no need for such additional complexity for this site. Also, according to these witnesses, Dr. Kreamer has failed to support his call for CBR to implement an allegedly superior alternative method by not providing an independent estimate for the rate of leakage based on an interpretation of the Marsland pumping test data derived by employing such an alternative method.<sup>168</sup>

Staff witnesses Back and Lancaster likewise disputed Dr. Kreamer's assertion that CBR's analysis was inadequate because CBR used only one pumping test data evaluation method. They noted that the pumping test was conducted

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<sup>162</sup> See CBR Initial Test. at 29.

<sup>163</sup> See *id.* at 30.

<sup>164</sup> See *id.* at 29-30.

<sup>165</sup> See *id.* at 30.

<sup>166</sup> See *infra* section V.A.1.b.

<sup>167</sup> See CBR Rebuttal Test. at 10-11 (citing Test #8 Rep. at 12-13, figs. app. at PDF 50 (fig. 18)).

<sup>168</sup> See *id.* at 11.

according to a plan approved by the Nebraska Department of Environmental Quality (NDEQ) and used accepted industry testing and analysis procedures.<sup>169</sup> Staff witnesses Back and Lancaster explained that the Theis type-curve matching and the Cooper-Jacob methods employed by CBR are widely used and accepted techniques that have been adopted into American Society for Testing and Materials (ASTM) standards.<sup>170</sup> Noting as well that at some scale all geologic strata are heterogeneous and anisotropic, they observed that in practice these equations are routinely applied to strata with an understanding of the assumptions inherent to their use. As a consequence, they indicated that if these methods are only applicable if the assumptions are strictly adhered to, as Dr. Kreamer suggested, these methods would never be used because these assumptions, if so rigorously applied, could not be met for any hydrogeologic strata.<sup>171</sup>

These Staff witnesses also claimed that (1) the Theis and Cooper-Jacob methods are consistent with the objectives of the pumping test; (2) it is not necessary that the assumptions in these analytical methods be strictly met; and (3) there is no evidence in the aquifer pumping test data to suggest that the assumptions were inappropriate for the BC/CPF sandstone aquifer at the MEA. Specifically, the MEA aquifer pumping test was a large, long-term, multiple-day test with a large ROI (8800 ft or over 1.5 miles) that averages the hydraulic behavior over a wide area in the middle of the MEA, thereby minimizing the impact of small-scale anisotropy and heterogeneity encountered in most aquifers.<sup>172</sup>

Finally, while Dr. Kreamer maintained there is a lack of containment in the production zone as demonstrated by departure from the expected Theis type-curve from the pumping test,<sup>173</sup> he did acknowledge that the more complex analysis methods he suggested (i.e., De Glee, Hantush-Jacob, and Walton methods) have the same assumptions of aquifer homogeneity, isotropy, uniform thickness, and lateral extent as the Theis and Cooper-Jacob methods.<sup>174</sup>

*b. CBR's Selective Use of Data*

In his initial written testimony, Dr. Kreamer also claimed that CBR only analyzed selective portions of the data from the pumping test and that the complete data set, if analyzed, would demonstrate the lack of containment of the

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<sup>169</sup> See Staff Initial Test. at 26 (citing ER at 3-45; Tech. Rep. at 2-82).

<sup>170</sup> See Staff Rebuttal Test. at 25 (citing Ex. NRC017 (ASTM Standards for Theis Analysis Methods) [hereinafter ASTM Theis Analysis Standards]).

<sup>171</sup> See *id.*

<sup>172</sup> See *id.* at 26.

<sup>173</sup> See Kreamer Rebuttal Test. at 2.

<sup>174</sup> See Tr. at 507-09.



BC/CPF aquifer.<sup>175</sup> Dr. Kreamer stated further that the measured water levels in the MEA aquifer test monitoring wells break significantly from the expected Theis type-curve, and that there is no justifiable basis for arbitrarily analyzing only a selected portion of the pumping data and not the entire test information.<sup>176</sup> In response, declaring that it was not clear what excluded data Dr. Kreamer was referencing, Staff witnesses Back, Lancaster, and Dr. Striz maintained that Dr. Kreamer appeared to be asserting that the Theis type-curves in CBR's pumping test report for the MEA observation wells show deviations for drawdown data that are consistent with a recharge boundary, which Dr. Kreamer characterized as leakage to the BC/CPF from the UCU.<sup>177</sup> They also responded to his "excluded data" allegation by stating that all data points for all of the observation wells used in the aquifer pumping test are presented in the graphs of drawdown and recovery included in Appendix C of the aquifer pumping test report.<sup>178</sup> Subsequently at the hearing, noting some confusion as to what he was referring to as "excluded data," Dr. Kreamer confirmed that he was talking about the deviations that show up on the pumping test data graphs.<sup>179</sup>

And in that regard, Dr. Kreamer opined there was no justifiable basis for arbitrarily analyzing only a selected portion of the pumping data and not the entirety of the test information given that using only selected portions of the measured data can bias the results and such an approach is not consistent with getting a complete picture of the pumped region (which itself is just a small portion of the MEA).<sup>180</sup> Specifically, Dr. Kreamer asserted that in some well-response analyses, late-time data were chosen for analysis, while for other wells late-time data were disregarded and the middle-time period data were analyzed.<sup>181</sup> Indeed, hearing testimony indicated that graphs of the pumping test data seemed to indicate data deviations in some of the wells, with wells Monitor-7 and Monitor-8 showing early-time effects, and wells CPW-1/1A and Monitor-3 showing late-time effects.<sup>182</sup> By analyzing selective portions, and ignoring other portions, of the early-time and late-time data, Dr. Kreamer maintained, the CBR pumping

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<sup>175</sup> See Kreamer Initial Test. at 2.

<sup>176</sup> See *id.* at 6, 7.

<sup>177</sup> See Staff Rebuttal Test. at 18-19.

<sup>178</sup> See *id.* at 17.

<sup>179</sup> See Tr. at 378, 380.

<sup>180</sup> See Kreamer Initial Test. at 7.

<sup>181</sup> See *id.*

<sup>182</sup> See Tr. at 384-85 (Kreamer), 396-98 (Lewis), 433-34 (Lewis); Test #8 Rep. at 13; *see also id.* app. C at PDF 79-96 (graphs C1 to C17). Also mentioned by CBR witness Lewis as having some early-time deviations was well Monitor-2, *see* Tr. at 434, an observation that does not seem to be relevant in this context given that well's remote location relative to the pumping field, *see id.*; *see also* Test #8 Rep. app. C at PDF 80 (graph C2).

test report did not analyze the full data set that would demonstrate the lack of containment of the production zone.<sup>183</sup>

i. EARLY-TIME DATA

Responding to Dr. Kreamer's concern about the bypassed early-time data, CBR witnesses Lewis, Nelson, and Pavlick pointed out that "[c]ertain data collected from the test are considered more reliable than others for purposes of data analyses," indicating that "early-time data [do] not characterize the aquifer response as accurately as do mid- and late-time data."<sup>184</sup> And Staff witnesses Back, Lancaster, and Dr. Striz supported this approach, declaring that CBR appropriately chose not to use early-time data and noting that the problems inherent with using these data from this testing time period are discussed in numerous textbooks and journal articles.<sup>185</sup>

Witnesses Lewis, Nelson, and Pavlick explained on behalf of CBR that early-time drawdown data are negatively influenced by a number of factors not related to the aquifer response to pumping. Valid drawdown data are achieved when the well discharge is constant, and when release of aquifer water is directly proportional to the rate of decline in the measured potentiometric levels — conditions that do not occur during the early stages of pumping. This discrepancy creates a disagreement between the theoretical flow and the actual flow during the early-time period, effects that are minimized as the time of pumping extends, during which closer agreement may be attained.<sup>186</sup>

As a second factor, both CBR and Staff witnesses testified that wellbore storage or near-wellbore effects can also impact the early-time data (especially, according to CBR witnesses, for large diameter, deep production wells with large water column height).<sup>187</sup> Because the amount of water stored within the wellbore can be substantial, it must be removed before the aquifer can respond properly to the induced drawdown, which further reduces the value of early-time data.<sup>188</sup> And, as the Staff witnesses noted, while these storage effects will pass with time so that the aquifer responds properly to the induced drawdown, they often result in deviations from a Theis type-curve that can mimic a recharge boundary.<sup>189</sup> For instance, if the Theis type-curve is fit to early-time drawdown

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<sup>183</sup> See Kreamer Initial Test. at 7.

<sup>184</sup> CBR Rebuttal Test. at 4-5.

<sup>185</sup> See Staff Rebuttal Test. at 17-18 (referencing Ex. CBR029, at 16 (G.P. Kruseman & N.A. de Ridder, *Analysis and Evaluation of Pumping Data* (2d ed. 1994))).

<sup>186</sup> See CBR Rebuttal Test. at 5.

<sup>187</sup> See *id.* (Lewis, Nelson, Pavlick).

<sup>188</sup> See *id.* (Lewis, Nelson, Pavlick); Staff Rebuttal Test. at 20 (Back, Lancaster, Striz).

<sup>189</sup> See Staff Rebuttal Test. at 20 (Back, Lancaster, Striz).

data impacted by wellbore storage and near-wellbore effects, the late-time data will then fall below the Theis curve and appear to be a recharge boundary.<sup>190</sup> The Staff witnesses concluded that the “use of early-time data in a Theis or Cooper-Jacob time-drawdown analysis is inappropriate,”<sup>191</sup> with Dr. Kreamer agreeing at the hearing that the early-time data are not as reliable.<sup>192</sup>

ii. LATE-TIME DATA

Dr. Kreamer admonished CBR for ignoring the flattening of the curve during the late-time periods of the well tests, which he claimed is associated with the drawdown encountered in a recharge zone and so evidences a preferential flow path through the heterogeneous UCU into the BC/CPF aquifer.<sup>193</sup> As described in the Test #8 report, and confirmed by Staff review, two of the eight observation wells (CPW-1 and Monitor-3) and the pumping well (CPW-1A) show late-time deviations in the Theis type-curves that could be interpreted as recharge.<sup>194</sup>

Seeking to counter Dr. Kreamer’s assertion of arbitrary data evaluation, Staff witnesses Back, Lancaster, and Dr. Striz declared that the authors of CBR’s aquifer pumping test report clearly explained their rationale for matching the data to the Theis type-curve.<sup>195</sup> According to the Test #8 report, the type-curve matching used for this analysis generally focuses on late-time drawdown data since these data are normally considered the most reliable indicator of overall aquifer response. But according to the report, because the drawdown data for wells CPW-1/1A and Monitor-3 showed a late-time flattening of the curve, as contrasted with the drawdown data for well Monitor-5 (and all other distant observation wells) that exhibited a more typical confined aquifer drawdown response, the type-curve matching for wells CPW-1/1A and Monitor-3 focused on middle-time data for the drawdown phase of the test.<sup>196</sup> The pumping test report further explained that the flattening of the drawdown curve in wells located in the immediate vicinity of the pumping well (i.e., CPW-1 and Monitor-3) was believed to be related to a transmissivity contrast between lower permeability aquifer materials near the pumped well location and higher permeability aquifer materials elsewhere within the test’s ROI.<sup>197</sup>

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<sup>190</sup> See *id.* (citing Ex. NRC016, at 233 (Fletcher G. Driscoll, *Groundwater and Wells* (2d ed. 1986)) [hereinafter *Driscoll Text*]).

<sup>191</sup> *Id.* at 21 (Back, Lancaster, Striz).

<sup>192</sup> See Tr. at 385.

<sup>193</sup> See Kreamer Initial Test. at 6.

<sup>194</sup> See Test #8 Rep. at 13; Staff Rebuttal Test. at 19 (Back, Lancaster, Striz).

<sup>195</sup> See Staff Rebuttal Test. at 17 (citing Test #8 Rep. at 13).

<sup>196</sup> See Test #8 Rep. at 13.

<sup>197</sup> See *id.*

While agreeing that the pumping test report acknowledged the flattening of the data, Dr. Kreamer criticized the report for presenting only one possible explanation for this deviation from the type-curve and for not discussing or analyzing the possibility of lack of containment.<sup>198</sup> But CBR witnesses Lewis, Nelson, and Pavlick noted, however, that Dr. Kreamer did not, either in his initial or rebuttal testimony, attempt to provide alternative results using one or more of his suggested curve fitting techniques (i.e., De Glee, Hantush-Jacob, and Walton methods) or otherwise demonstrate a sufficient effect that would alter the conclusions reached by CBR and the Staff in evaluating the pumping test data.<sup>199</sup>

In addressing this issue, the Staff disputed Dr. Kreamer's "lack of containment" explanation by offering several other reasons that might account for the flattening in the Theis curve at late-time data points during the pumping test. Staff witnesses Back, Lancaster, and Dr. Striz supported CBR's explanation that the deviation is related to an increase in transmissivity, stating that CBR's reasoning is plausible because an increase in flow capacity away from the pumping well could manifest as late-time data that differ from the Theis type-curve so as to resemble a recharge boundary.<sup>200</sup>

Another possible explanation, according to these Staff witnesses, is that water is being released from storage in the first several feet of the aquitard immediately overlying the BC/CPF aquifer. In this scenario, stresses induced during aquifer test pumping propagate into the thick, low-permeability UCU, compressing the aquitard matrix and yielding a small amount of water from storage. Although this effect can show up on a Theis type-curve in a way that mimics a recharge boundary, it does not represent recharge from overlying aquifers. Moreover, these Staff witnesses asserted, this effect would be consistent with the MEA pumping test responses for wells CPW-1 and Monitor-3, which show apparent "recharge" behavior at late-time. These wells, the Staff witnesses maintained, were subjected to significant drawdown as a consequence of their proximity to the pumping well and the resulting differential pressure across the aquitard could have slightly compressed the overlying aquitard sediments to produce enough water to show this apparent "recharge" effect.<sup>201</sup>

Additionally, Staff witnesses Back, Lancaster, and Dr. Striz noted that misinterpretation of wellbore storage effects or near-wellbore effects could explain Theis type-curve deviations that can mimic a recharge boundary. If the Theis type-curve is fit to early-time drawdown data that are impacted by these early-time effects, the late-time data will fall below the Theis type-curve and appear to

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<sup>198</sup> See Kreamer Initial Test. at 6.

<sup>199</sup> See CBR Rebuttal Test. at 11.

<sup>200</sup> See Staff Rebuttal Test. at 19.

<sup>201</sup> See *id.* at 19-20 (Back, Lancaster, Striz).

be aquifer recharge.<sup>202</sup> Furthermore, Dr. Striz testified that if there was a recharge boundary as alleged by Dr. Kreamer, the drawdown would not have reached out to 8800 ft during the short period of time that the well was pumped.<sup>203</sup>

On the last day of the hearing, Dr. Kreamer elaborated on his claims by attempting to show that well Monitor-3 detected a preferential pathway for groundwater flow indicating leakage in the containment of the production zone. In part, Dr. Kreamer postulated that a re-evaluation of the Cooper-Jacob analysis for well Monitor-3<sup>204</sup> would show a clear classic recharge boundary that supplies 30 percent more water in this area of the BC/CPF channel sand than would be predicted from the drawdown analysis, and that the storage coefficient for this monitoring well is almost two orders of magnitude different than the rest.<sup>205</sup> Dr. Kreamer also stated that this is a very localized flow from unknown sources in an area where there is a dip in the Pierre Shale and corresponding depression in the top of the BC/CPF with resultant leakage through fractures in the UCU.<sup>206</sup>

CBR witness Shriver countered Dr. Kreamer's claim with testimony indicating that the top of the elevation of the Pierre Shale is an erosional surface where the ancestral stream channel flowed over a width of several miles, scouring as it meandered, and depositing a stack of channel sand on the eroded Pierre Shale. Mr. Shriver stated that, consistent with CBR's other borings in the area, there is no indication of radical offsets in the structural contour maps that would be present with the faults and fractures hypothesized by Dr. Kreamer.<sup>207</sup>

## **2. Board Findings on Alleged CBR Misinterpretation of the Aquifer Pumping Test Data**

The evidentiary record before the Board establishes that CBR conducted a pumping test near the center of the MEA in May 2011 to (1) assess the hydraulic communication within the BC/CPF aquifer; (2) confirm the presence or absence of the BC/CPF within the MEA; (3) estimate the hydraulic properties of the BC/CPF within the pumping test's ROI; and (4) demonstrate containment

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<sup>202</sup> See *id.* at 20. In this regard, the Staff witnesses provided a quotation from the Driscoll text, described as an industry standard, to the effect that "early data reflect the removal of water stored in the casing," and "[b]efore the effect of casing storage on pumping test data was recognized, an interpreter might have mistaken the flattened or second part of the drawdown curve as an indication of aquifer recharge." *Id.* (quoting Driscoll Text at 232, 233).

<sup>203</sup> See Tr. at 502.

<sup>204</sup> During his testimony at the hearing, Dr. Kreamer referred to well Monitor-3 as CW-3. See, e.g., Tr. at 974.

<sup>205</sup> See Tr. at 937-41.

<sup>206</sup> See Tr. at 970-79.

<sup>207</sup> See Tr. at 979-82.

(i.e., hydraulic isolation) between the production zone and the overlying Brule aquifer.<sup>208</sup> This MEA aquifer pumping test was a large, long-term, multiple-day test with a large ROI (8800 ft, or over 1.5 miles) that averaged the hydraulic behavior over the wide area in the middle of the MEA, minimizing the impact of small-scale anisotropy and heterogeneity encountered in most aquifers.<sup>209</sup>

OST contested the adequacy of CBR's analysis of the pumping test results for two primary reasons: (1) the Applicant evaluated the pumping test data with only the Theis method and that technique was inappropriate because of its inherent assumptions (e.g., homogeneity, isotropy, uniform thickness, and infinite lateral extent) and because it did not consider potential leakage from the UCU into the production zone;<sup>210</sup> and (2) CBR used selective data for each observation well, ignoring the early-time data, as well as employing what appears to OST to be a variable undocumented procedure for fitting the Theis type-curves to the pumping test data.<sup>211</sup>

*a. Board Findings on the Singular Use of the Theis Method*

OST criticized CBR for using only one analysis technique in its evaluation of the May 2011 pumping test data, claiming that the Applicant referenced the use of the Cooper-Jacob straight-line distance-drawdown method but did not present the results of this supplemental analysis. Regarding the latter claim, the Board finds that CBR not only presented the graphical results of the Cooper-Jacob analysis,<sup>212</sup> but also documented that the analysis of this figure resulted in values of transmissivity and storativity (i.e.,  $T = 737 \text{ ft}^2/\text{d}$ ,  $S = 4.9 \times 10^{-5}$ ) that are consistent with the Theis drawdown analysis.<sup>213</sup>

Concerning Dr. Kreamer's assertions of analysis inadequacy arising from CBR's use of only one method to evaluate the May 2011 pumping test data, we find that CBR graphically analyzed both the drawdown and recovery data to estimate aquifer transmissivity and storativity using the Theis drawdown and recovery method and the Cooper-Jacob distance-drawdown method.<sup>214</sup> The Board also finds that Crow Butte was prepared to use more complex analytical techniques if needed,<sup>215</sup> but appropriately saw no need to do so based, inter alia, on

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<sup>208</sup> See CBR Initial Test. at 26, 28 (Lewis, Nelson, Pavlick).

<sup>209</sup> See Staff Rebuttal Test. at 26 (Back, Lancaster, Striz).

<sup>210</sup> See Kreamer Initial Test. at 6.

<sup>211</sup> See *id.* at 2.

<sup>212</sup> See Test #8 Rep. figs. app. at PDF 50 (fig. 18).

<sup>213</sup> See CBR Rebuttal Test. at 10 (Lewis, Nelson, Pavlick) (citing Test #8 Rep. at 12-13).

<sup>214</sup> See CBR Initial Test. at 29 (Lewis, Nelson, Pavlick) (citing Theis Article and Cooper-Jacob Article).

<sup>215</sup> See CBR Rebuttal Test. at 10 (Lewis, Nelson, Pavlick).

the apparent consistency of the hydraulic parameters resulting from these analyses for values that, as Dr. Kreamer acknowledged, can often vary by an order of magnitude or more.<sup>216</sup> The Board also notes that OST witness Wireman agreed that the use of the Theis method was a starting point for pumping test analyses (and would help to determine if more sophisticated analyses are needed),<sup>217</sup> and that Dr. Kreamer did not directly dispute CBR's derivation of the recovery data, which shows the same consistency for the hydraulic conductivity values as was derived from the drawdown data.<sup>218</sup>

We further find, as Staff witnesses noted, that CBR conducted the pumping test according to its NDEQ-approved plan using accepted industry testing and analysis procedures that are incorporated into ASTM standards.<sup>219</sup> We observe as well that CBR declared that, given the great thickness, low permeability, and depth of the BC/CPF confining unit, there is no conceptual basis that would support the need for the additional aquifer test analyses called for by OST, and that the local variations in aquifer thickness and hydraulic conductivity are conceptually consistent with observed drawdown responses in a highly-confined aquifer. As such, CBR maintained, there is no conceptual support for the need to perform the hypothetical aquifer leakage analyses deemed necessary by the Intervenor.<sup>220</sup> We agree, noting also that Dr. Kreamer did not provide an independent estimate for the rate of leakage based on his alternative interpretation of the MEA pumping test data using any of his suggested alternative, allegedly superior methods (i.e., De Glee, Hantush-Jacob, and Walton methods) to support his call for these techniques to be implemented by Crow Butte.<sup>221</sup>

Regarding the use of a leaky aquifer method, CBR decided not to do such an analysis on the pumping test data, even though it appears that it would not have been difficult to do so, likely requiring only the selection of such an analysis technique available in the software used to perform the Theis/Cooper-Jacob methods analysis.<sup>222</sup> While we consider this lost opportunity not to be the best engineering decision (if for nothing more than to satisfy intellectual curiosity and/or avoid providing the basis for a future challenge to the MEA license application), OST has not demonstrated there is any regulatory mandate for the Applicant to have done so. Furthermore, we find that the consistency of

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<sup>216</sup> See Test #8 Rep. tbls. app. at 10 of 10 (tbl. 8); Tr. at 485-88 (Kreamer).

<sup>217</sup> See Tr. at 682.

<sup>218</sup> See Test #8 Rep. tbls. app. at 10 of 10 (tbl. 8), figs. app. at PDF 50 (fig. 18).

<sup>219</sup> See Staff Initial Test. at 26 (Back, Lancaster) (citing ER at 3-45; Tech. Rep. at 2-82); *see also* ASTM Theis Analysis Standards.

<sup>220</sup> See CBR Rebuttal Test. at 10-11 (Lewis, Nelson, Pavlick) (citing Test #8 Rep. at 12-13).

<sup>221</sup> See *id.*

<sup>222</sup> See Tr. at 394-95, 495-96, 498-502, 880 (Lewis).

results from the Theis/Cooper-Jacob analyses provides sufficient information to meet the acceptance criteria for the MEA conceptual model.

Finally, with respect to the analysis assumptions, we concur with all the parties that all geologic strata exhibit heterogeneity and anisotropy at some scale,<sup>223</sup> and that application of the Theis and Cooper-Jacob techniques to these systems is routinely done in practice with an understanding of the assumptions inherent to their use.<sup>224</sup> Furthermore, Dr. Kreamer used the graphs in the pumping test report that are based on these solution techniques to justify his opinion that recharge boundaries indicating vertical leakage from heterogeneity were detected in some of the well data,<sup>225</sup> and even acknowledged that his suggested, more complex analysis methods (i.e., the De Glee, Hantush-Jacob, and Walton methods) may have the same assumptions about aquifer homogeneity, isotropy, uniform thickness, and lateral extent, so as to suffer from the same potential limitations as the Theis and Cooper-Jacob methods.<sup>226</sup>

*b. Board Findings on CBR's Alleged Use of Selected Data*

Dr. Kreamer asserted that CBR arbitrarily analyzed only selected portions of the data, choosing late-time data in some cases and middle-time data in others without a justifiable basis for analyzing only a selected portion of the pumping data rather than the test information in its entirety.<sup>227</sup> We find OST's claims that only selective portions of the data were analyzed, and that the report did not present an analysis of the complete data set, are unsupported.

Initially, we find that the MEA aquifer pumping test report presents draw-down and recovery response curves showing all data points for all of the observation wells used in the aquifer pumping test.<sup>228</sup>

The Board also finds that the rationale for analyzing the aquifer pumping test data was clearly explained by the Applicant and is consistent with recommended practice.<sup>229</sup> Specifically, CBR has verified that type-curve matching generally avoided the early-time data insofar as those data deviated from the type-curves,<sup>230</sup>

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<sup>223</sup> See CBR Rebuttal Test. at 11 (Lewis, Nelson, Pavlick); NRC Rebuttal Test. at 25 (Back, Lancaster, Striz); Tr. at 491-94 (Kreamer).

<sup>224</sup> See NRC Rebuttal Test. at 25 (Back, Lancaster, Striz); CBR Rebuttal Test. at 11 (Lewis, Nelson, Pavlick); Kreamer Initial Test. at 6.

<sup>225</sup> See Kreamer Rebuttal Test. at 2; Tr. at 940-41, 1021, 1024-25 (Kreamer).

<sup>226</sup> See Tr. at 507-09 (Kreamer).

<sup>227</sup> See Kreamer Initial Test. at 2, 7.

<sup>228</sup> See Test #8 Rep. at PDF 79-96 (figs. C1 to C17); Staff Rebuttal Test. at 17 (Back, Lancaster, Striz).

<sup>229</sup> See Test #8 Rep. at 13.

<sup>230</sup> See CBR Rebuttal Test. at 4-6 (Lewis, Nelson, Pavlick).



which is in line with the published explanation in an authority such as Driscoll as to why early-time data do not characterize the aquifer response as accurately as do mid- and late-time data.<sup>231</sup> In applying the Theis type-curve-fitting method (and likewise the other analysis methods advocated by Dr. Kreamer, which all seemingly share the same assumptions of homogeneity, isotropy, uniform thickness, and lateral extent), the Board finds that less weight should be given to the early-time data because those data may not closely represent the theoretical drawdown equation on which the type-curve is based.

When matching pumping results to the Theis type-curves, based on the information in the evidentiary record before us, we find that CBR correctly focused on late-time data as the most reliable indicator of overall aquifer response. We do agree that the drawdown data for wells CPW-1 and Monitor-3 (that are close to the pumping well CWP-1A) showed a late-time flattening of the curve not suitable for Theis curve fitting, whereas the drawdown data for all the other distant observation wells exhibited a more typical confined aquifer drawdown response.<sup>232</sup> And while it was Dr. Kreamer's position that this isolated flattening of the curve may be indicative of encountering a recharge zone, he nonetheless failed to produce any corroborating evidence supporting his position that the UCU is leaking sufficiently to jeopardize containment or prevent CBR from controlling its production fluids during operations and restoration.

Indeed, while Dr. Kreamer maintained there is a lack of containment in the BC/CPF as demonstrated by the departure of data points from the expected Theis curve during the pumping test,<sup>233</sup> we find just as, if not more, credible CBR's explanation that the flattening of the curve is due to higher transmissivities encountered at distances from the pumping well.<sup>234</sup> We note as well that the Staff agreed with CBR's position regarding a higher transmissivity boundary, and proffered two other reasons for this flattening of the curves (i.e., additional water release from aquitard storage due to high induced stresses from overburden depths and aquifer drawdown during the pumping test, and misinterpretation of wellbore storage/near-wellbore effects), either or both of which can mimic recharge deviations in the Theis graphs.<sup>235</sup>

As acknowledged by OST,<sup>236</sup> all the parties' positions on the significance of the curve flattening are feasible hypotheses. Nonetheless, we find on the basis of the record before us that the CBR and Staff theories deserve greater consideration in that they are consistent with the many other site characteristics and

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<sup>231</sup> See *supra* note 202.

<sup>232</sup> See Staff Rebuttal Test. at 19-20 (Back, Lancaster, Striz).

<sup>233</sup> See Kreamer Rebuttal Test. at 2.

<sup>234</sup> See Test #8 Rep. at 13; *id.* app. C at PDF 80, 82 (graphs C1 & C3).

<sup>235</sup> See Staff Rebuttal Test. at 19-20 (Back, Lancaster, Striz).

<sup>236</sup> See Tr. at 565 (Wireman).

observations that support the Applicant's overall position that not only will the fluids in the production zone continue to be contained to assure minimal impact on groundwater quality, but that the BC/CPF is sufficiently interconnected for CBR to control production fluids during operations and restoration.<sup>237</sup> In contrast, Dr. Kreamer offered no such corroborating evidence of other, co-existing factors supporting his position that there is localized leakage of sufficient magnitude to impact the containment properties and internal interconnections of the aquifer to control fluid migration within the BC/CPF. Accordingly, given the totality of the evidence before us, we reject his claim as lacking sufficient evidentiary support.

### **3. *Summary of Board Findings on Misinterpretation of Aquifer Pumping Test Data***

In sum, the rationale for why CBR analyzed the aquifer pumping test data as it did, both as to the use of only the Theis and Cooper-Jacob methodologies and the supposed improper data selectivity, was clearly explained by the Applicant in a manner consistent with recommended practice. Moreover, as to the judgment about what portion of the Theis type-curve to use after early-time effects have dissipated (i.e., middle- to late-time), in contrast to the Intervenor's failure to provide a sufficient evidentiary foundation to support Dr. Kreamer's opinion that significant localized aquifer leakage impacts CBR's conceptual hydrogeologic model for the MEA, we find that CBR's and the Staff's theories as to the late-time deviations detected at the two well locations are plausible and consistent with their other proffered information demonstrating the containment and connectivity characteristics of the MEA production zone.

## **B. Aquifer Heterogeneity and Anisotropy from Fracturing/Faulting**

### **1. *Parties' Position on Aquifer Heterogeneity and Anisotropy from Fracturing/Faulting***

Intervenor witnesses alleged that faults within the MEA and other fractures associated with the Pine Ridge escarpment and other areas create heterogeneity and anisotropy in the aquifers underlying the MUs that, in turn, have the potential to allow transmission of production fluids to impact regional groundwater and surface water resources. Before discussing this topic in detail, we first note that OST witness Dr. LaGarry, without contradiction, defined a "fracture" as a crack in the geologic structure, a "fault" as a fracture that has displaced the

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<sup>237</sup> See *infra* sections V.C, IX.A.2, and IX.B.2 for a summary of the site observations and characteristics that support BC/CPF aquifer containment.

strata in some direction, and a “joint” as a series of nondisplacement fractures oriented in parallel sets.<sup>238</sup> While we refer to named faults as such in this decision, in other instances we will use the term “fracture” to include faults, joints, or, for that matter, any other cracking, as subsets of this generic term.

*a. Fracturing/Faulting Underlying the MEA*

The Staff in its EA indicates that the relevant geologic literature, including a 1985 article by James B. Swinehart et al., reports two postulated faults near the MEA: the Pine Ridge fault, which is reportedly located along the northern edge of the Pine Ridge escarpment, approximately 5 miles north of the northern MEA boundary; and the Niobrara River fault, which is reported to run parallel to the river along the southern margin of the MEA.<sup>239</sup> Citing the Swinehart article, which relies on large-scale (i.e., regional-level) cross-sections, as well as a 1994 article by R.F. Diffendal, which was based on a lineament analysis of linear landscape features as possible expressions of an underlying geological structure such as a fault, Dr. LaGarry asserted that these potential faults north and south of Marsland may allow production fluids to travel upward into the overlying aquifers and laterally into adjacent areas to the west and east.<sup>240</sup> In this regard, referencing Figure 1 of his initial testimony that shows a geologic cross-section of far western Nebraska, including the MEA site, Dr. LaGarry noted that the Niobrara River fault and the Pine Ridge fault are among those that were large enough to be documented by the Swinehart article in compiled data from approximately 12,500 drilling records in western Nebraska and by drilling new boreholes at 5-mile intervals along the transect shown on the figure.<sup>241</sup>

In response, Staff witnesses Back and Lancaster testified that neither the large-scale regional interpretation nor the lineament analyses cited by Dr. LaGarry as proof of permeable pathway faults are persuasive when compared with

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<sup>238</sup> See Tr. at 787-88.

<sup>239</sup> See EA at 3-11 (citing Ex. NRC012 (James B. Swinehart et al., *Cenozoic Paleogeography of Western Nebraska* (1985) [hereinafter Swinehart Article])).

<sup>240</sup> See Ex. OST010 at PDF 5-6 ([Hannon E. LaGarry] Expert Opinion on the Environmental Safety of In-Situ Leach Mining of Uranium Near Marsland, Nebraska (2013) (citing Swinehart Article; Ex. NRC013 (R.F. Diffendal, Jr., *Geomorphic and structural features of the Alliance 1° × 2° Quadrangle, western Nebraska, discernible from synthetic-aperture radar imagery and digital shaded-relief maps*, 30 *Univ. of Wyo. Contributions to Geology* (Dec. 1994) [hereinafter Diffendal Article])) [hereinafter LaGarry Initial Test.].

<sup>241</sup> See *id.* at PDF 4 (fig. 1), PDF 5-6. Figure 1 is an annotated version of cross-section A-A' in Figure 5 of the 1985 Swinehart et al. article. Compare *id.* at PDF 4, with Swinehart Article at 214. According to Dr. LaGarry, of the five faults shown on Figure 1 (which are designated by vertical black lines with offset arrows at the base of the cross-section), the Niobrara fault is the second line from the left and the Pine Ridge fault is represented by the rightmost line. See Tr. at 825.

the analysis performed by CBR of site-specific cross-sections created with geophysical log data and drill cuttings from the MEA site.<sup>242</sup> And regarding the lineaments analysis in the Diffendal article, which involved observations based on large-scale mapping and the premise that a lineament represents a subsurface geologic fault, fracture, or joint, these Staff witnesses declared this approach to be speculative until field verification (i.e., “ground truthing”) is performed,<sup>243</sup> a characterization with which Dr. LaGarry seemingly concurred.<sup>244</sup> Staff witnesses Back and Lancaster asserted that the lineaments described in the Diffendal article have not been verified to be anything more than linear alignments of ground surface features so that subsurface exploration (as CBR has conducted on the MEA site) would be essential in determining the existence, extent, and possible impacts on containment of any fault or fracture.<sup>245</sup>

While acknowledging CBR employed geophysical logging of boreholes and constructed cross-sections to demonstrate the absence of faulting in the region, Dr. LaGarry declared that such methods do not delineate faults unless there is significant displacement. According to Dr. LaGarry, better techniques would have included electrical resistivity, seismic reflection and seismic reflection techniques, or possibly ground penetrating radar.<sup>246</sup> But CBR witness Lewis noted that fault offsets would have a specific signature in the geophysical logs that would suggest the presence of vertical displacements, yet none of these signatures were found in the 1600 logs for the site made by CBR, thereby confirming that CBR’s geological investigations did not encounter any sign of faulting across the MEA.<sup>247</sup>

Applicant witnesses Lewis, Nelson, Pavlick, and Shriver did concede, however, that faults may exist at a regional level, but declared there is no evidence of any significant faulting within the MEA that will affect containment or transmit production fluids based on the data from the large number of boreholes and

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<sup>242</sup> See Staff Initial Test. at 34.

<sup>243</sup> See *id.*

<sup>244</sup> Dr. LaGarry described a lineament as an “unexplained straight line feature visible in remotely sensed imagery” (such as aerial photography) and noted that whether a lineament is a fracture can only be verified by a site investigation. Tr. at 794-95.

<sup>245</sup> See Staff Initial Test. at 34-35; see also *id.* at 24-25 (Back, Lancaster) (describing the CBR MEA site characterization program that included drilling 1600 boreholes, creating cross-sections to cover the entire site based on geophysical logs and drill cuttings from 57 boreholes, supplemented with geophysical logs from oil and gas exploration wells previously drilled near the MEA, as well as isopach maps and structure contour maps based on borehole data).

<sup>246</sup> See Ex. OST016-R, at 2 (Rebuttal Opinion Testimony of Hannan LaGarry (rev. Oct. 3, 2018)) (citing Ex. OST019 (Mark R. Lewis & F.P. Haeni, The Use of Surface Geophysical Techniques to Detect Fractures in Bedrock — An Annotated Bibliography, U.S. Geological Survey (USGS) Circular 987 (1987)).

<sup>247</sup> See Tr. at 805-06.

wells drilled on the site to date, or any other surficial or subsurface geological information that exists.<sup>248</sup> In this regard, CBR witnesses Lewis, Pavlick, and Shriver pointed to regional cross-sections that extend from south of the Niobrara River, northward through the MEA, across the existing CBR ISR facility and the proposed North Trend Expansion Area (NTEA), with each cross-section passing the presumed location of the Niobrara River fault and Pine Ridge fault and none displaying a significant discontinuity of the BC/CPF aquifer.<sup>249</sup>

And by way of example, these CBR witnesses stated that none of the cross-sections (including an additional five cross-sections associated with the proposed Three Crow Expansion Area (TCEA) west of the current CBR ISR facility)<sup>250</sup> substantiate a large north-side-down vertical displacement across the area of the Pine Ridge escarpment. They noted additionally that in two of the cross-sections the top of the Pierre Shale surface elevations decreases southward, which they maintained is contradictory to a north-side-down vertical displacement. While these witnesses could not rule out the possibility of a small offset, they nonetheless concluded that the results from the boring logs demonstrate that there is not a large offset fault across the MEA that could act as a boundary for groundwater flow and movement that, in turn, could impact MEA operations.<sup>251</sup>

Moreover, as Dr. LaGarry acknowledged, the cross-section in Figure 1 of his initial testimony, which was taken from cross-section A-A' of Figure 5 of the Swinehart article and intersects both the Niobrara River and Pine Ridge faults,<sup>252</sup> is located 30 miles to the west of the MEA.<sup>253</sup> As was noted during the hearing, cross-section B-B' of Figure 5 of the Swinehart article is closer, albeit still 7.5 miles to the east of the MEA, and intersects the Pine Ridge fault but does not encounter the Niobrara River fault.<sup>254</sup> Because this cross-section showed that the Niobrara River fault ceases or deviates somewhere between 30 miles west and 7.5 miles east of the MEA, while the Pine Ridge fault runs to the north of the MEA, Dr. LaGarry conceded that, as is the case with the Pine Ridge fault, the Niobrara River fault likely does not underlie the MEA.<sup>255</sup> Additionally, CBR witness Shriver observed in connection with cross-section B-B' that the Whitney Ash marker bed in the White River Group (i.e., the Brule

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<sup>248</sup> See CBR Rebuttal Test. at 23.

<sup>249</sup> See *id.* at 17; see also Tech. Rep. at 2-58 to -59; Tech. Rep. Figs. at 88-91 (figs. 2.6-21 to -24).

<sup>250</sup> See CBR Rebuttal Test. at 17 (citing Ex. CBR039, at PDF 3-4 (Tech. Rep. app. Z) (figs. 2 & 3) [hereinafter Three Crow Cross-Sections]).

<sup>251</sup> See *id.*

<sup>252</sup> See *supra* note 241.

<sup>253</sup> See Tr. at 826.

<sup>254</sup> See Tr. at 830 (Lancaster); see also Staff Initial Test. at 35 (Back, Lancaster).

<sup>255</sup> See Tr. at 833-34.

Formation and the underlying Upper and Middle Chadron units) is shown as a dotted line, which in CBR's analysis continues beneath the MEA without any structural offset, implying that no faults exist in the production area — a point that Dr. LaGarry agreed was “well taken.”<sup>256</sup>

Staff witnesses Back and Lancaster were also critical of Dr. LaGarry for relying on the Swinehart article's large-scale, regional-level cross-sections derived from widely spaced (i.e., 5-mile interval) boreholes.<sup>257</sup> In contrast to this referenced regional study, these witnesses testified, the Staff's EA and SER provide a thorough discussion of the existence of reported faults near the MEA. That discussion, they maintained, concludes there is no evidence of vertical offsets indicative of faults and provides the reasons why, even if such faults exist, their potential impacts on the hydrogeologic behavior of the underlying strata beneath the site would not lead to significant adverse environmental impacts to surface water or groundwater as a result of MEA operations.<sup>258</sup> In this regard, while acknowledging reports that the Pine Ridge and Niobrara River faults transect the MEA, the EA indicates the Staff concluded these reports are false based on extensive independent review of available literature on these faults (including cross-sections provided in the literature), CBR's site-specific and regional cross-sections, and CBR's site-specific and regional structure contour maps.<sup>259</sup>

Regarding other fractures not associated with faults, Dr. LaGarry stated that his work over the past 25 years has shown that there are likely hundreds more fractures.<sup>260</sup> While CBR witnesses Lancaster, Nelson, Pavlick, and Shriver acknowledged that faults and other fractures may exist at a regional level, they stated they knew of no evidence of any fracturing within the MEA that would have any effect on the proposed ISR activities and further asserted that any undetected fractures will have no hydrologic effect based on the wealth of other evidence confirming containment of the BC/CPF.<sup>261</sup> Moreover, these witnesses asserted that if any minor fractures were to appear, they would close up quickly as a result of overburden stress from the weight of the overlying strata.<sup>262</sup>

CBR witnesses Lancaster, Nelson, Pavlick, and Shriver concluded that there is no evidence of a fault or fracture in the MEA that could serve as a potential contaminant pathway. And, based on the undisputed evidence that the BC/CPF is a confined aquifer, they further stated it is highly unlikely the MEA contains a fault or a connected pathway of faults in the UCU that is capable of trans-

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<sup>256</sup> See Tr. at 835-36.

<sup>257</sup> See Staff Initial Test. at 34.

<sup>258</sup> See *id.* at 32-33 (citing EA at 3-11 to -14; SER at 33-36).

<sup>259</sup> See EA at 3-11 to -14.

<sup>260</sup> See LaGarry Initial Test. at PDF 6.

<sup>261</sup> See CBR Rebuttal Test. at 23.

<sup>262</sup> See *id.*

mitting contaminants. Finally, according to these CBR witnesses, given the strong, downward hydraulic gradient between shallow aquifer and the BC/CPF sandstone, migration of fluids along any fault or fracture in the system would likely be downward, precluding any impacts to surficial aquifers.<sup>263</sup>

OST nonetheless posed the question of what would happen if faults or significant transmissive fracturing did exist within the MEA, with Dr. LaGarry observing:

Of greatest concern is [the MEA's] proximity to the Niobrara River (a National Scenic River), which is used for recreation by thousands of people each year. Unfortunately, if the High Plains Aquifer were to become contaminated, the effects would be irreversible and catastrophic for the local agricultural economy . . . [and] would likely lead to the depopulation of the region.<sup>264</sup>

Acknowledging that it is more uncertain whether the Niobrara River fault underlies the southern portion of the MEA, as opposed to the Pine Ridge fault that is well north of the MEA, the Staff's EA indicates that even if these faults do exist beneath the MEA, their presence would not lead to significant adverse environmental impacts because (1) ambient groundwater flow in the BC/CPF sandstone aquifer is to the northwest and away from the reported Niobrara River fault; (2) once uranium recovery begins, groundwater flow would be inward toward the MUs (as required by License Condition 10.1.6) and away from both the Pine Ridge and Niobrara River faults; (3) based on groundwater velocity estimates provided in the EA, it would take at least 500 years for groundwater to migrate from the MEA to the reported Pine Ridge fault, during which time any constituents of the lixiviant would attenuate through sorption and dilution; (4) the ambient hydraulic gradients are strongly downward from the overlying aquifers of the Brule Formation and Arikaree Group into the BC/CPF sandstone aquifer and, therefore, production fluids would not be able to migrate upward through any preferential pathways; (5) the downward gradient would become even more pronounced during restoration operations; and (6) CBR will conduct additional aquifer pumping tests in each MU to identify hydraulic boundaries, including those caused by faulting.<sup>265</sup>

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<sup>263</sup> See *id.* (citing Ex. CBR012 (Tech. Rep. app. AA-3 (Letter to Doug Pavlick & Larry Teahon, Cameco Resources, from Robert Lewis, AquiferTek (Dec. 17, 2014)) [hereinafter Hydraulic Containment Report]).

<sup>264</sup> LaGarry Initial Test. at PDF 6.

<sup>265</sup> See EA at 3-14 (citing ER at 3-49; SER at 139-40).

*b. Hydrogeological Effects of the Pine Ridge Escarpment*

Also with regard to aquifer heterogeneity and anisotropy, OST witness Wireman argued that, in addition to those factors affecting regional groundwater flow, CBR's characterization of northwest Nebraska structural geology is insufficient to develop an acceptable conceptual model of MEA site hydrology that is adequately supported by site data, particularly as it relates to the potential effects of the Pine Ridge escarpment on the MEA hydrogeology. Because CBR concluded that faulting does not exist beneath the MEA, Mr. Wireman claimed that Crow Butte improperly failed to discuss how structures like the Pine Ridge escarpment affect groundwater flow in the Arikaree and White River Groups.<sup>266</sup> It was his position that the Pine Ridge escarpment occurred prior to the deposition of the Chadron Formation and, as a result, was uplifted prior to the deposition of the BC/CPF, which would then be impacted by the significant discontinuity of the escarpment feature. And according to Mr. Wireman, CBR's conclusion that the BC/CPF is not affected by the Pine Ridge escarpment cannot be correct if the uplift predates the BC/CPF.<sup>267</sup>

In response to Mr. Wireman's concern about whether CBR's characterization of the Pine Ridge escarpment is sufficient to conceptually model this feature's effects on BC/CPF aquifer groundwater flow, CBR witnesses Lewis, Pavlick, and Shriver noted that Mr. Wireman did not discuss how his view of the structural geology in the area between the existing CBR ISR facility and the MEA can be reconciled with the hydraulic data at those sites. According to these witnesses, if there were a significant discontinuity in the BC/CPF along the Pine Ridge escarpment, no hydrogeological conceptual model can be constructed that would be consistent with the CBR-measured northwestward groundwater flow in the BC/CPF aquifer between the MEA and the existing CBR ISR facility. As a result, these witnesses indicated, Mr. Wireman's conclusions regarding the impacts of the Pine Ridge escarpment, rather than CBR's geological analysis, must be in error.<sup>268</sup>

In support of this view, CBR witnesses Lewis, Pavlick, and Shriver added that none of the regional cross-sections prepared from actual field data substantiate a large north-side-down vertical displacement across the Pine Ridge fault that should exist under Mr. Wireman's Pine Ridge escarpment hypothesis. For two of the cross-sections, these CBR witnesses claimed the top of the Pierre Shale surface elevations decreases southward, which is contradictory to such a

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<sup>266</sup> See Wireman Initial Test. at 3.

<sup>267</sup> See *id.*

<sup>268</sup> See CBR Rebuttal at 16-17; see also EA at 3-29 (fig. 3-8).



north-side-down vertical displacement.<sup>269</sup> While admitting they cannot rule out the possibility of a short/small offset, they nonetheless asserted that the data demonstrate there is not a large offset fault that could act as a boundary for groundwater flow and movement that could impact production operations at the MEA. Overall, these CBR witnesses concluded, nothing in Mr. Wireman's general and speculative assertions relating to the preferential flow path indicated any errors in the discussion of structural geology.<sup>270</sup>

In rebuttal, Mr. Wireman stated that there is significant uncertainty about groundwater flow in the BC/CPF downgradient of the MEA caused by the unknown effect of the Pine Ridge escarpment on these flow paths, given that this escarpment functions as a groundwater divide in the Arikaree and Brule aquifers. As a result, he declared CBR should conduct additional investigations to reduce these uncertainties, including hydrogeologic mapping to locate and characterize the suggested discharge areas, to provide necessary support for the Applicant's position that groundwater flow is not affected by the Pine Ridge escarpment.<sup>271</sup>

Staff witnesses Back, Lancaster, and Dr. Striz expressed support for the CBR position that Mr. Wireman's structural model is not correct. They based their assertion on regional cross-sections confirming that the BC/CPF is a continuous and essentially flat feature (from the MEA to beneath the Pine Ridge escarpment and on through to the existing CBR ISR license area), a pattern repeated with the overlying Chadron, Brule, and Arikaree Formations (from north of the Pine Ridge escarpment to the southern boundary of the MEA). Based on this stratigraphic mapping from explorations and geophysical logging, these Staff witnesses concluded that these formations were deposited without any apparent interruption from the Pine Ridge escarpment.<sup>272</sup> And they went on to point out that the groundwater flow in the BC/CPF aquifer is to the northwest from the MEA toward the existing CBR ISR facility — an unlikely flow pattern if there were a groundwater flow divide in the BC/CPF caused by uplift related to the Pine Ridge escarpment.<sup>273</sup> These Staff witnesses also noted that the field data clearly show that the Brule and Arikaree formations have been significantly eroded on the north side of the Pine Ridge escarpment away from the MEA, as compared with the south side where the MEA is proposed, which, in their

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<sup>269</sup> See CBR Rebuttal at 17 (citing Tech. Rep. Figs. at 87-90 (figs. 2.6-21 to -24); Three Crow Cross-Sections at PDF 3-4).

<sup>270</sup> See *id.*

<sup>271</sup> See Ex. OST015-R, at 2 (Rebuttal Test. of [Michael] Wireman (rev. Oct. 3, 2018)) [hereinafter Wireman Rebuttal Test.].

<sup>272</sup> See Staff Rebuttal Test. at 4.

<sup>273</sup> See *id.* at 4-5 (citing EA at 3-29 (fig. 3-8)).

view, is stratigraphic evidence supporting the position that these formations were deposited before the erosion occurred along the escarpment.<sup>274</sup>

*c. Fracture Analyses*

Relative to the aquifer heterogeneity and anisotropy-related issue of fracture analysis, OST witness Dr. LaGarry expressed concerns about secondary porosity in the form of fractures that have the potential to transmit leaks and excursions through preferential pathways in the Chadron Formation, calling for, among other things, a fracture analysis to help evaluate the extent of these features.<sup>275</sup> When queried about the techniques for a fracture analysis, Dr. LaGarry suggested an inexpensive pedestrian survey of surficial outcrops, claiming that, even with exposure to weathering and no overburden stress, bedrock observed at the surface will, in his opinion, be representative of what the bedrock will look like when buried several hundred feet below the surface and protected from weathering.<sup>276</sup> Dr. LaGarry's approach was rejected by both CBR witness Shriver and Staff witness Lancaster, with Mr. Shriver stating that any undetected fractures at depth are more compressed by the large overburden stresses and less able to transmit fluid. Mr. Shriver also noted that no fractures were observed in the borehole coring within the MEA.<sup>277</sup>

And when asked about what else would be needed to conduct a fracture analysis, OST's witnesses seemed to differ among themselves to a degree. Dr. LaGarry suggested a lineament analysis and surface geophysics to provide confidence in assessing the impact that the fractures have on the containment of the production zone underlying the MEA.<sup>278</sup> OST witness Dr. Kreamer, while calling for the same geophysics and lineament analysis of the surface features as first steps, also championed the usefulness of down-hole TV monitoring for determining aperture size and orientation, satellite information, high-altitude photography, and hydraulic packer testing to estimate the hydraulic characteristics of a detected fracture.<sup>279</sup>

Dr. Kreamer also made the point that a fracture analysis was not performed by CBR, nor required by the Staff, adding that heterogeneous fracture flow, if it were occurring, would diminish the value of spatially limited monitoring wells in the shallow Brule Formation because their interpretation depends on

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<sup>274</sup> See *id.* at 4.

<sup>275</sup> See LaGarry Rebuttal Test. at 1; Tr. at 583.

<sup>276</sup> See Tr. at 681, 804.

<sup>277</sup> See Tr. at 805-07.

<sup>278</sup> See Tr. at 681.

<sup>279</sup> See Tr. at 521-23.

homogeneous layers and the exclusion of discrete fractures.<sup>280</sup> CBR witnesses Lewis, Nelson, and Pavlick, and Staff witnesses Back and Lancaster, on the other hand, argued that the presence of the thick UCU indicating confinement of the BC/CPF Formation was supported by laboratory analysis of two core samples showing that this confining layer possesses an average laboratory vertical hydraulic conductivity of  $1.3 \times 10^{-7}$  cm/sec.<sup>281</sup>

Using the premise that the pumping test analysis shows departure from the Theis type-curve consistent with vertical leakage, Dr. Kreamer likewise emphasized that neither CBR nor the Staff even considered the possibility of fracture flow.<sup>282</sup> At the same time, Dr. LaGarry and Mr. Wireman acknowledged that the mere presence of fractures is not the controlling factor, because the impacts from such an alleged hydraulic heterogeneity depend upon whether the fractures are sufficiently transmissive to provide a preferential pathway for groundwater flow significant enough to adversely impact the containment properties of the BC/CPF.<sup>283</sup> Simply said, as Dr. LaGarry confirmed, the magnitude of fault displacement is immaterial to whether or not a joint, fracture, or fault will transmit fluids.<sup>284</sup>

In this regard, Crow Butte provided evidence indicating that as the hydraulic property of fractures that is derived from the pumping test results discussed in the preceding section, the transmissivity values are indicative of the lack of widespread fractured flow and consistent with the geophysical logging of over 1600 boreholes showing a lack of offsets associated with a fault.<sup>285</sup> In his rebuttal testimony, however, Dr. Kreamer stated that CBR's conclusions and the Staff's analyses rely on the presumption that chemical transport processes, including hydrodynamic dispersion and diffusion, are insignificant relative to the velocity or advective movement of groundwater.<sup>286</sup> According to Dr. Kreamer, their reference to chemical transport processes discussing hydrodynamic dispersion and diffusion also contain the a priori assumption of homogeneous isotopic flow through a non-fractured medium. As the MEA site is dominated entirely by hard-rock strata, Dr. Kreamer asserted, the omission of any analysis of the

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<sup>280</sup> See Kreamer Rebuttal Test. at 2.

<sup>281</sup> See CBR Initial Test. at 36-37; NRC Initial Test. at 28-29.

<sup>282</sup> See Kreamer Rebuttal Test. at 3.

<sup>283</sup> See LaGarry Rebuttal Test. at 2; Tr. at 677 (Wireman).

<sup>284</sup> See LaGarry Rebuttal Test. at 2.

<sup>285</sup> See Tech. Rep. at 2-58 to 2-59, 3-7; see also Tech. Rep. at 87-90 (figs. 2.6-21 to -24); Three Crow Cross-Sections at PDF 3-4 (figs. 2 & 3).

<sup>286</sup> See Kreamer Rebuttal Test. at 3 (citing CBR Initial Test. at 15, 22, 36-38 (Lewis, Nelson, Pavlick); NRC Initial Test. at 28-29, 42-43 (Back, Lancaster)).

possibility of fracture flow typically associated with hard-rock geology is inconsistent with normal hydrogeological and engineering practice.<sup>287</sup>

## **2. Board's Findings on Aquifer Heterogeneity and Anisotropy from Fracturing/Faulting**

Although it often is not apparent whether the Intervenor is referencing the BC/CPF aquifer, the UCU, the Brule Formation, or all of these geologic structures, OST clearly claimed that faulting/fracturing is a major cause for the alleged heterogeneity and anisotropy of transmissivity in the geologic strata underlying the MEA, and that these strata characteristics demonstrate that the Brule aquifer is not hydraulically isolated from the production zone in the BC/CPF. In this regard, OST pointed to lithologic and hydraulic data included in the TR, in conjunction with deviations from the Theis type-curve for the May 2011 pumping test, as proof of such heterogeneities.<sup>288</sup>

As was noted above, Dr. Kreamer's rebuttal testimony alleged that CBR has not considered the use of a fracture analysis and claimed that the omission of such a "robust" analysis typically associated with hard-rock geology is inconsistent with normal hydrogeological and engineering practice.<sup>289</sup> But while CBR's position is supported by numerous other observations demonstrating the integrity of the BC/CPF for containing the operational fluids injected into the production zone,<sup>290</sup> the Board finds that he, as well as Dr. LaGarry (who also called for a fracture flow analysis for the site),<sup>291</sup> failed to provide any evidence of widespread fracturing of the UCU that would suggest the need to conduct a fracture analysis. We find that to perform this evaluation would be a complex, time-consuming, and expensive endeavor that is hard to justify given the lack of any evidence of substantial fracturing of the geologic strata. Common sense dictates that even a simple pedestrian survey to map known geologic outcrops within the MEA, as was suggested by Dr. LaGarry,<sup>292</sup> would be of marginal usefulness in assessing the extent of fracture flow given that the similarities in the characteristics of the cracks (e.g., frequency, aperture dimensions, opening, fill/gouge)<sup>293</sup> in surficial bedrock exposed to weathering when compared to

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<sup>287</sup> See *id.*

<sup>288</sup> See Wireman Initial Test. at 4; Kreamer Rebuttal Test. at 1-3; Tr. at 342, 345, 347, 416, 494, 520-25 (Kreamer).

<sup>289</sup> See Kreamer Rebuttal Test. at 2-3.

<sup>290</sup> See *infra* section V.C for a discussion of BC/CPF containment.

<sup>291</sup> See LaGarry Rebuttal Test. at 2.

<sup>292</sup> See Tr. at 681 (LaGarry).

<sup>293</sup> See Tr. at 521-23 (Kreamer).

those of fractured rock buried under hundreds of feet of overburden stress and protected from weathering would likely be coincidental.

In support of fractures in the MEA, OST also relied heavily on the Diffendal and Swinehart articles, both of which, the Board concludes, contain scientific limitations. Given OST's agreement that a lineament study only detects an unconfirmed linear feature in the surface geography that must be field-verified to confirm the presence of a fault rather than some other straight-line anthropogenic feature,<sup>294</sup> we find that Diffendal's lineament analysis, not having been field-verified within the MEA, is of limited use in detecting or establishing fault locations.<sup>295</sup>

Regarding the evaluations in the Swinehart article, although they were derived from field borings (albeit made at 5-mile spacings), cross-section A-A' in that publication (which was used as the basis for Figure 1 in Dr. LaGarry's initial testimony) was 30 miles west of the MEA.<sup>296</sup> Additionally, cross-section B-B' in that publication is still 7.5 miles to the east of the site, and shows that neither the Pine Ridge nor the Niobrara River faults underlie the MEA,<sup>297</sup> a fact consistent with CBR's conclusion reached after reviewing over 1600 geophysical logs of the subsurface conditions at the site.<sup>298</sup> And besides showing that the Pine Ridge and Niobrara River faults do not cross the MEA, the Swinehart and Diffendal articles are stratigraphic reports that do not include any information on the transmissivity or preferential flow patterns through these fractures.<sup>299</sup>

Moreover, OST's arguments about the value of physical evidence of faulting and the steps that need to be taken to quantify the degree of fracturing at the MEA are eclipsed by the Intervenor's own acknowledgment that the important factor is not the mere presence of these fractures, but their transmissivity.<sup>300</sup> In this regard, we find that OST provided no evidence to demonstrate that there are sufficient preferential flows by any means (including fractured flow) to the degree necessary to undermine the CBR and Staff showings that containment within the BC/CPF provides isolation of the Arikaree/Brule aquifer from the production zone, and that the BC/CPF is internally interconnected to allow CBR to control operational fluids injected into these strata during ISR operations and restoration. In addition, CBR and the Staff have proffered substantial evidence supporting the conclusion that the processing lixiviant will be contained within

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<sup>294</sup> See Tr. at 794-95 (LaGarry).

<sup>295</sup> See Staff Initial Test. at 34-35 (Back, Lancaster).

<sup>296</sup> See Tr. at 826 (LaGarry), 829-30 (Lancaster).

<sup>297</sup> See Tr. at 829-35 (LaGarry).

<sup>298</sup> See CBR Rebuttal Test. at 23 (Lewis, Nelson, Pavlick, Shriver); Tech. Rep. at 3-7.

<sup>299</sup> See Tr. at 793 (LaGarry).

<sup>300</sup> See Tr. at 677 (Wireman).

the production zone, thus providing defense in depth for minimizing the environmental impact of ISR activities at the Marsland site.<sup>301</sup>

Regarding the hydrogeologic parameters of the MEA, OST countered CBR's laboratory test data, which show that the UCU consists of more than 90 percent claystone having an average laboratory hydraulic conductivity of  $1.3 \times 10^{-7}$  cm/sec,<sup>302</sup> by stating that CBR does not even consider the possibility of fracture flow, which OST concludes is evident based on its analysis of the May 2011 pumping test that shows a departure from the Theis type-curve that OST asserts is consistent with vertical leakage.<sup>303</sup> As was noted in section V.A above, CBR assumed homogeneity/isotropy for the pumping test, and then reviewed the actual test results to detect if data discrepancies indicated these assumptions were inappropriate and found none. And based on a review of aquifer pumping test results, we find that there is no compelling evidence that there were widespread, significant deviations that would call into question the assumptions of homogeneity and isotropy so as to require more complex "leaky aquifer" analyses. Nor has OST presented any evidence of gross heterogeneity and anisotropy that might establish an error in the Applicant's and the Staff's conclusions regarding the hydraulic connectivity within the BC/CPF and containment of the production fluids within these strata.

The Board thus finds relative to what the Intervenor surmises is a heterogeneous groundwater flow through fractures in the UCU that the preponderance of the evidence establishes that the deviations in the pumping test data performed in the BC/CPF aquifer resulted from other causes, i.e., localized variations in hydraulic conductivity of the layering, increased localized transmissivity from increased aquifer thickness, and water squeezed from the UCU.<sup>304</sup>

Dr. Kreamer did point to the range of hydraulic conductivity values derived from the pumping tests as proof of the heterogeneity of the BC/CPF. Based on the evidence before us, however, the Board does not find Dr. Kreamer's analysis convincing as the range of values from the pumping test is relatively consistent for both the drawdown and recovery analyses. As presented in the Test #8 report, hydraulic conductivity for the drawdown analysis varied from 6 ft/d to 45 ft/d (with 1 high value, 1 low value, and 6 very consistent values) with an average hydraulic conductivity of 22 ft/d, and with the recovery analysis showing hydraulic conductivity varied from 6 ft/d to 62 ft/d (with 1 high value, 1 low value, and 7 relatively consistent values), for an average hydraulic

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<sup>301</sup> See *infra* section V.C.2.

<sup>302</sup> See CBR Initial Test. at 36-37 (Lewis, Nelson, Pavlick).

<sup>303</sup> See Kreamer Rebuttal Test. at 3.

<sup>304</sup> See Test #8 Rep. at 13; Staff Rebuttal Test. at 18-20 (Back, Lancaster, Striz); *supra* section V.A.2.b.

conductivity of 28 ft/d.<sup>305</sup> As we discuss in more detail later,<sup>306</sup> we find these values consistent given the wide range over which hydraulic conductivity can vary.

Further, concerning the preferential flow path OST asserted is present in the area of well Monitor-3,<sup>307</sup> while feasible, we find that the preponderance of the evidence indicates no significant offsets associated with fracturing in this area. Again, with OST failing to provide any corroborating evidence for widespread aquifer leakage, we find that any fractures that may exist in the area of well Monitor-3 will not significantly affect the containment and control of fluids in the production zone.

There is also the issue of the impact of the Pine Ridge escarpment on the hydrogeology of the MEA, which is based on Mr. Wireman's claim that significant uncertainty remains about whether the groundwater flow in the BC/CPF downgradient of the MEA is affected by the Pine Ridge escarpment so as to require additional studies to support CBR's position that groundwater flow is not affected by this structure. The Board finds that OST's claim must be rejected based on a number of field-verified observations from explorations, geophysical logging, and water-level measurements, as identified by the Staff. These include (1) the field data-derived structure contour maps showing a nearly level BC/CPF from the MEA to beneath the Pine Ridge escarpment and on through to the existing CBR ISR facility;<sup>308</sup> (2) the groundwater potentiometric maps based on measured water levels that were used to establish the contour flow map that documents constant northwest flow in the BC/CPF aquifer along the axis of the MEA;<sup>309</sup> and (3) the erosion surface contours illustrating that the Brule and Arikaree formations have been significantly eroded on the north side of the Pine Ridge escarpment, as compared with the south side where the MEA is proposed, yielding stratigraphic evidence that supports the view that these formations were deposited before this erosion occurred along the escarpment.<sup>310</sup> The Board thus concludes there is an overwhelming body of field data supporting the northwest flow of groundwater in the BC/CPF — from south of the Niobrara River, through the proposed MEA and existing CBR ISR facility toward Crawford and the White River — such that the OST's argument that CBR needs to conduct

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<sup>305</sup> See Test #8 Rep. tbls. app. at 10 of 10 (tbl. 8); Tech. Rep. Tbls. at 73 (tbl. 2.7.3).

<sup>306</sup> See *infra* section VII.D.2.

<sup>307</sup> See Tr. at 520-25 (Kreamer).

<sup>308</sup> See Staff Rebuttal Test. at 4 (Back, Lancaster, Striz) (citing Tech. Rep. Figs. at 87-90 (figs. 2.6-21 to -24); Three Crow Cross-Sections at PDF 3-4 (figs. 2 & 3)).

<sup>309</sup> See *id.* at 4-5 (citing EA at 3-29 (fig. 3-8)).

<sup>310</sup> See *id.* at 4 (citing Tech. Rep. Figs. at 87-90 (figs. 2.6-21 to -24); Three Crow Cross-Sections at PDF 3-4 (figs. 2 & 3)).

an additional study because of the Pine Ridge escarpment's impact on MEA hydrology is not substantiated.

### ***3. Summary of Board Findings on Aquifer Heterogeneity and Anisotropy from Fracturing/Faulting***

The Board concludes that while there is likely some degree of structural fracturing of the geologic strata underlying the MEA, the mere presence of fractures is not the issue. Instead, the transmissivity of the strata is the critical factor. Regarding the heterogeneity and anisotropy in the rate and directions of groundwater flow within the MEA, we conclude there is no evidence in the hydrogeologic data before us that conclusively supports the presence of extensive, transmissive, heterogeneous pathways that would provide a preferential flow for contaminants to migrate uncontrollably into the adjacent Brule and Arikaree aquifers, much less into neighboring surface waters, including the Niobrara and White Rivers. And just as importantly, in the unlikely event that detrimental, transmissive fracturing were encountered during ISR activity within the MEA, the Board finds that the presence of such fracturing would not lead to unsafe conditions or significant adverse environmental impacts because (1) the lack of any vertical preferential pathways due to the strongly downward ambient hydraulic gradients from the overlying aquifers into the BC/CPF, in conjunction with the increased inward gradients toward the MUs required by License Condition 10.1.6,<sup>311</sup> would prevent contaminant migration into the adjacent aquifers; (2) in accordance with License Condition 11.3.4, CBR is required to conduct additional aquifer pumping tests designed to identify hydraulic boundaries, including those caused by faulting; (3) the BC/CPF groundwater flow is to the northwest and away from the Niobrara River such that the lixiviant would attenuate by sorption and dilution during the many decades it would take groundwater to migrate from the MEA toward the northwest discharge points;<sup>312</sup> and (4) if uncontrolled migration of production fluids occurred and the operations were deemed to be unsafe, operations would cease and, under License Condition 9.4, CBR would be required to submit a license amendment (which is subject to a hearing opportunity) that would provide a plan for safe operations in those conditions.<sup>313</sup>

The Board finds there is no evidence of excessive transmissive fracturing or faulting causing sufficient heterogeneity and anisotropy in the MEA geologic strata to refute the CBR and Staff showings of aquifer interconnectivity

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<sup>311</sup> See Tr. at 550 (Wireman).

<sup>312</sup> See EA at 3-14 (citing ER at 3-47 to -50).

<sup>313</sup> See Tr. at 443-44, 551-55 (Lancaster).



and containment of processing fluids that are required for safe, environmentally sound ISR activities in the proposed area. Additionally, we find that the preponderance of the evidence in the record supports a determination that there are no known faults or significant fracturing underlying the MEA that might cause heterogeneity and anisotropy of the underlying geologic strata. As a result, there is no need for CBR to augment its TR or the Staff to alter its EA to further address heterogeneity/anisotropy impacts due to fracturing.

### **C. Allegedly Reduced Containment of the BC/CPF Aquifer**

Details of OST's allegations challenging containment of the BC/CPF aquifer and the CBR and Staff responses are interwoven into the four "Concerns" associated with OST's contention, as amplified in the OST witnesses' initial and rebuttal testimony (admitted as exhibits) and their responses to Board questioning during the hearing. Much of their argument focused on the degree to which production fluids, e.g., lixiviant, are to be contained within the BC/CPF aquifer production zone during operations and restoration. Because the majority of the Intervenor's challenges rest on the alleged mischaracterization of the hydrogeologic properties of site stratification (*see infra* section VII), Crow Butte and the Staff highlighted multiple elements, including both natural conditions and human-engineered attributes, that support hydraulic containment of processing fluids within the production zone.

Accordingly, in the first subsection below we provide a brief review of the major disputes raised by OST relating to the containability of the BC/CPF. This is followed by a summary of CBR's and the Staff's evidence supporting containment of production fluids within the BC/CPF aquifer, which is derived from field investigations and operational experience with ISR uranium production, as impacted by regulatory requirements. Finally, the Board's findings concerning BC/CPF-provided containment conditions are presented in the last subsection below.

#### ***1. Intervenor Allegations Challenging Containment of the BC/CPF Aquifer***

Through its witness Dr. Kreamer (and with support from OST witnesses Wireman and Dr. LaGarry), OST challenged showings proffered by CBR and the Staff regarding CBR's ability to manage the flow of production fluids within the BC/CPF without migration of ISR process contaminants, either vertically up through the UCU so as to impact the overlying Brule and Arikaree aquifers or laterally toward potential BC/CPF discharge locations northwest of the pro-

posed MEA facility.<sup>314</sup> Relative to Intervenor's containment allegations, Dr. Kreamer implied that the results of the May 2011 pumping test indicated a lack of BC/CPF containment based on the late-time recharge zones detected in wells at two locations, CPW-1/1A and Monitor-3.<sup>315</sup> He stated that the flattening of the drawdown curves for these wells during the late-time period demonstrated the lack of containment associated with a detrimental flow path through the heterogeneous UCU into the BC/CPF aquifer.<sup>316</sup> Further, at the hearing, Dr. Kreamer attempted to show that well Monitor-3 detected a preferential pathway for groundwater flow, indicating production zone containment leakage.<sup>317</sup> And while Dr. Kreamer's testimony was the only direct attack by an OST witness on the lack of BC/CPF containment, the issue of reduced containment comes up repeatedly in support of numerous other Intervenor allegations.<sup>318</sup>

## **2. Summary of Staff Claims and OST Responses Regarding BC/CPF Aquifer Containment**

In addressing these OST allegations, the Staff identified various items, along with the results of the May 2011 pumping test, that the Staff asserted demonstrate the containment properties of the BC/CPF aquifer so as to make this formation uniquely suited for safe and environmentally sound ISR extraction operations at the Marsland site. As compiled by the Board based principally on the Staff's testimony, these include:<sup>319</sup>

1. Site-specific XRD analyses, particle grain-size distribution analyses, and geophysical logging that confirm the presence of a thick (between 360 ft and 450 ft), laterally continuous UCU consisting of low-permeability

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<sup>314</sup> See Kreamer Initial Test. at 2; Kreamer Rebuttal Test. at 2-3, 4; Wireman Initial Test. at 2-3; LaGarry Rebuttal Test. at 2-3.

<sup>315</sup> See Kreamer Initial Test. at 6.

<sup>316</sup> See *supra* section V.A.1.b.ii.

<sup>317</sup> See *id.*

<sup>318</sup> See, e.g., Kreamer Initial Test. at 2 (claiming Test #8 Report fails to show Cooper-Jacob analyses that could identify a recharge boundary consistent with lack of aquifer confinement); Kreamer Rebuttal Test. at 2-3, 4 (declaring possible lack of aquifer confinement not addressed by CBR and Staff assertions regarding adequacy of Theis method as sole aquifer test analysis or effectiveness of inward hydraulic gradient).

<sup>319</sup> At the evidentiary hearing, both CBR and the Staff acknowledged that the list in the text that follows captures those items that best supported their positions regarding BC/CPF aquifer containment. See Tr. at 963-64 (Back, Shriver). Although CBR suggested there were two other items, one dealing with the presence of volcanic ash beds in the lower Brule aquifer that are additional vertical permeability barriers and the other concerning the use of a leaky aquifer solution relative to CBR's impact modeling, the Board indicated neither would be the subject of further discussion. See Tr. at 964-65 (Lewis).

mudstone and claystone (with a measured falling-head permeameter test result for hydraulic conductivity of  $1.3 \times 10^{-7}$  cm/sec) and a thick (more than 750 ft), regionally extensive LCU composed of very low permeability black marine shale, all of which demonstrate that the hydraulic resistance to vertical flow is expected to be high due to the significant thickness of the upper and lower confining zones within the MEA.<sup>320</sup>

2. The results of the May 2011 aquifer pumping test demonstrate no discernable drawdown in the overlying Brule Formation observation wells.<sup>321</sup>
3. Large differences in the observed hydraulic head (330 ft to 500 ft) between the Brule Formation and the BC/CPF would not occur if the strata overlying the BC/CPF were not an effective barrier to flow.<sup>322</sup>
4. Potentiometric surfaces (i.e., water pressure levels) measured within the Arikaree/Brule aquifer are several hundred feet higher than those measured in the BC/CPF aquifer evidencing strong vertically downward gradients such that any amount of groundwater movement through the confining units would be downward from the Arikaree/Brule aquifer into the BC/CPF aquifer resulting in a minimal risk of naturally occurring impacts to the overlying Brule Formation.<sup>323</sup>
5. A comparison of the major anions and cations (such as calcium, sodium, sulfate, and bicarbonate) of BC/CPF and Brule Formations shows significant historical differences in geochemical groundwater characteristics between them.<sup>324</sup>
6. Based on isotope age dating, the Arikaree aquifer (150,000 to 250,000 years old), Brule aquifer (250,000 to 300,000 years old) and BC/CPF aquifer (300,000 to 500,000 years old) have large groundwater age differences.<sup>325</sup>
7. Pressure effects from pumping at a relatively low flow rate (27 gpm)

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<sup>320</sup> See Staff Initial Test. at 28-29 (Back, Lancaster); see also CBR Initial Test. at 36 (Lewis, Nelson, Pavlick).

<sup>321</sup> See Staff Initial Test. at 29-30 (Back, Lancaster); see also CBR Initial Test. at 35 (Lewis, Nelson, Pavlick).

<sup>322</sup> See Staff Initial Test. at 30 (Back, Lancaster); see also CBR Initial Test. at 36 (Lewis, Nelson, Pavlick).

<sup>323</sup> See Staff Initial Test. at 30-31 (Back, Lancaster).

<sup>324</sup> See *id.* at 31 (Back, Lancaster).

<sup>325</sup> See Staff Initial Test. at 31 (Back, Lancaster); see also CBR Initial Test. at 36 (Lewis, Nelson, Pavlick).

were detected at long distances over short time periods, which would only occur with containment of the aquifer.<sup>326</sup>

8. Calculated storativity values ranged from  $1.7 \times 10^{-3}$  to  $8.3 \times 10^{-5}$  and averaged  $2.56 \times 10^{-4}$ , corresponding to storativity values for a confined aquifer that range between  $5 \times 10^{-5}$  and  $5 \times 10^{-3}$ .<sup>327</sup>

In his initial testimony, Dr. Kreamer addressed the last item above (item 8) by asserting that the large range of these storage values and those of transmissivity (230 ft<sup>2</sup>/d to 1780 ft<sup>2</sup>/d) are not consistent with homogeneous conditions.<sup>328</sup> But at the hearing, Staff witness Dr. Striz pointed out that considering later time data that account for well effect, the largest value for storativity could be reduced from  $1.7 \times 10^{-3}$  to  $1 \times 10^{-5}$ , thus yielding a narrower range of  $1 \times 10^{-5}$  to  $8.3 \times 10^{-5}$  that is more in line with other wells and indicative of a confined aquifer.<sup>329</sup> And with regard to the range of transmissivity values, Dr. Kreamer agreed that these values can often vary by an order of magnitude or more.<sup>330</sup>

Further, in his rebuttal testimony, Dr. Kreamer challenged another three of these Staff-identified items: item 1, dealing with the UCU's ability, both in terms of quantity and quality, to restrict vertical groundwater flow; item 2, whether the results of the May 2011 aquifer pumping test demonstrated no discernable drawdown in the overlying Brule Formation observation wells; and item 5, concerning water quality chemical characteristic differences between the BC/CPF and the Arikaree/Brule aquifer. On these three points, Dr. Kreamer countered that (1) for item 1, the UCU may be breached by potential fracturing of the intervening strata between the upper and lower aquifers as indicated by the departure of the May 2011 pumping test data from the Theis type-curve consistent with vertical leakage;<sup>331</sup> (2) for item 2, the efficacy of no discernable drawdown in the Brule observation wells during the May 2011 pumping test as support for containment is diminished by the fact that the results from these area-restricted, shallow monitoring wells, instead of demonstrating site containment, indicated leakage into the BC/CPF;<sup>332</sup> and (3) for item 5, chemical characteristic differences between the BC/CPF and the Arikaree/Brule aquifer are invalid in that (a) chemical transport processes, including hydrodynamic dispersion and diffusion, are insignificant relative to the velocity of the hydraulic movement of

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<sup>326</sup> See Staff Rebuttal Test. at 15 (Back, Lancaster, Striz).

<sup>327</sup> See *id.* (citing Ex. NRC015, at 45-46 (David Keith Todd, Groundwater Hydrology (2d ed. 1980) [hereinafter Todd Text])).

<sup>328</sup> See Kreamer Initial Test. at 6.

<sup>329</sup> See Tr. at 502-05 (referencing Test #8 Rep. app. C at PDF 82 (graph C3)).

<sup>330</sup> See Tr. at 485-88.

<sup>331</sup> See Kreamer Rebuttal Test. at 2-3.

<sup>332</sup> See *id.* at 1-2.

groundwater, (b) downward groundwater flow would be expected to naturally change chemical composition, and (c) current water quality differences noted by CBR are under unstressed conditions rather than conditions associated with production pumping and injection.<sup>333</sup>

When given the opportunity at the hearing to comment further on the Staff-identified items supporting aquifer containment at the MEA,<sup>334</sup> Dr. Kreamer initially addressed the alleged competency of the UCU as demonstrating BC/CPF containment by discussing in detail the data from the May 2011 pumping test showing a flattening of the drawdown curve from the Theis type-curve for wells CPW-1/1A and Monitor-3. Dr. Kreamer noted the deviations of the data from the Theis type-curve, alleging that “[t]his change in the level of water from the Theis curve is consistent with a lack of confinement of the aquifer.”<sup>335</sup> Then, as we noted previously, at the hearing Dr. Kreamer further attempted to show that well Monitor-3 detected a preferential pathway for groundwater flow indicating leakage in the containment of the production zone.<sup>336</sup> Specifically, as it related to aquifer isolation, Dr. Kreamer claimed that the depression of the Pierre Shale and the upper surface of the BC/CPF was indicative of “possible fractures” and additional leakage at this location.<sup>337</sup> In response, CBR witness Shriver claimed this depression was merely a low area in the erosional surface of the Pierre Shale and the BC/CPF deposit by pointing out that, in the relevant geologic cross-sections, there is no offset in the formations through this area.<sup>338</sup>

Relative to item 3 regarding the lack of discernable drawdown in the overlying Brule Formation observation wells, Dr. Kreamer responded that a leaky aquifer can still exhibit a large difference in potentiometric levels between aquifers, as has been measured between the Arikaree/Brule aquifer and the BC/CPF aquifer.<sup>339</sup> And regarding item 4 concerning the strong downward gradients between the Arikaree/Brule aquifer and the BC/CPF, Dr. Kreamer claimed that this downward flow has an environmental impact associated with a possible loss of water in the Arikaree/Brule aquifer and so indicated nothing about lateral movement of groundwater in the BC/CPF.<sup>340</sup> For item 5 relating to chemical characteristic differences between the BC/CPF and the Arikaree/Brule aquifer, Dr. Kreamer indicated that the complexity of potential geochemical interactions

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<sup>333</sup> See *id.* at 3.

<sup>334</sup> See Tr. at 965-99.

<sup>335</sup> Kreamer Initial Test. at 6.

<sup>336</sup> See *supra* section V.A.1.b.

<sup>337</sup> See Tr. at 971, 977-79 (citing Test #8 Rep. at PDF 41-42 (figs. 9 & 10)).

<sup>338</sup> See Tr. at 979-82 (citing Test #8 Rep. figs. app. at PDF 38 (fig. 6)); Tech. Rep. Figs. at 52 (fig. 2.6-3d).

<sup>339</sup> See Tr. at 990-91 (Kreamer).

<sup>340</sup> See Tr. at 991-93.

during groundwater flow through geologic strata makes such differences a poor measure of aquifer isolation.<sup>341</sup>

Addressing the difference in the ages of the groundwater in the three aquifers referenced in item 6, Dr. Kreamer opined that because the water samples tend to be integrated and the individual ages of the groundwater in the different aquifers tend to have wide, overlapping ranges, there possibly was communication between these aquifers.<sup>342</sup> Regarding item 7, it was Dr. Kreamer's opinion that with a large ROI for a well pumping at a relatively low rate, a large influence can exist and still have localized leakage in the aquifer.<sup>343</sup> For item 8 (concerning the storativity values derived from the May 2011 aquifer pumping tests falling within the range indicative of a confined aquifer), Dr. Kreamer declared that while this statement would be true for a homogeneous aquifer, it would not be true for a heterogeneous aquifer such as the BC/CPF.<sup>344</sup>

Finally, Dr. Kreamer was questioned about whether he was proffering extreme/rare situations supporting aquifer leakage to address each of the eight Staff-identified items, any one of which may or may not happen, but all of which apparently would have to fail for the Staff's non-leaking containment analysis to be rejected. In response, he cautioned that only one preferential flow path leakage from the MEA facility could cause devastating results and called again for a robust fracture analysis to better characterize the BC/CPF aquifer's status.<sup>345</sup>

### **3. Board Findings on BC/CPF Aquifer Containment**

Initially, the Board notes that each of the eight Staff-identified items asserted to demonstrate aquifer containment are independent of the others. Moreover, five of the eight are independent of the May 2011 pumping test, i.e., quantity and quality of the UCU (item 1); large differences in head between the Arikaree/Brule aquifer (the first overlying aquifer) and the BC/CPF aquifer (item 3); strong vertically downward gradients existing between the Arikaree/Brule and the BC/CPF aquifers (item 4); differences between the geochemical characteristics of the BC/CPF and Arikaree/Brule aquifer (item 5); and varying ages of the water between the Arikaree/Brule and the BC/CPF aquifers (item 6). The other three items relate to the May 2011 pumping test data, i.e., no discernable drawdown observed in any of the three Brule aquifer observation wells mon-

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<sup>341</sup> See Tr. at 951-56.

<sup>342</sup> See Tr. at 993-94.

<sup>343</sup> See Tr. at 994-95.

<sup>344</sup> See Tr. at 995-96.

<sup>345</sup> See Tr. at 996-99.

itored during the May 2011 pumping test (item 2); the long ROI of over 1.5 miles for a modest pumping rate of 27 gpm (item 7); and calculated storativity values indicative of a confined aquifer (item 8). In the Board's view, with one exception discussed below, these Staff-identified items provide strong evidentiary support for the sound containment properties of the BC/CPF's upper and lower confining units.

During the hearing Dr. Kreamer was offered an opportunity to comment on each of these eight signs of containment.<sup>346</sup> The Board finds that Dr. Kreamer provided persuasive evidence for discounting one of the eight items: item 5, concerning water quality differences between the upper and lower aquifers. In addressing this issue, Dr. Kreamer emphasized the complexity of potential geochemical interactions during groundwater flow through geologic strata.<sup>347</sup> The Board agrees that differing water quality between the BC/CPF and Arikaree/Brule aquifer can occur from a variety of mechanisms and that the resulting water quality between these two formations may not necessarily be the sole result of isolation of the upper aquifers from the Chadron Formation. Therefore, we place very little weight on the observation of differing water quality as definitive proof of aquifer containment — a position that was acknowledged to some degree by CBR witness Lewis.<sup>348</sup>

But we disagree with the hypotheses raised by Dr. Kreamer in refuting the other seven Staff-identified items showing aquifer containment.<sup>349</sup> As previously stated,<sup>350</sup> the report on the May 2011 pumping test provides a detailed discussion and explanation regarding how the data generated were used to characterize the aquifer response. That report also documents that no drawdown was observed in any of the three Brule Formation observation wells during the test period.<sup>351</sup> This well array for the Brule being adequate for its intended purpose, we find that, by itself, the pump test supports the conclusion that adequate containment exists between the overlying Brule Formation and the BC/CPF production zone. The test also shows, based on the character of the drawdown versus time graphs that were plotted for each observation well, that the resulting hydraulic storativity values analytically calculated from these plots place the BC/CPF within the range of values associated with a confined aquifer, i.e., the calculated range

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<sup>346</sup> See Tr. at 960-67, 990-96.

<sup>347</sup> See Tr. at 951-56.

<sup>348</sup> See Tr. at 956.

<sup>349</sup> In addition to these containment findings, we note that Board findings relative to Dr. Kreamer's responses regarding these items that appear relevant to MEA site characteristics associated with each of the Contention 2 concerns are presented within the individual sections regarding those concerns.

<sup>350</sup> See *supra* section V.A.1.b.

<sup>351</sup> See Test #8 Rep. at 1; see also Tech. Rep. Tables at 72 (tbl. 2.7-2) (describing three Brule observation wells monitored during the pumping tests).

of storativity values of  $1.7 \times 10^{-3}$  to  $8.3 \times 10^{-5}$ , as compared to the values of  $5 \times 10^{-3}$  to  $5 \times 10^{-5}$  that scientifically reliable technical literature indicates is expected for a confined aquifer.<sup>352</sup> Given this substantial evidentiary support, and faced with the absence of any corroborating evidence from OST supporting Dr. Kreamer's position that the BC/CPF aquifer lacks containment, we reject OST's conclusion that the May 2011 pumping test data provide confirmation of a significant lack of aquifer containment.<sup>353</sup>

With regard to the more general containment issues concerning the BC/CPF, we note that OST's testimony for the most part addressed the inadequacy of the CBR characterization of data from the May 2011 pumping test while pointing to little specific evidence indicating that containment of production fluids within the BC/CPF is not achievable. On that score, we provided our findings regarding the adequacy of the aquifer pumping test in section V.A *supra*, and the potential for fracturing causing heterogeneity/anisotropy in section V.B *supra*. And in this section, we address the validity of other information CBR and the Staff offered to demonstrate containment, with other matters regarding containment adequacy raised by OST in the context of Concerns 1 to 4 addressed *infra* in sections VI to IX, so that they will not be repeated here.

Of the seven Staff-identified items we consider convincing evidence of BC/CPF containment, four are independent of the May 2011 pumping test. Relative to Contention 2, these multiple independent lines of evidence, separate from the aquifer pumping test, are a significant testament to the validity of CBR's assessment of the degree of containment provided by the BC/CPF sandstone aquifer. Moreover, while none of Dr. Kreamer's hypothetical rebuttals are infeasible, the fact remains that given what the evidentiary record reflects is a thick UCU, the only way containment can be breached sufficiently to jeopardize UCU integrity is if essentially all of Dr. Kreamer's hypotheses come to fruition to nullify each of the remaining seven Staff-identified containment items. On the other hand, any one or more of these seven Staff-identified items would provide a reasonable basis for concluding that the BC/CPF is isolated so as to prevent that aquifer from impacting the overlying Arikaree/Brule aquifer. In the face of the strong evidentiary basis for each of these seven Staff-identified containment items, we find it is highly unlikely that any of Dr. Kreamer's hypotheses will come to pass and we therefore discount these responses in favor of the Staff's and CBR's evidence supporting aquifer containment.

Therefore, based on the evidentiary record before us, we conclude that the allegations raised by Dr. Kreamer do not indicate a significant loss of contain-

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<sup>352</sup> See *id.* at 13; Staff Rebuttal Test. at 15 (Back, Lancaster, Striz) (citing Todd Text at 45-46 (stating that storativity values for a confined aquifer range between  $5 \times 10^{-5}$  and  $5 \times 10^{-3}$ )).

<sup>353</sup> See Test #8 Rep. at 13; *id.* app. C at PDF 80, 82 (graphs C1 & C3).



ment for, or demonstrate the connectivity properties of, the BC/CPF aquifer to the extent that the safe operation of the Marsland ISR facility or environmental impacts from the proposed extraction operations at the Marsland site would be adversely affected in any meaningful way. The Board also finds that the multiple lines of additional support for BC/CPF aquifer containment, four of which are independent of the May 2011 pumping test, are compelling and consistent with the Applicant's interpretation of the pumping test analyses. In contrast, nothing approaching that level of support has been proffered by OST to augment the Intervenor's central assertion that the BC/CPF is not contained because of the discontinuities (i.e., late-time curve flattening of the drawdown curves) in the pumping test data for two of the eight monitoring wells (i.e., CPW-1/1A, Monitor-3). At the same time, evidence presented by the Staff and CBR effectively refuted OST's claims that such discontinuities can be attributed to factors that are unrelated to a loss of containment.<sup>354</sup>

The Board thus finds that the weight of the evidence is heavily in favor of the Applicant's and Staff's conclusions that the BC/CPF will adequately contain contaminants generated by CBR's MEA mining activities.

## **VI. CONCERN 1: INADEQUATE DESCRIPTION OF AFFECTED ENVIRONMENT**

Having addressed the overarching issues concerning hydrological conditions raised by OST regarding Contention 2, we turn now to consideration of the more specific matters raised in the context of Contention 2's four concerns. As was noted previously, Concern 1 challenges "the adequacy of the descriptions of the affected environment for establishing the potential effects of the proposed MEA operation on the adjacent surface water and groundwater resources."<sup>355</sup> Based on the OST witness testimony addressing this concern, the focus of this concern involves two subjects, i.e., stratigraphy and possible contaminant pathways, and affected surface and subsurface environments. We address each in turn.

### **A. Concern 1A — Stratigraphy and Contaminant Pathways**

#### ***1. Stratigraphy of Water-Bearing Rocks in Northwestern Nebraska***

The stratigraphy of northwestern Nebraska has been documented in a previ-

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<sup>354</sup> See Staff Rebuttal Test. at 19-20 (Back, Lancaster, Striz) (indicating late-time curve flattening could be caused, as CBR suggests, either by increase in transmissivity away from the pumping well, release of water from storage in the first several feet of aquitard, or wellborne/near-wellborne storage effects).

<sup>355</sup> LBP-18-3, 88 NRC at 53.

ous proceeding regarding the license renewal for CBR's existing ISR facility,<sup>356</sup> which has contributed to the stipulated understandings of the geology and hydrogeology of the MEA presented *supra* in sections IV.B and IV.C. The parties' positions and the Board's findings on stratification issues beyond those stipulations are the subject of this section.

*a. Parties' Positions on Disputed Stratigraphy in Northwestern Nebraska*

OST witnesses Wireman and Dr. LaGarry provided testimony regarding the disputed issues associated with the stratigraphy in northwestern Nebraska, with an emphasis on the strata underlying the MEA. Mr. Wireman stated in his initial testimony that the structural geologic setting in northwest Nebraska is more complex than previously reported by CBR. He asserted as well that there is a specific disagreement between CBR and previous researchers about the existence of two major east-west trending faults — the Pine Ridge fault to the north of the Pine Ridge escarpment and the Niobrara River fault, which trends parallel to the Niobrara River — and other fracturing associated with these two faults. According to Mr. Wireman, CBR concluded that the faults do not exist in the MEA and, therefore, provided no discussion about whether these structures affect groundwater flow in the Arikaree/Brule and the BC/CPF aquifers.<sup>357</sup>

Dr. LaGarry claimed in his direct and rebuttal testimony that these potential faults north and south of Marsland may allow production fluids to travel upward into the overlying aquifers and laterally into adjacent areas to the east and west.<sup>358</sup> Referencing Figure 1 of his initial testimony, Dr. LaGarry stated that the Niobrara River and Pine Ridge faults are among those that were large enough to be discovered by other researchers who compiled data from approximately 12,500 borehole records in western Nebraska and had drilled new boreholes at 5-mile intervals along the transect shown in Figure 1.<sup>359</sup>

Staff witnesses Back and Lancaster testified that regional interpretation of the strata provided by the Swinehart article, and the lineament analyses in the Diffendal article (both of which Dr. LaGarry relied upon as sources for his claim of permeable pathway faults), pale in comparison to the analysis performed by the Applicant, who used site-specific cross-sections created with geophysical

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<sup>356</sup> See *Crow Butte Resources, Inc.* (In Situ Leach Facility, Crawford, Nebraska), LBP-16-13, 84 NRC 271, 287-302 (2016), *petition for review denied*, CLI-18-8, 88 NRC 141, 144-46 (2018).

<sup>357</sup> See Wireman Initial Test. at 3.

<sup>358</sup> See LaGarry Initial Test. at PDF 5-6 (citing Swinehart Article & Diffendal Article); LaGarry Rebuttal Test. at 1.

<sup>359</sup> See LaGarry Initial Test. at PDF 4-6. As we indicated previously, *see supra* note 241, Figure 1 of Dr. LaGarry's initial testimony is an annotated version of cross-section A-A' of the Swinehart article.

log data and drill cuttings from the MEA site.<sup>360</sup> CBR witnesses Lewis, Nelson, Pavlick, and Shriver did concede that faults may exist at a regional level, but testified that none seemed sufficient to affect confinement or transmit production fluids. Furthermore, based on the undisputed evidence that the BC/CPF is a confined aquifer, they stated it is highly unlikely the MEA contains a fault or a connected pathway of faults in the UCU that is capable of transmitting contaminants.<sup>361</sup>

Also, as we have detailed previously, the parties disputed the location and potential impact on the MEA of both the Pine Ridge and Niobrara River faults.<sup>362</sup> Additionally, disputed party positions concerning Mr. Wireman's challenges regarding structural geology characterization are presented later in this decision.<sup>363</sup>

*b. Board Findings on Disputed Stratigraphy in Northwestern Nebraska*

In connection with the dispute over stratigraphy within the MEA region, the Board's findings regarding the issue of aquifer heterogeneity and anisotropy from fracturing/faulting that previously was discussed in detail in section V.B.2 and the disagreement regarding Mr. Wireman's structural geology characterization concerns as set forth below in section VI.B.2 are detailed in those sections and will not be repeated here. Concerning the potential effects of fracturing within the MEA, however, as a general matter, the Board observes that OST relied heavily on the lineament study in the Diffendal article, which has not been field-verified within the MEA, and the Swinehart article, the geologic cross-sections from which cover western Nebraska areas that do not pass through the Marsland site, but rather lie more than 7 miles east and 30 miles west of the MEA. As a consequence, neither study establishes that the Pine Ridge or Niobrara River faults transect the MEA.<sup>364</sup> The absence of these faults in the MEA is consistent with CBR's assertion that there is little fracturing and faulting of the BC/CPF within the MEA, a conclusion derived from studying over 1600 geophysical logs of subsurface conditions at the site.<sup>365</sup> Moreover, besides failing to show that these faults cross the MEA, Dr. LaGarry confirmed that both the Diffendal and Swinehart articles are stratigraphic reports that do not include any information on the transmissivity or preferential flow patterns through fractures, which are

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<sup>360</sup> See Staff Initial Test. at 34.

<sup>361</sup> See CBR Rebuttal Test. at 23 (citing Hydraulic Containment Report).

<sup>362</sup> See *supra* section V.B.

<sup>363</sup> See *infra* section VI.B.2.

<sup>364</sup> See Staff Initial Test. at 33-35 (Back, Lancaster); Tr. at 794-95 (LaGarry), 829-35 (Lancaster, LaGarry).

<sup>365</sup> See Tech. Rep. at 3-7, Tr. at 805-06 (Lewis); CBR Rebuttal Test. at 23 (Lewis, Nelson, Pavlick, Shriver).

the critical factors for demonstrating whether there is contaminant flow between the aquifers.<sup>366</sup>

## 2. *LaGarry's Position on Contaminant Pathways*

Dr. LaGarry stated in his initial testimony that an ISR facility at the Marsland site would likely release toxic heavy metal contaminants, including but not limited to uranium, through three potential pathways: surface leaks and spills, underground leaks and spills, and lack of containment. Furthermore, referencing Figure 1 in that testimony, Dr. LaGarry claimed that once these contaminants are in the aquifer, they would migrate laterally through porous, permeable sandstones to the White and Niobrara rivers.<sup>367</sup> Based on these potential pathways for toxin migration, it was Dr. LaGarry's assertion that CBR's application for an MEA ISR facility should be denied because groundwater contamination of the Arikaree/Brule aquifer would result in irreversible and catastrophic impacts to local agriculture and the Niobrara River — a National Scenic River used for recreation by thousands of people each year — that he declared would likely lead to depopulation of the region.<sup>368</sup> Each of these facets of Dr. LaGarry's testimony is discussed in the following sections.

### a. *Surface Leaks and Spills Pathways*

#### i. PARTIES' POSITIONS ON SURFACE LEAKS AND SPILLS PATHWAYS

In his initial testimony, Dr. LaGarry expressed a concern about surface leaks and spills, asserting that the soils in western Nebraska are thin and lie directly over permeable, porous sandstone bedrock. Citing Figure 1 in his initial testimony that he indicated showed the interval of the aquifer vulnerable to surface leaks and spills, Dr. LaGarry maintained that any leaks or spills of production fluids would be transmitted directly into the unconfined Arikaree/Brule aquifer “within a few years.”<sup>369</sup>

Staff witnesses Back and Lancaster agreed with Dr. LaGarry that spills or leaks of production fluids or wastewater at the MEA could impact surface waters or the Arikaree/Brule aquifer.<sup>370</sup> They observed, however, that the Staff in its EA concludes that such impacts to surface water and groundwater from spills and leaks would be “SMALL” because of the extensive operational controls,

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<sup>366</sup> See Tr. at 793 (LaGarry).

<sup>367</sup> See LaGarry Initial Test. at PDF 5.

<sup>368</sup> See *id.* at PDF 6.

<sup>369</sup> *Id.* at PDF 5.

<sup>370</sup> See Staff Initial Test. at 36-37.

procedures, and monitoring that CBR will have in place at the MEA to prevent and detect spills and leaks and minimize any possible impacts should such spills occur.<sup>371</sup> The Staff also indicates in its EA that, in addition to CBR's Safety, Health, and Environment Quality Management System (SHEQMS) to ensure workers and crew exercise due diligence in addressing environmental, health, and safety matters, the Applicant has complementary plans in place, including (1) a Spill Prevention, Control, and Countermeasure (SPCC) plan to manage accidental discharge (including requirements for reporting, spill response, and cleanup measures); and (2) a Storm Water Pollution Prevention Plan (SWPPP) requiring the Applicant to develop a storm water management and spill response plan that identifies personnel responsible for implementing the SWPPP along with an employee education program to ensure effective plan implementation.<sup>372</sup> Finally, according to the Staff's EA, CBR has committed to following best management practices (BMPs) to control erosion, minimize disturbance, and facilitate reclamation as described in its MEA TR.<sup>373</sup>

Based on all this, the Staff concludes in its EA that the design and engineering controls for the proposed MEA facility will collect and properly dispose of any potentially contaminated stormwater runoff or snowmelt during facility construction and operation. And in addition to the engineering and procedural controls contained in the SWPPP, SHEQMS, and SPCC plan, the Staff notes in the EA that CBR's NDEQ-issued National Pollutant Discharge Elimination System (NPDES) permit requires CBR to remediate spills of petroleum products or hazardous chemicals that may enter surface waters or related habitats.<sup>374</sup>

CBR witnesses Lewis, Nelson, Pavlick, and Shriver also disputed Dr. LaGarry's claim that surface leaks and spills at Marsland could be transmitted to the Arikaree/Brule aquifer "within a few years," declaring that Dr. LaGarry's claim is speculation and not supported by any evidence or transport analysis. According to these witnesses, data from boreholes and geophysical well logs of surficial soils and shallow subsurface sediments at the MEA indicate the site is underlain by 30 ft to something over 100 ft of unsaturated sediments between the ground surface and the underlying water table, including layering of low-permeability materials. As a result, they maintained, much of the Arikaree/Brule aquifer has a limited lateral extent and is interbedded with low-permeability siltstones, claystones, and mudstone units. In their view, the significant thickness of the unsaturated zone and the presence of low-permeability materials would reduce the likelihood of downward migration of any spilled processing solutions

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<sup>371</sup> See *id.* (citing EA at 4-10 to -13, 4-22 to -23).

<sup>372</sup> See EA at 4-9, 4-11.

<sup>373</sup> See *id.* at 4-9.

<sup>374</sup> See *id.* at 4-9, 4-10 to -11.

into the underlying water table. From this, these CBR witnesses concluded that in the unlikely scenario of a surface spill migrating through unsaturated sediments into Arikaree/Brule aquifer, the leak would be extremely limited in extent, both laterally and vertically.<sup>375</sup>

ii. BOARD FINDINGS ON SURFACE LEAKS AND SPILLS PATHWAYS

In addressing Dr. LaGarry's concerns regarding surface leaks and spills, the Board finds significant that, as is described in the Staff's EA, the Applicant is to follow the engineering and procedural controls contained in the SWPPP, SHEQMS, and SPCC that are designed to detect, isolate, and remediate such accidents should they occur, as well as to remediate spills of petroleum products or hazardous chemicals into surface waters or related habitats in accordance with CBR's NPDES permit.<sup>376</sup> And while Dr. LaGarry maintained that surface spills will reach the Arikaree/Brule aquifer within a few years, we find this timing estimate unlikely due to the extensive depth of unsaturated strata, including a significant thickness of low-permeability material across much of the site. Similarly, the Board finds that in the unlikely event of a surface spill migrating through unsaturated sediments into the Arikaree/Brule aquifer, the seepage would be extremely limited in extent, both laterally and vertically.<sup>377</sup>

Given the evidentiary record establishing the controls and requirements of CBR's SHEQMS, SWPPP, and SPCC plans, as well as CBR's NDEQ-issued NPDES permit, all designed to ensure that surface leaks and spills will not be a source of contaminant release, we conclude that Dr. LaGarry's concern that spilled contaminants will have any appreciable impact on surface or groundwater resources lacks a sufficient evidentiary basis.

*b. Underground Leaks and Spills Pathways*

i. PARTIES' POSITIONS ON UNDERGROUND LEAKS AND SPILLS PATHWAYS

Regarding potential underground (as opposed to surface) leakage, Dr. LaGarry pointed out in his initial testimony that to reach the uranium in the BC/CPF, wells will need to be drilled through the Arikaree/Brule aquifer, creating a potential interconnection between these aquifers. Likewise, referencing his initial testimony Figure 1 as showing the interval of this aquifer that is vulnerable to impact, Dr. LaGarry asserted that contamination into the shallow unconfined Arikaree/Brule aquifer from underground leaks and spills attributable to such

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<sup>375</sup> See CBR Rebuttal Test. at 21.

<sup>376</sup> See EA at 4-9, 4-10 to -11.

<sup>377</sup> See CBR Rebuttal Test. at 21 (Lewis, Nelson, Pavlick, Shriver).

wells would be catastrophic because such contaminants would quickly spread throughout the aquifer.<sup>378</sup>

Disputing Dr. LaGarry's allegation regarding possible Arikaree/Brule aquifer contamination due to leaking buried well piping, CBR witnesses Lewis, Nelson, Pavlick, and Shriver testified that CBR has evaluated potential underground spills and the subsequent migration of fluids to overlying aquifers, and has established controls to prevent such an occurrence. To seal off aquifer communication between the Arikaree/Brule and BC/CPF aquifers caused by borehole drilling, these Crow Butte witnesses testified that CBR plugs all exploration holes to maintain the isolation of the mineralized zone and prevent commingling of groundwater with the Arikaree/Brule aquifer. Regarding well casing breaches, these witnesses declared that mechanical integrity tests (MIT) will be performed prior to placing a well into service, as required by NDEQ's underground injection control (UIC) program that ensures all wells are constructed properly and are capable of maintaining pressure without leakage. In addition, these CBR witnesses noted that monitoring wells located in the overlying Arikaree/Brule aquifer will be tested every two weeks during operations to detect the presence of lixiviant.<sup>379</sup>

CBR witnesses Lewis, Nelson, Pavlick, and Shriver also stated that Dr. LaGarry's underground leakage concern is hypothetical and ignores the Applicant's other operational practices, well-construction requirements, and site-specific conditions that will help to prevent unwanted contamination from buried pipe leaks. According to these witnesses, besides plugging abandoned wells, pressure testing well casings, and monitoring the upper aquifer for production fluids, Crow Butte will take other steps to minimize the potential for leaks and spills. These include continuous, around-the-clock flow monitoring by control room operators using visual and audible alarms triggered by a significant piping failure, thereby allowing flow to be stopped to prevent any significant migration of process fluids. In this same vein, these CBR witnesses indicated that wellfield buildings are equipped with wet alarms for early detection of leaks and explained as well that piping from the wellfield will be buried, minimizing the possibility of an accident.<sup>380</sup> Additionally, these CBR witnesses identified site-specific conditions, including the strong downward hydraulic gradients and the large thickness of the confining units at the Marsland site, that they contended help in preventing upward travel of processing solutions into the overlying Arikaree/Brule aquifer.<sup>381</sup>

Endorsing CBR's efforts in this regard, Staff witnesses Back and Lancaster

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<sup>378</sup> See LaGarry Initial Test. at PDF 5.

<sup>379</sup> See CBR Rebuttal Test. at 21-22.

<sup>380</sup> See *id.* at 22.

<sup>381</sup> See *id.* at 22-23 (citing Hydraulic Containment Report).

reiterated that CBR will install monitoring wells in the shallowest Arikaree/Brule aquifer at a density of one well per four acres and, as required by License Condition 11.1.5, to detect leakage CBR will sample these monitoring wells every 14 days for indicators of lixiviant.<sup>382</sup> The Staff also indicates in its EA that, in response to the Staff's request,<sup>383</sup> to assess potential impacts from a leaky pipe on the only irrigation well within the MEA license area and the facility's area of review (AOR) (albeit outside the MEA itself), CBR analyzed the potential hydrologic impacts that might be occasioned by a hypothetical shallow casing leak from a processing well in the nearest MU to this irrigation well.<sup>384</sup> To achieve this, in 2013 CBR simulated groundwater flow in the shallow Arikaree/Brule aquifer at the MEA by employing a numerical groundwater flow model that used particle-tracking techniques and a worse-case capture zone scenario, which was done to illustrate the 30-year capture zone of the irrigation well and assess whether a hypothetical shallow casing leak from the MEA wellfields could potentially impact the quality of the irrigation water.<sup>385</sup> In 2016, a revision to the initial 2013 modeling was performed to correct the location of the irrigation well. Initially, this revision calibrated the existing groundwater flow model using 2014 irrigation water-level data, and then re-calculated the calibrated 30-year capture zone of the irrigation well.<sup>386</sup>

According to the revised CBR well impact analysis, the results of this modeling demonstrate that MEA wellfields are not located within the capture zone of this sole nearby irrigation well, meaning that, under similar operating conditions, a shallow casing leak within the MEA wellfields will not impact the irrigation well at any time in the future. Further, using the same worse-case capture zone scenario as the 2013 analysis, the revised well impact analysis concludes that no other wells outside the MEA boundary will be impacted by a potential release of MEA lixiviant to the shallow aquifer given the location of other irrigation and domestic wells in the area.<sup>387</sup> As a result, CBR maintains

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<sup>382</sup> See Staff Initial Test. at 39-40 (citing EA at 2-6, 6-2; CBR License Amend. 3, at 17).

<sup>383</sup> See Tr. at 840 (Back).

<sup>384</sup> See EA at 4-22; see also Ex. CBR010 (Tech. Rep. app. AA-1 (Letter from Robert L. Lewis, AQUI-VER, Inc., to Doug Pavlick, CBR (Dec. 10, 2013) [hereinafter Initial Well Impact Analysis]; Ex. CBR011 (Tech. Rep. app. AA-2 (Letter from Robert L. Lewis, AQUIFERTEK, to Doug Pavlick & Larry Teahon, CBR (May 11, 2016) [hereinafter Revised Well Impact Analysis]). The CBR TR indicates that the MEA license area is approximately 4622.3 acres that encompasses the 11 MUs, while the AOR conforms to the NDEQ requirement as the area at a 2.25-mile radius from these MUs that is utilized for assessing land and water use surrounding the MEA. See Tech. Rep. at 2-3, 8-3; Tech. Rep. Figs. at 9, 11 (figs. 2.2-1, 2.2-3); see also Tr. at 590 (Pavlick).

<sup>385</sup> See Initial Well Impact Analysis at 3-4.

<sup>386</sup> See Revised Well Impact Analysis at 1.

<sup>387</sup> See *id.* at 3 (citing *id.* at 6 (fig. 4)).



that the current MEA shallow groundwater monitoring network is adequate to ensure the protection of human health and environment.<sup>388</sup>

ii. BOARD FINDINGS ON UNDERGROUND LEAKS AND SPILLS PATHWAYS

While Staff witnesses Back and Lancaster agreed with Dr. LaGarry that underground leaks and spills at the MEA from buried piping and well casing failures could impact groundwater from the Arikaree/Brule aquifer,<sup>389</sup> based on the evidentiary record the Board finds that Crow Butte will institute multiple initiatives that should adequately minimize the potential for adverse impacts from underground leaks and spills. These include (1) implementing a comprehensive monitoring program (including a monitoring well ring and corrective actions) to detect and mitigate any leaks or spills should they occur; (2) installing all wells using standard techniques, leak-testing all piping before placing the piping into service, and burying piping from the wellfield to minimize the possibility of a pipe-failure-inducing accident and a related release of processing solutions; (3) monitoring production flows 24 hours a day/7 days a week using visual and audible alarms that sound in the event of a pipe failure and allowing for the shut-off of process flow to prevent any significant migration of process fluids; and (4) equipping wellfield buildings with wet alarms for early detection of leaks. Also, we find that the strong downward hydraulic gradients between the Arikaree/Brule aquifer and the BC/CPF, along with the extensive thickness and low permeability of the UCU at Marsland, will prevent upward movement of ISR solutions into the overlying aquifers.<sup>390</sup>

The Board finds further that CBR adequately assessed potential impacts of a leaky pipe on the only irrigation well within the MEA's AOR by modeling groundwater flow in the shallow Arikaree/Brule aquifer at the MEA to evaluate whether a hypothetical shallow casing leak from the MEA wellfields could potentially impact the quality of the irrigation water.<sup>391</sup> The results of this numerical analysis indicate that MEA wellfields are not located within the capture zone of this sole nearby irrigation well,<sup>392</sup> leading us to conclude that a shallow casing leak within the MEA wellfields is unlikely to impact this irrigation well in the future, if operating under similar conditions to those used in this modeling. The Board also finds that, based on CBR's 2013 and 2016 well

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<sup>388</sup> See Tech. Rep. at 2-118 to -119; *see also* Revised Well Impact Analysis at 3.

<sup>389</sup> See Staff Initial Test. at 36.

<sup>390</sup> See CBR Rebuttal Test. at 22-23 (Lewis, Nelson, Pavlick); *see also* Hydraulic Containment Report at 1-2.

<sup>391</sup> See Initial Well Impact Analysis at 1-5; Revised Well Impact Analysis at 1-3; *see also* EA at 4-22.

<sup>392</sup> See Revised Well Impact Analysis at 3 (citing *id.* at 6 (fig. 4)).

impact modeling analyses, it was reasonable for CBR and the Staff to conclude that no other wells outside the MEA boundary will be impacted by a potential release of MEA lixiviant to the shallow aquifer, and the current MEA shallow groundwater monitoring network is adequate to ensure the protection of human health and the environment.<sup>393</sup>

*c. Possible Containment Pathways*

i. PARTIES' POSITIONS ON POSSIBLE CONTAINMENT PATHWAYS

Dr. LaGarry raised another concern regarding containment pathways by claiming that BC/CPF containment is lacking due to bedrock fracturing in the Marsland area that will allow leaks or excursions that might occur to migrate through these openings. This same issue has already been considered more generally *supra* as part of sections V.B and V.C, and that discussion will not be repeated in its entirety here. But to summarize, Dr. LaGarry's allegation of a lack of BC/CPF containment due to fracturing is based primarily on the works of Diffendal, showing several potential faults in the Marsland area, and the Swinehart article showing (per the previously discussed Figure 1 of his initial testimony) known faults both north and south of the proposed Marsland facility that may allow the transmission of production fluids to travel upward into the Arikaree/Brule aquifer and laterally into adjacent areas to the west and east.<sup>394</sup> And in addition to these identified faults, Dr. LaGarry stated that, based on his work over the past 25 years as supported by other referenced literature,<sup>395</sup> there are likely hundreds more BC/CPF fractures in both Nebraska and South Dakota that are too small to be shown on a diagram such as that in his initial testimony, but that nonetheless will transmit leaks and spills.<sup>396</sup>

Staff witnesses Back and Lancaster were critical of Dr. LaGarry, however, for relying on studies based on Diffendal's lineament analysis and the Swinehart article's large-scale (regional-level) cross-sections, which are derived from widely spaced boreholes placed at 5-mile intervals.<sup>397</sup> Specifically, these Staff witnesses stated that Diffendal's analysis of lineaments involved observations based on large-scale mapping, and they further asserted that any claim that a

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<sup>393</sup> See Tech. Rep. at 2-118 to -119; *see also* Revised Well Impact Analysis at 3.

<sup>394</sup> See LaGarry Initial Test. at PDF 5-6.

<sup>395</sup> See LaGarry Rebuttal Test. at 1 (citing Ex. OST017 (Harmon Maher, Jr. & Robert D. Shuster, Poster, Significance of an ESE Fracture Direction in Tertiary Strata of South Dakota and Nebraska? (2012)); Ex. OST018 (Harmon D. Maher, Jr., Theoretical Framework for Great Plains Fracture Generation — Ver. 2 (draft Mar. 2012))).

<sup>396</sup> See LaGarry Initial Test. at PDF 6.

<sup>397</sup> See Staff Initial Test. at 33-34.

lineament represents a subsurface geologic fault, fracture, or joint is speculative until field verification is performed.<sup>398</sup> On this count, Dr. LaGarry concurred that lineaments are not necessarily fractures with hydrogeologic performance, which can only be verified by a site investigation.<sup>399</sup> But according to these Staff witnesses, no investigation has been done for the lineaments described in the Diffendal article,<sup>400</sup> and, in any event, none of the evidence submitted by the Tribe indicated that such verification investigations have been completed in the area of the MEA.<sup>401</sup>

Regarding his other main technical source, Dr. LaGarry agreed that the Swinehart article, cross-section A-A', which intersects both the Pine Ridge and Niobrara River faults and is used in Figure 1 of his initial testimony, is located 30 miles to the west of the MEA, while cross-section B-B' of the Swinehart article, which intersects the Pine Ridge fault but not the Niobrara River fault, is 7.5 miles to the east of the MEA.<sup>402</sup> Because these two cross-sections show that the Niobrara River fault ceases or deviates from the MEA somewhere between them, Dr. LaGarry conceded that, as with the Pine Ridge fault, the Niobrara River fault likely does not underlie the MEA.<sup>403</sup>

In contrast to the more general nature of Dr. LaGarry's referenced studies, Staff witnesses Back and Lancaster testified that the Staff's EA and SER provided a thorough discussion about reported MEA-area faults and their potential impacts on the hydrogeologic behavior of the underlying strata.<sup>404</sup> Based on its review of available literature and other data on such faults, as well as CBR's site-specific and regional cross-sections and CBR's site-specific and regional structure contour maps, in the EA the Staff indicates there is no evidence of vertical offsets indicative of faults within the MEA.<sup>405</sup>

And as for the other fractures that Dr. LaGarry indicated he encountered over the past 25 years,<sup>406</sup> while CBR witnesses Lewis, Nelson, Pavlick, and Shriver acknowledged these features likely exist at a regional level, they maintained there is no evidence of a fault or fracture in the MEA that is sufficiently

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<sup>398</sup> See *id.* at 34-35.

<sup>399</sup> See Tr. at 795 (LaGarry).

<sup>400</sup> See Staff Initial Test. at 34-35 (Back, Lancaster).

<sup>401</sup> During the hearing, Dr. LaGarry made reference to a master's degree thesis study in which a student from Chadron State College in northwestern Nebraska had field-checked a few lineaments and used statistics to corroborate the rest, but indicated he could not speak to the results because it had been some time since he read the thesis. See Tr. at 795.

<sup>402</sup> See Tr. at 717, 826, 830-35.

<sup>403</sup> See Tr. at 833-34.

<sup>404</sup> See Staff Initial Test. at 32-33 (citing EA at 3-11 to -14; SER at 33-36).

<sup>405</sup> See EA at 3-11 to -14.

<sup>406</sup> See LaGarry Initial Test. at PDF 5.

transmissive to serve as a conduit for potential contaminant migration.<sup>407</sup> Rather, based on what they asserted is the undisputed evidence of containment of the BC/CPF, they declared it is highly unlikely the MEA contains a fracture or a connected pathway of fracturing in the UCU that is hydraulically capable of transmitting contaminants.<sup>408</sup>

Finally, regarding Dr. LaGarry's claim that excursions from the MEA production zone into the Arikaree Group are a possible contamination pathway, Staff witnesses Back and Lancaster indicated that the pathway Dr. LaGarry describes is a vertical excursion from the BC/CPF sandstone aquifer into the overlying Arikaree/Brule aquifer. Yet, these Staff witnesses asserted, such excursion events are unlikely given the multiple bases establishing there is adequate vertical containment at the MEA, including (1) the plugging of all the abandoned exploratory drill holes at the MEA; (2) all the well casings installed at the MEA being subject to MIT initially and every five years thereafter; (3) the strong downward gradient at the MEA that would prevent upward migration of contaminants from the production zone to the overlying Arikaree/Brule aquifer; and (4) the thick, continuous UCU between the BC/CPF sandstone aquifer and the Arikaree/Brule aquifer, which is composed of clays, mudstones, and siltstones with very low hydraulic conductivity that would prevent vertical excursions.<sup>409</sup>

#### ii. BOARD FINDINGS ON POSSIBLE CONTAINMENT PATHWAYS

In support of his argument that fractures in the MEA-area bedrock will result in pathways through containment to the Arikaree/Brule aquifer, Dr. LaGarry relied heavily on the Diffendal and Swinehart articles, both of which we conclude contain significant limitations relative to our consideration of OST's containment pathways claim. Specifically, we find Diffendal's analysis is based on a lineament study that has not been field-verified within the MEA,<sup>410</sup> a concern that Dr. LaGarry recognized as well in his acknowledgment that lineament studies only detect a linear feature in the surface geography that must be field-verified to confirm that the feature indicates the presence of a fracture with hydrogeologic performance rather than some straight-line anthropogenic feature.<sup>411</sup> And while the evaluations in the Swinehart article were derived from field borings (albeit made at 5-mile spacing intervals), we find that cross-section A-A' in that publication (used as Figure 1 in Dr. LaGarry's initial testimony) was 30 miles west of

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<sup>407</sup> See CBR Rebuttal Test. at 23.

<sup>408</sup> See *id.* (citing Hydraulic Containment Report).

<sup>409</sup> See Staff Initial Test. at 36-40 (citing EA at 3-32 to -34, 4-23, 5-2; SER at 36-37; CBR License Amend. 3, at 10-11 (License Condition 10.1.4)).

<sup>410</sup> See *id.* at 34-35.

<sup>411</sup> See Tr. at 794-95.

the MEA while cross-section B-B' was 7.5 miles to the east of the site.<sup>412</sup> Given the location of each of these cross-sections, the Board concludes these sections show that neither the Pine Ridge nor the Niobrara River faults likely underlie the MEA, a point that was conceded by Dr. LaGarry.<sup>413</sup> This is also consistent with CBR's reached conclusion after it studied over 1600 geophysical logs of subsurface conditions at the MEA site.<sup>414</sup> We also agree with Dr. LaGarry that the Swinehart article, like the Diffendal article, is a stratigraphic report that omits any information on the transmissivity or preferential flow patterns through these fractures, which is the critical factor in assessing potential contamination travel.<sup>415</sup>

Regarding the question of the significance of other fractures that Dr. LaGarry indicated he encountered over the past 25 years,<sup>416</sup> the Board agrees with CBR that faults and other fractures likely exist at a regional level, but concludes there is no evidence of a fault or fracture in the MEA with sufficient transmissivity to serve as a potential contaminant pathway.<sup>417</sup> Further, based on the essentially undisputed evidence of containment within the BC/CPF aquifer,<sup>418</sup> we agree with CBR that it is highly unlikely that the MEA contains a fracture or a connected pathway of fractures in the UCU capable of transmitting meaningful volumes of contaminants.<sup>419</sup>

Lastly, we find that Dr. LaGarry's claims about the prospect of vertical excursions from the BC/CPF sandstone aquifer into the overlying Arikaree/Brule aquifer fail to be persuasive in the face of the evidence presented by CBR and the Staff on this issue. Specifically, to preclude borings and wells from becoming potential conduits for contaminant flow, CBR has plugged and abandoned all exploratory drill holes at the MEA. In addition, all wells installed at the MEA will be subject to MIT initially and at subsequent five-year intervals.<sup>420</sup> Further, the weight of the evidence presented by CBR and the Staff, including the presence of strong downward gradients during MEA operation and the thick, continuous, low-permeability UCU (composed of clays, mudstones and siltstones) between

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<sup>412</sup> See Tr. at 717, 826 (LaGarry), 829-35 (Lancaster, LaGarry).

<sup>413</sup> See Tr. at 833-34.

<sup>414</sup> See CBR Rebuttal Test. at 23 (Lewis, Nelson, Pavlick, Shriver); Tech. Rep. at 3-7.

<sup>415</sup> See Tr. at 792-93.

<sup>416</sup> See LaGarry Initial Test. at PDF 5.

<sup>417</sup> See CBR Rebuttal Test. at 23 (Lewis, Nelson, Pavlick, Shriver).

<sup>418</sup> See *supra* section V.C.3.

<sup>419</sup> See CBR Rebuttal Test. at 23 (Lewis, Nelson, Pavlick, Shriver).

<sup>420</sup> See Staff Initial Test. at 38-39 (Back, Lancaster) (citing EA at 4-23, 5-2; SER at 36-37; CBR License Amend. 3, at 10-11 (License Condition 10.1.4)).

the Arikaree/Brule aquifer and the BC/CPF, demonstrates there will be adequate vertical containment of production fluids within the BC/CPF at the MEA site.<sup>421</sup>

*d. Lateral Migration*

i. PARTIES' POSITIONS ON LATERAL MIGRATION

As a final contamination pathway concern, Dr. LaGarry posited that once contaminants are in the underground aquifers, they will move laterally and, within a few years, could be drawn up to the surface by domestic and irrigation wells, springs (such as those that feed the White River), and the groundwater-fed Niobrara River. He contended that the resulting contamination would migrate eastwards (downgradient) to contaminate both the White River, which supplies the towns of Glenn, Crawford, Whitney, and Pine Ridge with water, as well as the Niobrara River, which is a National Scenic River used by thousands of people for recreation every year.<sup>422</sup> And in his rebuttal testimony, in response to the Staff's initial testimony questioning his positions on containment pathways, Dr. LaGarry reproduced a list of alleged facts from the hydrogeologic studies performed on portions of the Niobrara River by Hallum et al.<sup>423</sup> At the hearing, he clarified that he adopted as his testimony only certain points of the Hallum studies that were within his area of expertise,<sup>424</sup> albeit without clarifying how

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<sup>421</sup> See CBR Rebuttal Test. at 22-23 (Lewis, Nelson, Pavlick); Staff Initial Test. at 39 (Back, Lancaster) (citing EA at 3-32 to -34).

<sup>422</sup> See LaGarry Initial Test. at PDF 6.

<sup>423</sup> See LaGarry Rebuttal Test. at 2-3 (citing Ex. OST020 at 2-3 (Douglas R. Hallum, et al., Project Completion Report: Hydrogeologic Framework Studies of Portions of the Niobrara River (Mar. 2018))).

<sup>424</sup> See Tr. at 1004-10. At the hearing, Dr. LaGarry adopted the following four points from the seven listed in his rebuttal testimony (which are designated below by their rebuttal testimony numbers):

1. White River Group that outcrops along the valley margins create the impression and subsequent misconception (when analyzed regionally) that the reach lacks hydraulic connection between surface water and groundwater. This is not the case locally. See Tr. at 1004.
2. There is sufficient near-surface alluvium to conduct water between the stream and groundwater wells. See Tr. at 1005-06.
4. Irrigation wells in the aquifer absent area near the Niobrara River are hydraulically connected to the High Plains aquifer and/or alluvial fill of the Niobrara River valley. See Tr. at 1007.
6. At larger scales, it becomes apparent that the reach is in contact with sediments capable of conducting water, and that the formation's ability to conduct water will likely be affected by the available thickness of conductive sediments and the physical configuration of said sediment. See *id.*

these adopted statements are relevant to his opinions on Contention 2.<sup>425</sup>

Disputing Dr. LaGarry's assertions that ISR contamination would migrate laterally into the White and Niobrara rivers, CBR witnesses Lewis, Nelson, Pavlick, and Shriver declared that his statements are hypothetical, speculative, and unsupported by data or other evidence.<sup>426</sup> They further stated that Dr. LaGarry's alleged migration pathways to the White and Niobrara rivers from the Marsland site are not plausible, given the MEA site conditions, CBR ISR facility operational practices, and the lack of any transport calculations or historical evidence as the basis for his claims.<sup>427</sup> CBR witnesses Lewis, Nelson, and Pavlick also declared that Dr. LaGarry's assertion that contaminated water could be drawn into agricultural wells, released into rivers, or migrate more than 15 miles to the White River are highly unlikely hypothetical events that rely on erroneous technical conclusions not backed by any data-driven or other evidentiary facts.<sup>428</sup> These CBR witnesses also testified that Dr. LaGarry's claim of a rapid contamination of the Niobrara River is without technical basis and implausible given the physical processes of dispersion, attenuation, and chemical dilution that would both retard any transmission and reduce the concentration of radioactive contaminants.<sup>429</sup>

Additionally, regarding the impacts of facility operations on irrigation wells near the MEA, CBR witnesses Lewis, Nelson, and Pavlick indicated that Crow Butte's groundwater flow modeling that derived the 30-year capture zone of a nearby irrigation well demonstrated that the MEA wellfields are not located within the capture zone of irrigation wells in the vicinity of the MEA. As such, they contended, a shallow casing leak within the MEA production wellfields will not impact area irrigation wells at any time in the future, given expected operating conditions.<sup>430</sup>

Also on this score, in its EA the Staff discusses the potential impacts of horizontal excursions (i.e., lateral migration of ISR production fluids within the BC/CPF sandstone aquifer) and concluded that any potential long-term impacts on groundwater quality would be "SMALL."<sup>431</sup> Furthermore, Staff witnesses Back and Lancaster explained that while lateral migration of production fluids is possible, such movements should be infrequent and the impacts minor for the

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<sup>425</sup> See Tr. at 1006. At the hearing, Dr. LaGarry also corrected his testimony relating to the direction from the MEA to the headwaters of the White River, changing the direction from east of the MEA to northwest of the MEA. Compare Tr. at 725 (east), with Tr. at 847 (northwest).

<sup>426</sup> See CBR Rebuttal Test. at 20-21.

<sup>427</sup> See *id.*

<sup>428</sup> See *id.* at 24.

<sup>429</sup> See *id.*

<sup>430</sup> See *id.* at 24-25 (citing Tech. Rep. at 2-118).

<sup>431</sup> See EA at 4-21 to -22.

previously highlighted reasons that (1) the wellfields are required by License Condition 10.1.6 to be under an inward hydraulic gradient to contain process fluids;<sup>432</sup> and (2) the BC/CPF aquifer will be monitored by a ring of wells surrounding each wellfield that, in accordance with License Condition 11.1.5, will be tested on a biweekly basis. If migration is confirmed, these Staff witnesses explained, CBR is to take corrective actions (e.g., adjusting wellfield extraction and injection rates to draw fluids back into the wellfield) and initiate more frequent weekly sampling from the ring of monitoring wells.<sup>433</sup>

And relative to Dr. LaGarry's assertion that contaminants could escape via lateral migration into the Arikaree/Brule aquifer, Staff witnesses Back and Lancaster stated that both the vertical containment at the MEA and the downward gradient between the overlying aquifers and the BC/CPF sandstone aquifer in the vicinity of the MEA would prevent such fluids from moving up to any of the locations Dr. LaGarry identified.<sup>434</sup>

ii. BOARD FINDINGS ON LATERAL MIGRATION<sup>435</sup>

The Board finds that Dr. LaGarry's claim that contaminated groundwater in the BC/CPF aquifer would be drawn up to the surface within "a few years" is speculation that lacks any reasonable hypothesis about the mechanisms or timing needed for this event as well as any supporting transport calculations, consistency with site data, or backing from historical data. We conclude as well that Dr. LaGarry's statement regarding contamination escaping into the Arikaree/Brule aquifer (and migrating to both the White and the Niobrara rivers) contains no viable explanation about how the contamination would manage to migrate from the BC/CPF into the Arikaree/Brule aquifer in the first place, particularly given the lack of record evidence demonstrating the presence of transmissive fracturing in the area of the MEA.

We also find that Dr. LaGarry's claim that the degraded groundwater in the High Plains aquifer "would likely migrate eastwards (downgradient) and contaminate the White River"<sup>436</sup> is in error as "eastward" is not the downgradient direction of groundwater flow for the Arikaree/Brule aquifer, which has an established southeasterly flow across the MEA.<sup>437</sup> And while, in an attempt to

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<sup>432</sup> See Staff Initial Test. at 40 (citing EA at 2-8, 4-16; CBR License Amend. 3, at 11 (License Condition 10.1.6)).

<sup>433</sup> See *id.* (citing EA at 4-21; CBR License Amend. 3, at 17 (License Condition 11.1.5)).

<sup>434</sup> See *id.* at 41 (citing EA at 3-34).

<sup>435</sup> For a more detailed discussion of the associated issue of groundwater flow see *infra* section VI.B.1.a.

<sup>436</sup> LaGarry Initial Test. at PDF 6.

<sup>437</sup> See CBR Rebuttal Test. at 14 (Lewis, Nelson, Pavlick).



bolster his testimony, Dr. LaGarry adopted some alleged facts concerning the hydrogeologic studies performed on portions of the Niobrara River (limiting his selection to those factors within his area of expertise),<sup>438</sup> we assign no weight to these facts in our decision, because Dr. LaGarry failed to clarify how these adopted statements are relevant to his opinions on Contention 2.

In responding to Dr. LaGarry's assertions about potential lateral migration, Crow Butte stated that its groundwater flow modeling of the 30-year capture zone of the only irrigation well near the MEA demonstrated that the MEA wellfields are not located within the capture zone of local irrigation wells.<sup>439</sup> The Board finds that CBR's modeling does not necessarily fully negate Dr. LaGarry's claim because, while we agree this modeling shows that a shallow casing leak within the MEA wellfields will not impact irrigation wells in the vicinity of the MEA, it does not address Dr. LaGarry's broader concern that contaminants anywhere in the Arikaree/Brule aquifer (not just at locations of failed well casings) might be picked up by other irrigation wells. Nonetheless, CBR's not having prevailed in toto on this particular point is not significant to our findings regarding lateral migration given Dr. LaGarry's more telling failure, in the face of the CBR and Staff evidence regarding BC/CPF containment,<sup>440</sup> to provide any specific evidence or a defensible hypothesis explaining the migration of the contaminants from the BC/CPF to the Arikaree/Brule aquifer, other than his already-rejected assumption of structural fracturing in the MEA's geologic strata.<sup>441</sup>

The Board further finds Dr. LaGarry's testimony that a contaminated Arikaree/Brule aquifer could impact supply wells within a few hours, that the groundwater in this aquifer flows eastward, and that contaminants will migrate more than 15 miles to the White River is conjecture that is not supported by any available data in the record of this proceeding and lacks any technical foundation. And concerning lateral migration within the BC/CPF, we find that because the BC/CPF groundwater flow is to the northwest and away from the Niobrara River, we agree with the Staff's estimate that, should it occur, any lateral excursion of MEA production fluids would attenuate by sorption and dilution during the many decades it would take for groundwater to migrate from the MEA toward the reported Pine Ridge fault and northwest discharge points.<sup>442</sup> As a final matter, we state our agreement with CBR's assessments that Dr. LaGarry's brief description of contaminant transport pathways to the White and Niobrara rivers from the Marsland site is not reasonable given MEA site conditions (e.g., strong

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<sup>438</sup> See Tr. at 1004-10.

<sup>439</sup> See CBR Rebuttal Test. at 24-25 (citing Tech. Rep. at 2-118).

<sup>440</sup> See *supra* section V.C.

<sup>441</sup> See *supra* section VI.A.

<sup>442</sup> See EA at 3-14 (citing ER at 3-47 to -50).

downward gradients from the Arikaree/Brule aquifer through the thick UCU to the BC/CPF aquifer) and operational mandates at the ISR facility (e.g., maintaining inward gradients within each MU during operations), and the fact that Dr. LaGarry's claims are not based on any reasonable transport calculations.<sup>443</sup>

## **B. Concern 1B — Affected Surface and Subsurface Environment**

In his initial testimony, OST witness Wireman provided what he characterized as five “opinions” stating his criticisms of the CBR and Staff characterizations of the MEA area subsurface environment that he alleges would be affected by the planned operation of the Marsland ISR facility. Mr. Wireman's concerns address uncertainties in regional hydrogeology and groundwater flow, deficiencies in the assessment of the structural geology, misinterpretation of the aquifer pumping test, confusion regarding groundwater restoration standards, and inadequacies with the wastewater disposal design. Each of these topics is discussed in the sections that follow.

### ***1. Wireman Opinion 1 — Regional Hydrogeology and Groundwater Flow***

In his Opinion 1, Mr. Wireman stated that there is still too much uncertainty regarding groundwater flow in the BC/CPF aquifer. While noting that hydraulic characteristics associated with the Marsland site have been quantified via the May 2011 aquifer pumping test that provided data deemed necessary for ISR operations, he nonetheless concluded that there are no data to support the Applicant and/or Staff claims regarding (1) recharge and discharge to the BC/CPF; (2) downgradient MEA groundwater flow; (3) lack of perimeter groundwater monitoring wells; (4) absence of a surface water hydrology discussion; and (5) lack of baseline restoration well monitoring.<sup>444</sup> Each of these, a so-called “basis” for his Opinion 1, is outlined below, along with responses from CBR and the Staff to his claims and the Board's findings on each topic.

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<sup>443</sup> See CBR Rebuttal Test. at 20-21 (Lewis, Nelson, Pavlick, Shriver); Tr. at 819 (LaGarry).

<sup>444</sup> See Wireman Initial Test. at 2-3. Mr. Wireman also included an inadequate selection of meteorological data as a basis for his Opinion 1, which the Board struck from his testimony as not being within the scope of the contention. See Board In Limine Ruling at 7.

a. *Wireman Opinion 1, Basis 1 — Recharge Sources and Discharge Locations of the BC/CPF Aquifer*

i. PARTIES' POSITIONS ON WIREMAN OPINION 1, BASIS 1 — RECHARGE/DISCHARGE

As Basis 1, Mr. Wireman asserted that CBR has failed to include any information in its TR on sources of groundwater recharge in the BC/CPF and on the primary pathways that deliver water to the deep, confined aquifer. In addition, he stated that the only reference to discharge from the BC/CPF aquifer provided by CBR is a TR statement that the aquifer discharge occurs at a point east of Crawford where the formation is exposed.<sup>445</sup> Mr. Wireman asserted that CBR should conduct hydrogeologic mapping to locate and characterize the recharge and discharge areas for the BC/CPF. Mr. Wireman also stated in his rebuttal testimony that the lack of specific information regarding the groundwater flow system in the BC/CPF aquifer is apparent in that CBR's TR contains no data-based information on the areas where sources of recharge occur or on the definition of the primary pathways that deliver recharge to the deep, confined aquifer.<sup>446</sup>

Regarding this basis, CBR states in its TR that, based on confined groundwater flow conditions indicated by the potentiometric maps and cross-sections of the BC/CPF sandstone, the recharge zone for the BC/CPF is most likely located west or southwest of the MEA at a minimum elevation of 3715 ft above mean sea level (amsl).<sup>447</sup> CBR also notes in the TR that the top of the basal sandstone of the BC/CPF occurs at much lower elevations within the MEA, ranging from approximately 3210 ft to 3290 ft amsl.<sup>448</sup> Also, according to Crow Butte's TR, groundwater flow in the BC/CPF in the vicinity of the MEA is predominantly to the northwest toward the White River at a lateral hydraulic gradient of 0.0004 feet per foot (ft/ft).<sup>449</sup> And Crow Butte's TR indicates, based on regional water-level information, that a discharge point at an elevation of at least as low as 3700 feet amsl (or below) is located east of Crawford, presumably at a location where the BC/CPF is exposed.<sup>450</sup>

Also relative to this basis, the Staff in its EA states that while the Pine Ridge escarpment acts as a groundwater divide for the Arikaree/Brule aquifer, this is not the case for groundwater flow in the BC/CPF where groundwater south of

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<sup>445</sup> See Wireman Initial Test. at 2 (citing Tech. Rep. at 2-86).

<sup>446</sup> See Wireman Rebuttal Test. at 1-2.

<sup>447</sup> See Tech. Rep. at 2-86 (citing Tech. Rep. Figs. at 49-62 (figs. 2.6-3a to -3n), 113-16 (figs. 2.9-6a to -6d)).

<sup>448</sup> See *id.* (citing Tech. Rep. Figs. at 49-62 (figs. 2.6-3a to -3n)).

<sup>449</sup> See *id.*

<sup>450</sup> See *id.*

the Pine Ridge escarpment flows in a northerly direction.<sup>451</sup> According to the Staff's EA, groundwater within the BC/CPF aquifer flows from recharge areas farther south of Dawes County, northward through the MEA and the existing CBR ISR facility, and then discharges where erosion has exposed this formation on the land surface north of Crawford.<sup>452</sup> Reportedly, at one discharge location the BC/CPF crops out about 20 miles northwest of Crawford in Sioux County, Nebraska.<sup>453</sup>

CBR witnesses Lewis, Nelson, Pavlick, and Shriver also pointed out that, as illustrated by a conceptual diagram showing areas of recharge and discharge of the BC/CPF, recharge to the BC/CPF occurs as direct infiltration of precipitation where the formation is exposed at distant locations west and south of the existing CBR ISR facility and the MEA, and also may occur as a small amount of downward groundwater flow from the overlying confining unit.<sup>454</sup> Furthermore with respect to the recharge, CBR witness Lewis testified at the hearing that previous CBR geologic studies (including field checks of geologic mapping of the area) indicated that the BC/CPF outcropped regionally at distant locations (e.g., 60 miles southeast of Scottsbluff and other recharge areas a significant distance to the west) where there were some outcrop areas believed to be local recharge to the BC/CPF aquifer.<sup>455</sup> Mr. Wireman, however, questioned recharge 60 miles away because of a geologic feature he concluded blocked any recharge and prevented groundwater from getting into the portion of the BC/CPF underlying the MEA. It was his opinion, therefore, that the recharge has to be local.<sup>456</sup>

CBR witnesses claimed as well that discharge from the BC/CPF currently occurs primarily through the pumped wells at the existing CBR ISR facility and from flowing wells located near the town of Crawford. They also indicated that prior to the installation of flowing wells and the development of the existing CBR ISR facility, discharge from the BC/CPF occurred in drainages and by evapotranspiration in areas east and north of Crawford where the formation is exposed at and near the surface.<sup>457</sup>

CBR witness Lewis further clarified at the hearing that flowing well #123 and flowing well #97, which are located northeast of Crawford as shown in

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<sup>451</sup> See EA at 3-27.

<sup>452</sup> See *id.*

<sup>453</sup> See *id.*

<sup>454</sup> See CBR Rebuttal Test. at 13 (citing Ex. CBR021 (Conceptual Groundwater Flow Diagram, Basal Chadron Aquifer) (per Tr. at 595, this is the same figure as that in the EA at 3-29 (fig. 3-8), which apparently was provided to the Staff by CBR in an April 2016 open issues response, see EA at 10-1) [hereinafter Conceptual Flow Model Diagram])).

<sup>455</sup> See Tr. at 609-10.

<sup>456</sup> See Tr. at 612.

<sup>457</sup> See CBR Rebuttal Test. at 13 (Lewis, Nelson, Pavlick, Shriver).

EA Figure 3-8,<sup>458</sup> have been flowing at about 40 gpm since at least the 1980s, and that pumping from the BC/CPF aquifer at the existing CBR ISR facility discharges 200 gpm to 240 gpm for a total of 280 gpm to 300 gpm from both sources.<sup>459</sup> He added that there is no discharge from the BC/CPF aquifer into the White River because the formation does not outcrop in the White River, and that the elevation of the BC/CPF potentiometric surface is substantially below the elevation of the White River, thus precluding any discharge from this aquifer into the White River.<sup>460</sup>

Mr. Lewis thus offered his geologic interpretation that prior to development, discharge of the BC/CPF would have taken place in the tributaries north of Crawford, noting as well that the red dashed line in EA Figure 3-8, labeled “Extent of Basal Chadron Sandstone,” is an outcrop area for the BC/CPF. Mr. Lewis added that this hypothesis is backed by old aerial photographs from the 1960s and 1970s (prior to mineral extraction operations) showing that lush vegetation existed in these tributaries where now they are dry, meaning that prior to development of CBR’s existing main facility, discharge from the aquifer took place north of Crawford.<sup>461</sup> Furthermore, it is the Applicant’s claim that the distance of the recharge and discharge areas from the MEA are such that they will not affect the behavior of the BC/CPF aquifer at the MEA.<sup>462</sup>

ii. BOARD FINDINGS ON WIREMAN OPINION 1, BASIS 1 —  
RECHARGE/DISCHARGE

While Mr. Wireman stated that CBR’s TR failed to include any information on sources of recharge/discharge of groundwater in the BC/CPF,<sup>463</sup> the Board finds that recharge and discharge locations for the BC/CPF are in fact discussed in the CBR TR. Additionally, we find such information is included in CBR’s initial and rebuttal testimony and in the Staff’s EA and rebuttal testimony. Further, we find that the general locations of the discharge and recharge areas are described and shown on a CBR conceptual map that pictorially represents the groundwater flow regime from south of the MEA toward the northwest.<sup>464</sup>

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<sup>458</sup> See EA at 3-29.

<sup>459</sup> See Tr. at 608, 620.

<sup>460</sup> See Tr. at 608.

<sup>461</sup> See Tr. at 608-09; *see also* CBR Rebuttal Test. at 13 (Lewis, Nelson, Pavlick, Shriver); Tr. at 598-99 (Lewis) (correcting rebuttal answer to indicate referenced town is Crawford rather than Chadron).

<sup>462</sup> See CBR Rebuttal Test. at 13 (Lewis, Nelson, Pavlick, Shriver).

<sup>463</sup> See Wireman Initial Test. at 2.

<sup>464</sup> See Conceptual Flow Model Diagram; Tech. Rep. at 2-86; CBR Initial Test. at 33-34 (Lewis, Nelson, Pavlick); CBR Rebuttal Test. at 13 (Lewis, Nelson, Pavlick, Shriver), 14 (Lewis, Nelson, Pavlick); EA at 3-27 to -29, 10-1; NRC Rebuttal Test. at 2-3 (Back, Lancaster, Striz).

We also find that CBR's description is based on the potentiometric maps and geologic cross-sections of the BC/CPF sandstone derived from actual field data. The Board concludes that CBR's claim regarding BC/CPF recharge and discharge sources is persuasive, including its supporting positions that (1) recharge to the BC/CPF occurs as direct infiltration of precipitation (at a minimum elevation of 3715 feet amsl) where the formation is exposed at distant locations west and south of the existing CBR ISR facility and the MEA; (2) discharge from the BC/CPF currently occurs primarily from wells being pumped at the existing CBR ISR facility and from flowing wells located near the town of Crawford; and (3) prior to ISR development and the installation of flowing wells, discharge of the BC/CPF took place in the tributaries north of Crawford and by evapotranspiration in drainages east and north of Crawford where the formation is exposed at or near the surface. The Board also agrees with the Applicant that the distances of the recharge and discharge areas from the MEA are such that they will not affect the behavior of the BC/CPF aquifer at the MEA.<sup>465</sup>

Mr. Wireman advocated more investigations, including hydrogeologic mapping, to refine the recharge and discharge locations of the BC/CPF. We find, however, that in the face of the CBR and Staff evidence regarding recharge/discharge, he failed to justify the need for such supplemental studies, providing no evidence indicating that the results of these proposed studies would have any measurable impact on the conclusions about recharge and discharge locations reached in CBR's TR and the Staff's EA. While such studies would no doubt be useful in better understanding the regional hydrogeology at some distance from the MEA, we find it hard to understand how any additional definition of the discharge and recharge zones for the BC/CPF, beyond that proffered by CBR and the Staff as summarized in the previous section, would have much bearing on any assessment of the interconnectivity and containment properties of the BC/CPF. Nor do we see the acceptance criteria in NUREG-1569 section 2.7 or the requirements of NEPA mandating a higher level of detail on the discharge and recharge zones of the production aquifer than has already been provided by the Applicant. As a result, we find that CBR's TR description and the Staff's EA assessment of discharge and recharge zones are supported by substantial evidence that is adequate to meet the applicable AEA and NEPA standards of review.

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<sup>465</sup> See CBR Rebuttal Test. at 13 (Lewis, Nelson, Pavlick, Shriver).

b. *Wireman Opinion 1, Basis 2 — Downgradient MEA BC/CPF Groundwater Flow*

i. PARTIES' POSITIONS ON WIREMAN OPINION 1, BASIS 2 — BC/CPF GROUNDWATER FLOW

As the second basis supporting his Opinion 1, Mr. Wireman stated that there is significant uncertainty about groundwater flow in the BC/CPF downgradient of the MEA, in part because of the claim in the Staff's EA that groundwater flow in this aquifer is not affected by the Pine Ridge escarpment. According to Mr. Wireman, there is no discussion to support this Staff EA statement even though this escarpment functions as a groundwater divide in the Arikaree/Brule aquifer.<sup>466</sup>

Citing to published references, the Staff's EA states that the Pine Ridge escarpment acts as a groundwater divide for the Arikaree/Brule aquifer, but does not act as a divide for groundwater flow within the BC/CPF. According to the EA, groundwater within the BC/CPF aquifer flows from recharge areas farther south of Dawes County northward through the MEA and the existing CBR ISR facility, until discharging north of Crawford.<sup>467</sup> Additionally, referencing regional and local hydraulic gradient data presented in potentiometric maps, CBR witnesses Lewis, Nelson, and Pavlick confirmed these EA statements by noting that this charting (created using field data) indicates that the Pine Ridge escarpment does not influence the groundwater flow in the BC/CPF and, therefore, no flow divide exists in this aquifer. They also stated that these observations are consistent with the CBR conceptual model of groundwater flow indicating no significant recharge to the BC/CPF along the Pine Ridge escarpment, a condition they assert is not unexpected given the substantial depth of the BC/CPF below the escarpment and the significant thickness of the UCU that isolates the BC/CPF from the Arikaree/Brule aquifer.<sup>468</sup>

According to these CBR witnesses, these observations are also consistent with the groundwater flow aspects of CBR's conceptual flow model that show consistent north to northwest flow in the BC/CPF underlying the MEA, which is in line with the pre-development and current regional flow direction observed in and around the existing CBR ISR facility north of Marsland.<sup>469</sup> Also, they maintained, consistent with the conceptual flow model, the groundwater flow in the overlying Arikaree/Brule aquifer is northwest through the existing CBR ISR facility, while being southeasterly beneath MEA. This observation, they

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<sup>466</sup> See Wireman Initial Test. at 2.

<sup>467</sup> See EA at 3-27.

<sup>468</sup> See CBR Rebuttal Test. at 14 (citing Tech. Rep. Figs. at 105-08 (figs. 2.9-4a to -4d) (Arikaree aquifer), 109-12 (figs. 2.9-5a to -5d) (Brule aquifer), 113-16 (figs. 2.9-6a to -6d) (BC/CPF aquifer).

<sup>469</sup> See *id.* at 14 (citing Conceptual Flow Model Diagram).

asserted, clearly indicates that a flow divide exists between the existing facility and the MEA in the Arikaree/Brule aquifer due to significant recharge to the shallow formations exposed along the Pine Ridge escarpment.<sup>470</sup>

Furthermore, when Mr. Wireman expressed doubts at the hearing about CBR's position that the escarpment affects the Brule and Arikaree formations but not the BC/CPF,<sup>471</sup> CBR witness Shriver responded that the BC/CPF is nearly flat across the escarpment from the south, where the Niobrara River flows, through the Marsland site, across the Pine Ridge escarpment, through the existing CBR ISR facility, and northwesterly to the discharge zones. Mr. Shriver also claimed that, as the regional geologic cross-sections indicate, only minimal (if any) dip is present in the geologic structure of the BC/CPF, and that the Arikaree/Brule aquifer is recharged at the Pine Ridge escarpment where there is a groundwater divide with southern flow to the south of the escarpment and north-northwestern flow to the north of this feature.<sup>472</sup>

When asked about the geologic theory that justifies this allegedly mysterious dichotomy between the groundwater flows in the two strata as a result of the Pine Ridge escarpment, CBR witness Shriver opined that the BC/CPF, middle and upper Chadron, Brule, and Arikaree formations were deposited during the same time period as the structural deformation associated with the Pine Ridge escarpment. As a result, any structural upheaval that occurred did not affect the deposition of the BC/CPF and the overlying formations. And according to Mr. Shriver, subsequent erosion of the upper deposits occurred on the north side of the escarpment, but not to any degree on the south side, creating the flow divide now observed in the Arikaree/Brule aquifer.<sup>473</sup>

Staff witness Dr. Striz indicated she concurred with CBR's claims, referencing the detailed regional geological cross-section in Figure 2.6-23 of the CBR TR that spans the Pine Ridge fault, which is indicated by a green line, and the Cochran Arch, which is indicated by a red line. Dr. Striz maintained that this cross-section is consistent with the CBR conceptual flow model and demonstrated only a minor dip in the BC/CPF aquifer, which is confirmed by the intact marker beds of Whitney ash within the Chadron Formation.<sup>474</sup> And with regard to the northern and southern groundwater flow in the Arikaree/Brule aquifer on either side of the escarpment, Dr. Striz testified that the Pine Ridge escarpment is the northern boundary of these aquifers and is a well-known erosional escarpment with sediments eroded to the north, but not so much to the south. Dr. Striz thus concluded that CBR had made its case that both the BC/CPF and

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<sup>470</sup> See *id.*

<sup>471</sup> See Tr. at 616-17.

<sup>472</sup> See Tr. at 617-18.

<sup>473</sup> See Tr. at 618-20.

<sup>474</sup> See Tr. at 621-24 (citing Tech. Rep. at 90 (fig. 2.6-23)).



the Arikaree/Brule aquifer were not offset by any activity at the Pine Ridge escarpment.<sup>475</sup> Finally, CBR witness Shriver emphasized that the existence of the intact upper and lower Whitney ash layers made a compelling case that there is not displacement across the escarpment, adding that there are no offsets shown on the geophysical logs making up the geologic cross-sections.<sup>476</sup>

According to OST witness Dr. LaGarry, however, this CBR position refutes 70 years of geological literature that says otherwise.<sup>477</sup> And with regard to OST's criticism of general groundwater flow in the BC/CPF, Mr. Wireman testified that the CBR and Staff reports "are very confusing with respect to the direction of flow" and that the CBR conceptual flow model indicates that the groundwater flow in the BC/CPF is highly variable "from the north, from the northwest, from the west, from the southwest, from the south."<sup>478</sup> In his view, this is "very qualitative information, somewhat inconsistent and not supported by actual data."<sup>479</sup> And when queried during the hearing about whether these directions vary as a function of the flow lines for the groundwater in the BC/CPF, Mr. Wireman seemed to agree in part, but still alluded to numerous allegedly unexplained directions of groundwater flow for BC/CPF,<sup>480</sup> before finally agreeing that the BC/CPF flow is primarily from the south to north and northwest across the MEA.<sup>481</sup> Likewise, relative to its conceptual flow model, CBR states in its TR that groundwater flow in the BC/CPF in the vicinity of the MEA is predominantly to the northwest toward the White River at a lateral hydraulic gradient of 0.0004 ft/ft.<sup>482</sup>

ii. BOARD FINDINGS ON WIREMAN OPINION 1, BASIS 2 — BC/CPF  
GROUNDWATER FLOW

Basis 2 of Mr. Wireman's first opinion stated that there is no discussion to support the CBR and Staff statements that groundwater flow in the BC/CPF aquifer is not affected by the Pine Ridge escarpment even though this escarpment functions as a groundwater divide in the Arikaree/Brule aquifer.<sup>483</sup> We find, however, that Mr. Wireman erred in this instance, as the TR clearly stated that potentiometric maps and cross-sections of the BC/CPF indicated that confined

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<sup>475</sup> See Tr. at 624-25.

<sup>476</sup> See Tr. at 629-30.

<sup>477</sup> See Tr. at 625-27.

<sup>478</sup> Tr. at 601.

<sup>479</sup> Wireman Rebuttal Test. at 1.

<sup>480</sup> See Tr. at 602-05.

<sup>481</sup> See Tr. at 601, 604-05, 616.

<sup>482</sup> See Tech. Rep. at 2-86.

<sup>483</sup> See Wireman Initial Test. at 2.

groundwater flow in the vicinity of the MEA is predominantly to the northwest at a lateral hydraulic gradient of 0.0004 ft/ft, and that regional water-level information for the Brule aquifer within the MEA (as depicted in potentiometric maps) shows that groundwater in the Brule Formation generally flows to the southeast across the entire MEA toward the Niobrara River at a lateral hydraulic gradient of 0.011 ft/ft.<sup>484</sup> The Board also finds that the referenced potentiometric mapping provided in CBR's TR clearly shows these contrasting flow directions in these two aquifers,<sup>485</sup> and that OST provided no evidence to the contrary.

Mr. Wireman continued to state that the groundwater flow directions in the BC/CPF are uncertain, repeating at the hearing his rebuttal testimony position implying that CBR's licensing information shows unexplained indications of flow from "the north, from the northwest, from the west, from the southwest, from the south. It's unclear."<sup>486</sup> But with CBR's explanation of the discharge occurring at the flowing wells north of Crawford and from the active pumping at the existing CBR ISR facility, we find that both the conceptualized flow diagram<sup>487</sup> and the plots of potentiometric levels in the BC/CPF<sup>488</sup> show that the flow across the MEA is to the northwest, a position with which Mr. Wireman agrees.<sup>489</sup> We also find that the other arrows that point to differing flow directions presented in the EA are a function of the groundwater flow paths shown on this figure, which are caused by the discharge of BC/CPF at the flowing wells near Crawford and the ongoing restoration activities at the existing CBR ISR facility.

In addition, the Board notes that the Staff's EA cites to published references indicating that while the Pine Ridge escarpment acts as a groundwater divide for the Arikaree/Brule aquifer, it does not create the same divide for groundwater flow within the BC/CPF, which has a consistent northwesterly groundwater flow both north and south of the Pine Ridge escarpment.<sup>490</sup> This cited material has not been made a part of the evidentiary record, however, and so cannot, in and

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<sup>484</sup> See Tech. Rep. at 2-86 (citing Test #8 Rep.; Tech. Rep. Figs. at 49-62 (figs. 2.6-3a through 2.6-3n), 109-12 (figs. 2.9-5a to -5d), 113-16 (figs. 2.9-6a to -6d)).

<sup>485</sup> See Tech. Rep. Figs. at 105-08 (figs. 2.9-4a to -4d) (Arikaree aquifer), 109-12 (figs. 2.9-5a to -5d) (Brule aquifer), 113-16 (figs. 2.9-6a to -6d) (BC/CPF aquifer).

<sup>486</sup> Tr. at 601.

<sup>487</sup> See EA at 3-29 (fig. 3-8); see also Conceptual Flow Model Diagram.

<sup>488</sup> See Tech. Rep. Figs. at 113-16 (figs. 2.9-6a to -6d).

<sup>489</sup> See Tr. at 601.

<sup>490</sup> See EA at 3-27 (citing T.W. Gjelsteen & S.P. Collings, *Relationship Between Groundwater Flow and Uranium Mineralization in the Chadron Formation*, Northwest Nebraska, Wyo. Geological Ass'n Guidebook, 39th Annual Field Conference 271-84 (1988); S.P. Collings & R.H. Knode, *Geology and Discovery of the Crow Butte Uranium Deposit*, Proceeding of the Practical Hydromet '83, 7th Annual Symposium on Uranium & Precious Metals, Littleton, Colo., Amer. Inst. of Mining, Metallurgical, and Petroleum Eng'g (1984)).

of itself, be relied upon as support for the Staff's EA statement.<sup>491</sup> Nonetheless, based on the information that is in the evidentiary record, it seems reasonable to us, as the Staff's EA statement citing this material indicates, that groundwater within the BC/CPF aquifer flows from recharge areas farther south of Dawes County northward through the MEA, until historically discharging where erosion has exposed this formation on the land surface north of Crawford.<sup>492</sup> We likewise conclude that CBR's references to regional and local hydraulic gradient data presented in potentiometric maps is correct in stating that the lack of a flow divide in the BC/CPF aquifer beneath the Pine Ridge escarpment is not unexpected, given the significant depth of the BC/CPF below the escarpment, and the significant thickness of the UCU that separates this aquifer from the Arikaree/Brule aquifer.<sup>493</sup>

The Board further finds that this evidence is consistent with CBR's conceptualized flow model showing southeast flow in the overlying Arikaree/Brule aquifer through the MEA, but northerly flow in these aquifers north of the Pine Ridge escarpment, while flow in the BC/CPF is north-northwest from the Niobrara River through the MEA and the existing CBR ISR facility to the north of Crawford. These observations clearly indicate there is a flow divide between the existing CBR ISR facility and MEA in the shallow aquifers due to significant recharge to the shallow formations exposed along the Pine Ridge escarpment.<sup>494</sup>

And in response to Mr. Wireman's doubts about the escarpment affecting the Brule Formation but not the BC/CPF,<sup>495</sup> the Board finds credible CBR witness Shriver's explanation that the BC/CPF is nearly flat across the escarpment (as documented by the regional geologic cross-sections) such that the structural upheaval associated with the Pine Ridge escarpment did not affect the deposition of the BC/CPF and the overlying formations, because the BC/CPF, middle and upper Chadron, Brule, and the Arikaree formations were deposited during the same time period as the structural deformation. Consequently, we find that erosion occurring on the north side created the different flow directions in the Arikaree/Brule aquifer while maintaining the northwesterly flow in the deeper BC/CPF aquifer.<sup>496</sup> The Board further concludes that CBR's and the Staff's position is supported by the existence of flat, intact upper and lower Whitney ash layers — marker beds within the Chadron Formation that were not displaced

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<sup>491</sup> See Licensing Board Memorandum and Order (Providing Administrative Directives Associated with Evidentiary Hearing and Limited Appearance Sessions) (July 27, 2018) at 3 n.4 (unpublished).

<sup>492</sup> See EA at 3-27.

<sup>493</sup> See CBR Rebuttal Test. at 14 (citing Tech. Rep. Figs. at 105-08 (figs. 2.9-4a to -4d) (Arikaree aquifer), 109-12 (figs. 2.9-5a to -5d) (Brule aquifer), 113-16 (figs. 2.9-6a to -6d) (BC/CPF aquifer)).

<sup>494</sup> See *id.* (citing Conceptual Flow Model Diagram).

<sup>495</sup> See Tr. at 616.

<sup>496</sup> See Tr. at 619-20.

across the escarpment as shown on the geophysical logs making up the geologic cross-sections.<sup>497</sup>

Finally, the Board rejects Mr. Wireman's claim that CBR's conceptualization of groundwater flow<sup>498</sup> indicates that groundwater flow in the BC/CPF comes from all directions, is inconsistent, and was not supported by actual data.<sup>499</sup> It seems apparent to us that these varying directions are a function of, and consistent with, the flow lines for the groundwater in the BC/CPF near the proffered discharge area north of Crawford. While it would be illuminating to know more precisely the pathway for flow in the BC/CPF aquifer than what is represented by this conceptualization of flow, we nonetheless find that the representation in the EA is consistent with CBR's field data and provides a sufficient understanding of the groundwater flows in the BC/CPF to resolve the issues raised in Contention 2 as they are relevant in determining the interconnectivity and containment properties of the BC/CPF.

*c. Wireman Opinion 1, Basis 3 — Perimeter Groundwater Monitoring Wells*

*i. PARTIES' POSITIONS ON WIREMAN OPINION 1, BASIS 3 — GROUNDWATER MONITORING WELLS*

Because of a concern that CBR has not installed any of the perimeter monitoring wells in the BC/CPF upgradient or downgradient of the MEA licensed area, in Basis 3 to his first opinion Mr. Wireman declared that these wells are necessary to provide the data required to fully evaluate downgradient impacts to the BC/CPF aquifer. He claimed that “[t]hese impacts include potential perturbation of the potentiometric surface downgradient of the mine units and potential contamination of downgradient groundwater that may result from groundwater restoration operations.”<sup>500</sup>

In response to these allegations, CBR witnesses Lewis, Nelson, and Pavlick confirmed that a perimeter ring of BC/CPF monitoring wells will be installed inside the licensed area surrounding ISR production and injection wells as part of the monitoring for each MU. According to these witnesses, “[t]hese monitoring wells will be used to ensure hydraulic containment and provide the necessary monitoring of groundwater quality downgradient (and in all directions) from active mining areas,” but will not be installed prior to operations as there is no need to do so.<sup>501</sup> Consistent with this CBR representation regarding perimeter

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<sup>497</sup> See Tr. at 629-30.

<sup>498</sup> See EA at 3-29 (fig. 3-8); see also Conceptual Flow Model Diagram.

<sup>499</sup> See Wireman Rebuttal Test. at 1.

<sup>500</sup> Wireman Initial Test. at 2-3; see Wireman Rebuttal Test. at 2.

<sup>501</sup> CBR Rebuttal Test. at 14-15.

monitoring well installation, the Staff's EA states that "CBR would place monitoring wells in the overlying aquifer and in perimeter rings surrounding all mine units to detect vertical and horizontal" migration.<sup>502</sup>

In its TR, CBR states that these perimeter monitoring wells will be installed in both the BC/CPF aquifer to detect lateral migration and in the Arikaree/Brule aquifer for the detection of vertical migration.<sup>503</sup> The CBR TR also indicates that the lateral monitoring wells are to be completed in the same aquifer and zone as the injection and production wells and that this placement is consistent with its NRC-issued license and NDEQ Class III underground injection control (UIC) permit for the existing CBR ISR facility, i.e., BC/CPF aquifer wells will be located no more than 300 ft from the nearest mineral production wells and no more than 400 ft from each other.<sup>504</sup> For the vertical monitoring wells, the TR declares that CBR will monitor for potential migration into the overlying Arikaree/Brule aquifer using shallow monitoring wells that are located within the wellfield boundary at a density of one well per four acres.<sup>505</sup> And the Staff's EA indicates that these perimeter monitoring wells will be sampled biweekly for approved indicators as required by License Condition 11.1.5, adopted by the MEA-related amendment to CBR's current license that authorizes operation of the existing CBR ISR facility.<sup>506</sup>

In addition to these perimeter wells, as reflected in another license condition for the Marsland ISR facility, two additional BC/CPF wells are to be installed inside of the MEA licensed area but outside of the operational monitoring well ring and downgradient of the perimeter monitoring wells. Water levels from these wells will be measured by CBR semi-annually to better track the cone of depression for aquifer drawdown during operations.<sup>507</sup>

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<sup>502</sup> EA at 4-21.

<sup>503</sup> See Tech. Rep. at 5-56.

<sup>504</sup> See *id.* at 7-45; CBR License Amend. 3 at 10 (License Condition 10.1.3).

<sup>505</sup> See Tech. Rep. at 7-46. Although the Staff's SER states that CBR is only required to space these wells at one per every five acres, *see* SER at 138, this disparity was clarified at the hearing by Staff witness Lancaster, who indicated that CBR has a stricter commitment to place wells at a spacing of one for every four acres, which is now reflected in a license condition. *See* Tr. at 639, 641; *see also* CBR License Amend. 3, at 3-4 (License Condition 9.2), 16 (License Condition 11.1.3(A)).

<sup>506</sup> See EA at 4-22; CBR License Amend. 3, at 2 (cross-reference table for Amendment 3), 17 (License Condition 11.1.5).

<sup>507</sup> See Tr. at 639-41, 642-43 (Lancaster, Nelson); CBR License Amend. 3, at 21 (License Condition 11.3.3).

ii. BOARD FINDINGS ON WIREMAN OPINION 1, BASIS 3 — GROUNDWATER  
MONITORING WELLS

In Basis 3 to his first opinion, Mr. Wireman declared that because CBR does not have any BC/CPF monitoring wells upgradient or downgradient of the MEA license area, these wells must be installed to provide the data needed to fully evaluate downgradient water quality impacts to the BC/CPF aquifer.<sup>508</sup> As was described above, the Applicant will install perimeter monitoring wells in the BC/CPF and in the Arikaree/Brule aquifer to detect potential lateral and vertical migration of production fluids along with two additional monitoring wells further downgradient of the perimeter wells to measure water levels needed to track drawdown in the mineralized zone, albeit in conjunction with each MU becoming operational.

In championing the need for such monitoring wells prior to facility licensing, Mr. Wireman is correct that the record shows the upgradient and downgradient monitoring wells are only to be installed by CBR as the ISR extraction process extends to each new MU. But the record does not indicate that installing such monitoring wells prior to licensing is either a part of the agency's regulations, a criterion under NUREG-1569 for assessing the adequacy of the hydrologic conceptual model for the MEA, or a requirement memorialized in the several license conditions adopted in the Marsland-associated license amendment to the current license for the existing CBR ISR facility that provide for the establishment and operation of these monitoring wells. And for his part, Mr. Wireman neither explained why the wells need to be installed as part of the licensing process nor showed how waiting for their installation until the post-operational period has any real effect on the ability of the wells to perform their important functions of detecting changes in the potentiometric surface downgradient of its respective MU or the presence of potential contamination of downgradient groundwater. We thus find no basis for requiring the installation and operation of such monitoring wells prior to licensing.

The evidentiary record also shows that these perimeter monitoring wells will be installed in both the BC/CPF and Arikaree/Brule aquifer at specific spacing to detect production fluid migration and they will be sampled on a required schedule, pursuant to the Marsland facility's license conditions.<sup>509</sup> The Board finds that these commitments memorialized in CBR's license, along with those discussed above regarding the establishment of such wells, provide a firm evidentiary basis for concluding that CBR's program for perimeter monitoring well installation and sampling is environmentally sound, and will be sufficient,

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<sup>508</sup> See Wireman Initial Test. at 2-3.

<sup>509</sup> See CBR License Amendment 3, at 10 (License Condition 10.1.3), 17 (License Condition 11.1.5), 21 (License Condition 11.3.3).

if installed as planned, to identify potential vertical and lateral migration of production fluids and assess inward hydraulic gradient during facility operation and restoration.

*d. Wireman Opinion 1, Basis 4 — Surface Water Hydrology*

i. PARTIES' POSITIONS ON WIREMAN OPINION 1, BASIS 4 — SURFACE WATER HYDROLOGY

Relative to the fourth basis for his first opinion, Mr. Wireman identified in his initial testimony (and later reiterated in his rebuttal testimony) three concerns: (1) no data or information on surface water hydrology was included in the TR or the EA; (2) the two southward flowing ephemeral streams traversing the MEA should be sampled when ephemeral flow is occurring; and (3) the Dooley Spring, located within the MEA, should be sampled for a baseline and investigated.<sup>510</sup>

According to CBR and the Staff,<sup>511</sup> the CBR TR and the Staff EA each do discuss surface water hydrology in some detail, stating, among other things, that no surface water impoundments, lakes, or ponds have been identified within the MEA.<sup>512</sup> Likewise each of these documents indicates there is no known persistent stream flow, as evidenced by Dooley Spring, Willow Creek, and other ephemeral streambeds, all of which lack defined banks, are usually dry, and are only expected to carry water during significant precipitation events and snowmelt.<sup>513</sup>

With respect to CBR's surface water characterization efforts, CBR witnesses Lewis, Nelson, and Pavlick testified that it has characterized surface-water bodies and drainages within the licensed area and affected surroundings in accordance with the acceptance criteria of NUREG-1569, including providing maps identifying the location, size, shape, hydrologic characteristics, and uses of surface-water bodies, as well as likely surface drainage areas, near its proposed site.<sup>514</sup> As a result of this characterization work, CBR determined that the only significant water body near the MEA is the Niobrara River, which flows easterly through a point approximately 0.4 miles south of the southernmost MEA MU (i.e., MU-F).<sup>515</sup>

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<sup>510</sup> See Wireman Initial Test. at 3; Wireman Rebuttal Test. at 3.

<sup>511</sup> See CBR Rebuttal Test. at 15 (Lewis, Nelson, Pavlick); Staff Rebuttal Test. at 7 (Back, Lancaster, Striz).

<sup>512</sup> See Tech. Rep. at 2-77 to -78, 2-119 to -123, 2-128, 5-57 to -58; EA at 3-18 to -23; *see also* ER at 3-41 to -42; SER at 59-60.

<sup>513</sup> See Tech. Rep. at 2-105, 7-28; EA at 3-19; *see also* ER at 3-66; SER at 60.

<sup>514</sup> See CBR Initial Test. at 19-20 (citing Tech. Rep. at 2-77 to -78).

<sup>515</sup> See Tech. Rep. at 2-77.

And as Staff witnesses Back and Lancaster indicated,<sup>516</sup> gathering flow and/or water quality information about the Niobrara River, in addition to establishing its own water sampling locations on the river, CBR utilized information from several existing Nebraska programs including the Nebraska Department of Natural Resources' (NDNR) Niobrara River Ambient Stream Monitoring Program; the NDEQ Niobrara River Ambient Stream Monitoring Program, which provides water quality sampling data for the Niobrara River above and below the Box Butte Reservoir, as well as the Box Butte Reservoir itself, which is located some 3 miles to the east of the MEA; and the United States Bureau of Reclamation's (or USBR) Box Butte Reservoir Storage Content program. Moreover, with regard to the two CBR-established water quality sampling locations on the Niobrara River, one sampling point (N-1) is upstream (west) of the MEA license boundary, and one point (N-2) is downstream (east) of the license boundary (which CBR indicated was moved closer to the MEA to co-locate with the USGS/NDNR and NDEQ gaging stations).<sup>517</sup>

As the CBR TR indicates, the two sampling points are located to detect potential impacts from either of the two major ephemeral drainages referenced by Mr. Wireman, both of which drain the MEA from northwest to southeast and connect to the Niobrara River between the two sampling points.<sup>518</sup> Also, the Staff's EA indicates that CBR initially collected samples from these two locations for baseline water quality analysis for nonradiological (quarterly) and radiological (monthly) parameters from January 2011 through March 2013. The results of these analyses indicated that background levels of radioactivity were low, with the majority of the results at or below detection limits.<sup>519</sup> Furthermore, for nonradiological parameters, the majority of the results for dissolved metals were reported at or below the detection limit. A qualitative comparison indicates that the concentrations at N-1 and N-2 appear to be similar so as to provide an existing water quality baseline in the area.<sup>520</sup>

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<sup>516</sup> See Staff Initial Test. at 26.

<sup>517</sup> See *id.* at 2-119 to -123; see also EA at 3-21 to -23.

<sup>518</sup> See Tech. Rep. at 2-122 to -123 (citing Tech. Rep. Figs. at 95 (fig. 2.7-4)).

<sup>519</sup> See EA at 3-22. The Staff's EA, which indicates that the term "detection limit" refers to the lower limit of detection as outlined in Regulatory Guide 4.14, goes on to explain that Regulatory Guide 4.14 defines the lower limit of detection as the smallest concentration of a material sampled that has a 95 percent probability of being detected, with only a 5 percent probability that a blank sample will yield a response interpreted to mean that the material is present. See *id.* at 3-22 n.14. The EA indicates as well that for radioactive material, "detection" means that it yields an instrument response that leads the analyst to conclude that activity above the system background is present. See *id.* (citing Office of Standards Dev., NRC, Regulatory Guide 4.14, "Radiological Effluent and Environmental Monitoring at Uranium Mills" at 4.14-21 (rev. 1, Apr. 1980) (ADAMS Accession No. ML003739941)).

<sup>520</sup> See EA at 3-22.



Responding to Mr. Wireman's assertion that Crow Butte omitted discussion of, and should include baseline sampling for, ephemeral streams and should further investigate Dooley Spring located within the MEA, CBR in its rebuttal testimony declared that (1) Dooley Spring is not located within the MEA, but is located approximately 1.5 miles west of the MEA boundary; (2) site investigations found no surface water impoundments within the MEA; (3) the lack of water flow in the two ephemeral drainages in the MEA prevented collection of surface water samples; and (4) rainfall runoff occasionally creates temporary small pools in a few places on the MEA site, but there is no evidence of persistent streamflow in recent times.<sup>521</sup> CBR also indicates in its TR that seven sediment and surface runoff sampling locations (MED-1 to MED-7) in these drainages have been established and, if at any time prior to operation water flow becomes available in the two ephemeral drainages at any of the sampling points set up along those drainages, CBR will collect baseline water samples.<sup>522</sup> CBR did, however, collect sediment samples at the designated locations, and those analytical results are presented in CBR's TR.<sup>523</sup>

And with regard to future operational and restoration monitoring, CBR in its TR indicates that samples will be collected at the two locations in the Niobrara River on a quarterly basis, and from the main drainage channel at the seven designated locations whenever sufficient flow is available for sampling in the two ephemeral drainages. Surface water monitoring results will be submitted in the semi-annual environmental and effluent reports to the NRC.<sup>524</sup>

Finally, in its rebuttal testimony the Staff indicated that its EA provides an extensive description of surface water hydrology, including ephemeral drainages and Dooley Spring, based on descriptions and supporting information in CBR's TR.<sup>525</sup> In that regard, the Staff's EA also provides an assessment of the potential impact of the MEA ISR on surface water quality, including the Niobrara River. According to the Staff's EA, surface water quality impacts will be "SMALL" because CBR had committed to control stormwater runoff during construction and operation of the MEA by implementing an SWPPP, applying BMPs, and

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<sup>521</sup> See CBR Rebuttal Test. at 15 (Lewis, Nelson, Pavlick) (citing Tech. Rep. at 2-78, 2-105, 2-120).

<sup>522</sup> See Tech. Rep. at 2-128. On this score, the Staff stated that CBR's commitment to sample ephemeral drainages if water is available during the pre-operational period was not required by Staff guidance because, given the quantity of this kind of water flow, the quality is not representative of any average value, so that the Applicant's commitment is over and above what is required by the Staff. See Tr. at 653 (Striz).

<sup>523</sup> See SER at 59 (citing Tech. Rep. Tbls. at 192-94 (tbl. 2.9-39)).

<sup>524</sup> See Tech. Rep. at 5-57 to -58.

<sup>525</sup> See Staff Rebuttal Test. at 7 (Back, Lancaster, Striz) (citing EA at 3-18 to -22, 3-72, 4-6 to -9; Tech. Rep. at 2-8 to -9, 2-77 to -78).

following the NPDES program per CBR's existing stormwater discharge permit issued by NDEQ.<sup>526</sup>

ii. BOARD FINDINGS ON WIREMAN OPINION 1, BASIS 4 — SURFACE WATER HYDROLOGY

The evidence adduced in this proceeding does not support Mr. Wireman's Basis 4 of his first opinion, i.e., that neither the CBR TR nor the Staff EA contain data or information on surface water hydrology at MEA, including information regarding two ephemeral streams and Dooley Spring.<sup>527</sup> To the contrary, the Board finds that the Applicant's TR and the Staff's EA, as well as CBR's ER and the Staff's SER, provide extensive information on MEA-related surface water hydrology. In addition to thoroughly describing CBR's efforts to characterize the existence of, and facility impacts on, surface water associated with the MEA site, including studies on the Niobrara River performed by NDNR and NDEQ, these documents summarize the hydrology of the river and outline CBR's baseline sampling and the monitoring program CBR intends to utilize during ISR activities on the site.<sup>528</sup>

Specifically, the Board finds that CBR has appropriately characterized surface-water bodies and drainages within the licensed area and affected surroundings, and provided maps identifying the location, size, shape, hydrologic characteristics, and uses of surface-water bodies near the area. Based on this evidence, we conclude that the only significant water body near the MEA is the Niobrara River.<sup>529</sup> Further, we find that in addressing the circumstances surrounding the only waterway in the vicinity of the MEA, CBR provided a detailed discussion concerning the Niobrara River and existing monitoring programs for this surface water body.<sup>530</sup> In that regard, CBR has established two water quality sampling locations on the Niobrara River located to detect potential impacts from either of the two major ephemeral drainages that drain the MEA (from northwest to the southeast) and connect into the Niobrara River between the two sampling points. Moreover, CBR has collected samples from these locations for baseline water quality analysis for both nonradiological (quarterly) and radiological (monthly) parameters from January 2011 through March 2013.<sup>531</sup> Notwithstanding Mr. Wireman's assertion that Crow Butte omitted discussion of

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<sup>526</sup> See EA at 4-12 to -14.

<sup>527</sup> See Wireman Initial Test. at 3; Wireman Rebuttal Test. at 3.

<sup>528</sup> See Tech. Rep. at 2-77 to -78, 2-119 to -123, 2-128, 5-57 to -58; EA at 3-18 to -23; *see also* ER at 3-41 to -42; SER at 59-60.

<sup>529</sup> See Tech. Rep. at 2-77 to -78.

<sup>530</sup> See *id.* at 2-77 to -78, 2-119 to -123.

<sup>531</sup> See EA at 3-22.

ephemeral streams located within the MEA, the evidentiary material provided by CBR establishes that (1) there are two major ephemeral drainages traversing the MEA license area from north to south; (2) CBR selected seven channel-bottom sampling points for these drainages to measure radiological concentrations in the sediment; and (3) in the face of insufficient water flow to permit sampling, CBR sampled sediments from these drainages twice for baseline values. Moreover, CBR in its TR indicates that since water was not present in the ephemeral drainage system during the previous sampling sessions so that no baseline water samples were collected, if water flow becomes available prior to the startup of the MEA ISR facility, CBR will collect baseline water samples as well.<sup>532</sup>

In sum, based on the evidentiary record, the Board has determined that sample analysis of both the Niobrara River and the sediment in the dry ephemeral drainages provides a baseline of existing water and sediment quality in the area, and finds no basis for Mr. Wireman's concerns the CBR TR and the Staff EA posed possible surface water hydrology-associated deficiencies relative to the MEA.

*e. Wireman Opinion 1, Basis 6 — Groundwater Baseline Restoration Wells*

The final basis for OST witness Wireman's Opinion 1, Basis 6, deals with the absence of pre-licensing selection of, and sampling from, baseline restoration wells.<sup>533</sup>

i. PARTIES' POSITIONS ON WIREMAN OPINION 1, BASIS 6 — GROUNDWATER BASELINE RESTORATION WELLS SELECTION AND SAMPLING

In Basis 6 of his Opinion 1, Mr. Wireman challenged CBR's failure, as reflected in its TR, to select and install groundwater baseline restoration monitoring wells and to obtain data regarding background concentrations for applicable constituents.<sup>534</sup> According to Crow Butte, Mr. Wireman's concern is groundless. Specifically, CBR maintained that restoration monitoring wells will be established on an MU-by-MU basis as required by License Condition 11.1.3, which addresses the sampling necessary to establish baseline groundwater quality data for the ore zone and overlying aquifers. Further, according to CBR, the sampling results will then be used to define the background groundwater protection standards for restoration in accordance with 10 C.F.R. Part 40, app.

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<sup>532</sup> See Tech. Rep. at 2-128.

<sup>533</sup> Basis 5 for Mr. Wireman's Opinion 1, regarding whether additional meteorological data should be collected, was stricken by the Board as outside the scope of Contention 2. See Board in Limine Ruling at 7.

<sup>534</sup> See Wireman Initial Test. at 3.

A, criterion 5B(5).<sup>535</sup> In that regard, the CBR TR indicates that prior to starting the ISR process at an MU, a minimum of six baseline restoration wells will be installed per MU and that each of those wells will be sampled four times.<sup>536</sup> And at the hearing CBR witness Nelson maintained that the standards for baseline restoration wells will be established consistent with the above-referenced NRC license condition and in compliance with the NDEQ Class III permit that will be required before installing these wells. He also confirmed that these restoration wells will be installed on an MU-by-MU basis, so that for each future MU the wells are to be installed and baseline water quality then established to determine the restoration parameters for that area.<sup>537</sup>

On this score, the Staff's rebuttal testimony declared that the installation and testing of baseline restoration wells cannot occur until after the site is licensed and each wellfield is constructed. The Staff's testimony emphasized that because these wells are to be used for restoration, there is no need for them to be installed during the licensing process since potential impacts of operation have previously been satisfactorily assessed, i.e., CBR has already provided sufficient water quality data from installed wells to establish a pre-operational water quality baseline of the BC/CPF aquifer.<sup>538</sup>

CBR witness Nelson and Staff witness Dr. Striz were asked about the possibility of water quality in an undeveloped MU being affected by ISR production activities that already occurred in an existing MU. Both expressed confidence that the perimeter monitor wells around each operating MU would detect any migration of production fluids, which would ensure that CBR could undertake preventive measures to protect those MUs outside of the areas of active wellfield operation from exposure before CBR could establish baseline conditions.<sup>539</sup> Dr. Striz further noted that as part of the wellfield package associated with starting a new MU, CBR will use these baseline water quality conditions, including a statistical analysis of those constituent levels, to establish the restoration standard for each MU. Moreover, if there is an unusual value, CBR will subject the sample to outlier tests to evaluate whether it should be included in the data set, along with an explanation as to why such an unusual value occurred.<sup>540</sup> And if there are indications that the water quality of an adjacent undeveloped MU may have been tainted by production fluids from an existing MU, Dr. Striz testified

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<sup>535</sup> See CBR Rebuttal Test. at 16 (Lewis, Nelson, Pavlick) (citing CBR License Amendment 3, at 16 (License Condition 11.1.3)).

<sup>536</sup> See Tech. Rep. at 6-5.

<sup>537</sup> See Tr. at 654-55.

<sup>538</sup> See Staff Rebuttal Test. at 11 (Back, Lancaster, Striz) (citing Tech. Rep. Figs. at 6 (fig. 2.7-6); Tech. Rep. Tbls. at 136-41 (tbl. 2.9-11)).

<sup>539</sup> See Tr. at 656 (Nelson), 658 (Striz).

<sup>540</sup> See Tr. at 665-66.

that the Staff has the option to modify any constituent concentration to better reflect a restoration value indicative of background conditions had the migration of production fluids not occurred.<sup>541</sup>

Consistent with his initial testimony, at the hearing Mr. Wireman indicated that all baseline sampling should be conducted before any ISR operational extraction occurred at Marsland. In his view, baseline is “pre-mining,” i.e., before any operations have begun anywhere within the MEA, because once lixiviant has been injected into the first MEA MU, the BC/CPF chemistry (specifically oxidation levels) has been altered and there are no longer “background” levels in the aquifer.<sup>542</sup> He further stated he had a hard time accepting the premise that “where the mine unit that’s already been mined and water quality has been altered, that none of that water gets into the next mine unit.”<sup>543</sup> He was, however, encouraged by the Staff’s testimony that, in appropriate situations, the Staff has the ability to modify constituent values that will be used as the benchmark in assessing restoration efforts.<sup>544</sup>

But Dr. Striz challenged Mr. Wireman’s statements suggesting that there would be movement of production fluids between the MEA MUs once any operations began. He was in error, she stated, because each MU is required to have an inward hydraulic gradient to prevent such a migration of fluids. She added that the water quality in the perimeter wells is monitored every two weeks to detect any indication of uncontrolled fluid movements, and corrective action is to be taken to control any migration if it did occur. In her opinion, it is implausible for constituents to be freely moving downgradient into other ISR units given the required inward gradient at operating MUs. She also rejected the notion that the constituents mobilized by the ISR process could move by chemical transportation rather than by hydraulic gradients, stating that constituents cannot overcome and move out by chemical diffusion against the strong groundwater flow established by the required inward hydraulic gradients.<sup>545</sup>

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<sup>541</sup> See Tr. at 659-60. As an analogous example of this occurring, Dr. Striz spoke of a company that conducted a pilot ISR study on a very small footprint of one well pattern. When this area was then advanced into commercial operation, the baseline restoration wells detected elevated values for uranium in the vicinity of the study area. In that case, the elevated value for uranium was considered to be an outlier and, as such, the measured concentration was not used in calculating a restoration value. Dr. Striz indicated that this example demonstrates that the Staff has the ability to adjust the baseline values if any outlying, elevated constituent levels were deemed not to be representative of background conditions. See Tr. at 659-60, 683-84.

<sup>542</sup> See Tr. at 661-63.

<sup>543</sup> Tr. at 662.

<sup>544</sup> See Tr. at 664-65.

<sup>545</sup> See Tr. at 666-67.

ii. BOARD FINDINGS ON WIREMAN OPINION 1, BASIS 6 — GROUNDWATER  
BASELINE RESTORATION WELLS SELECTION AND SAMPLING

Regarding Mr. Wireman's baseline restoration well selection and sampling claims,<sup>546</sup> while he is correct that the wells for baseline monitoring have not been selected and no data points are provided regarding background concentrations for applicable constituents, the Board finds that Mr. Wireman failed to provide any evidence justifying the installation of such restoration wells at this time. It is at best questionable that water quality data should be obtained before ISR operations begin.<sup>547</sup> Moreover, we find that CBR and the Staff have proffered sufficient evidence to support their position that it is suitable to wait to install and sample these restoration wells as each MU is developed.

Concerning the potential for adjacent MUs to impact the groundwater baseline of the next area to be developed as an MU, CBR witness Nelson and Staff witness Dr. Striz agreed that the perimeter monitoring wells surrounding active MUs, which are monitored every two weeks, would detect any changes in groundwater quality and so would alert CBR to the need to implement corrective measures before any impacts could occur to the baseline water quality of an MU prior to the unit becoming operational. Based on the evidentiary record, we agree with this conclusion, and in particular, based on Dr. Striz's testimony, we find that before initiating operation of a new MU, CBR is obliged to submit a wellfield package to the NRC demonstrating all perimeter monitoring well completions and locations to assure they are placed so that contaminant migration is detected before it can migrate to a new MU area.<sup>548</sup>

We also find that CBR's wellfield package will include water quality information for all constituents with a statistical analysis to identify any outliers. And if there is any indication that the baseline water quality underlying the new MU has been impacted by previous ISR activity, the record establishes that the Staff has the ability to adjust the documented baseline values to be used after the MU

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<sup>546</sup> As part of their initial testimony regarding Mr. Wireman's Opinion 1, Basis 6, CBR witnesses Lewis, Nelson, and Pavlick sought to raise a legal issue, asserting that his claims were not within the scope of Contention 2. *See* CBR Rebuttal Test. at 16. This was resolved in the context of the Staff's prehearing in limine motion in which the Staff sought to strike this same statement. There we concluded that the testimony was within the confines of Contention 2's concerns "because establishing baseline groundwater quality is relevant to the Contention 2 issue regarding impacts the MEA would impose on surface and groundwater quality, especially to the issue of groundwater restoration." Board In Limine Ruling at 8.

<sup>547</sup> *See Strata Energy, Inc.* (Ross In Situ Uranium Recovery Project), CLI-16-13, 83 NRC 566, 583-84 (2016), *petition for review denied sub nom. Nat. Res. Def. Council*, 879 F.3d at 1214.

<sup>548</sup> *See* Tr. at 656-58 (Nelson, Striz), 660 (Striz).

is depleted to assess the effectiveness of restoring the aquifer — a capability supported by Mr. Wireman.<sup>549</sup>

Finally, we agree with Dr. Striz's assertion that movement of production fluids between the developed and undeveloped MUs is not plausible due to the required inward hydraulic gradients that prevent such fluid migration. And in this regard, nothing has been provided in the record demonstrating that the chemical transportation of constituents in the ISR process can overcome the strong inward groundwater hydraulic gradients sufficiently to allow migration away from an active MU by chemical diffusion.<sup>550</sup>

## **2. Wireman Opinion 2 — Structural Geology Characterization**

In Opinion 2 of his initial testimony, Mr. Wireman challenged CBR's characterization of the structural geology in northwestern Nebraska as insufficient to develop an acceptable conceptual model of site hydrology that is adequately supported by site data. More specifically, he claimed that the area's structural geologic setting is more complex than previously reported by CBR, with numerous significant structural features including (1) the Black Hills and Chadron uplifts in northwest Nebraska; (2) the Pine Ridge escarpment to the north; (3) an east-west graben (i.e., a sunken elongated block of bedrock lying between two faults) south of Marsland; and (4) two major east-west trending faults (i.e., the Pine Ridge fault to the north of the Pine Ridge escarpment and the Niobrara River fault that trends parallel to the Niobrara River).<sup>551</sup> In his rebuttal testimony, Mr. Wireman asserted that there is significant uncertainty about groundwater flow in the BC/CPF downgradient of the MEA caused by the unknown effect of the Pine Ridge escarpment on these flow paths, given that this escarpment functions as a groundwater divide in the Arikaree and Brule aquifers.<sup>552</sup>

The Board has addressed these matters as one of the overarching issues in section V.B above.<sup>553</sup> The CBR and Staff responses to Mr. Wireman's claims, his rebuttal to those responses, and the Board findings on these issues presented therein need not be repeated here. But to summarize the findings in this decision pertinent to structural geology characterization as that issue is raised by Mr. Wireman in his Opinion 2, we conclude that:

1. While there is likely some degree of structural fracturing of the geologic

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<sup>549</sup> See Tr. at 660 (Striz), 665-66 (Wireman, Striz).

<sup>550</sup> See Tr. at 666-67 (Striz).

<sup>551</sup> See Wireman Initial Test. at 3.

<sup>552</sup> See Wireman Rebuttal Test. at 2.

<sup>553</sup> See *supra* section V.B.1.b.

strata underlying the MEA, the mere presence of fractures is not the issue. Rather, the transmissivity of such a feature is the critical factor.

2. With regard to the potential impacts of heterogeneity and anisotropy on the rate and directions of groundwater flow within the MEA, there is no evidence in the hydrogeologic data that conclusively supports the presence of extensive, transmissive, heterogeneous pathways that would provide a preferential flow for contaminants to uncontrollably migrate into the adjacent Brule and Arikaree aquifers or into the neighboring surface waters, including the Niobrara and White Rivers, and thus there is insufficient OST evidence to refute the evidentiary showings of CBR and the Staff regarding the containment of processing fluids and the lack of aquifer interconnectivity as demonstrating CBR's ability to conduct safe, environmentally-sound ISR activities in the proposed area.
3. OST's hypothesis regarding the impacts associated with the Pine Ridge escarpment is rejected based on
  - a. Structure contour maps derived from field data showing a nearly level BC/CPF from below the MEA, to beneath the Pine Ridge escarpment, and on through to the existing CBR ISR Facility, without any apparent interruption by the Pine Ridge escarpment;<sup>554</sup>
  - b. Groundwater potentiometric maps based on measured water levels establishing the contour flow maps documenting constant north-west flow along the axis of the MEA;<sup>555</sup> and
  - c. Surface contours illustrating that the Brule and Arikaree formations have been significantly eroded on the north side of the Pine Ridge escarpment as compared to the south side where the MEA is proposed, yielding stratigraphic evidence that supports the view that these formations were deposited before this erosion occurred along the escarpment.<sup>556</sup>

Contrary to Mr. Wireman's claim that there is insufficient characterization of the structural geology as well as uncertainty about groundwater flow in the BC/CPF downgradient of the MEA, the Board finds that there is an overwhelming quantity of reliable field data supporting the northwest flow of groundwater in the BC/CPF (from south of the Niobrara River, through the proposed MEA

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<sup>554</sup> See Staff Rebuttal Test. at 4 (Back, Lancaster, Striz) (citing Tech. Rep. Figs. at 87-90 (figs. 2.6-21 to -24)); Three Crow Cross-Sections at PDF 3-4 (figs. 2 & 3)).

<sup>555</sup> See Staff Rebuttal Test. at 3, 4-5 (Back, Lancaster, Striz) (citing EA at 3-29 (fig. 3-8)).

<sup>556</sup> See *id.* at 4 (citing Tech. Rep. Figs. at 87-90 (figs. 2.6-21 to -24); Three Crow Cross-Sections at PDF 3-4 (figs. 2 & 3)).



and the existing CBR ISR facility towards Crawford and the White River) and that these data largely refute the essentially hypothetical postulates advanced by Mr. Wireman.

In conclusion, we find that the evidentiary record before the Board supports a determination that there are no known faults or significant fracturing underlying the MEA that might cause heterogeneity and anisotropy of the underlying geologic strata. As a result, there is no need for CBR to augment its TR or the Staff to alter its EA to address heterogeneity/anisotropy impacts due to fracturing.

### **3. Wireman Opinion 3 — MEA Aquifer Testing**

#### **a. Parties' Positions on Wireman Opinion 3 — MEA Aquifer Testing**

In Opinion 3 to his initial testimony, Mr. Wireman echoed OST witness Dr. Kremer's criticisms of CBR's aquifer testing conducted at the MEA, stating that this test was inadequate for developing an acceptable site-wide conceptual hydrologic model and does not adequately characterize the subsurface heterogeneity. Much of the material Dr. Kremer provided in his opinion has been addressed as part of the section V.A overarching issue of misinterpretation of aquifer pumping test data, including Mr. Wireman's criticism that only one aquifer test has been conducted for the entire MEA, resulting in only a small part of the BC/CPF being tested. But Mr. Wireman also testified that lithologic and hydraulic data included in the TR for the Arikaree and Brule aquifers indicate significant heterogeneity and that this heterogeneity is further increased by structural deformation of the sedimentary rocks that comprise the aquifers, with the resulting heterogeneities affecting groundwater flow and well yields.<sup>557</sup>

Although additional details regarding the heterogeneity challenges raised by Dr. Kremer are discussed *infra* in section VII.D, Mr. Wireman was in agreement with his OST colleague that the May 2011 pumping test, as the only aquifer test that was conducted at the MEA, was limited to obtaining data to assess the hydraulic properties of the BC/CPF. As a result, and alluding to the fact that no pumping test was performed on the Arikaree/Brule aquifer, he concluded that “[a]quifer testing conducted at the MEA is inadequate for developing an acceptable site-wide conceptual hydrologic model and does not adequately characterize the subsurface heterogeneity.”<sup>558</sup> To support his argument, he stated that the lithologic and hydraulic data included in the CBR TR for the Arikaree and Brule aquifers indicated significant heterogeneity. Further, he hypothesized that sediment comprising these formations was deposited in a variety of fluvial

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<sup>557</sup> See Wireman Initial Test. at 4.

<sup>558</sup> *Id.*

environments resulting in changes in the characteristics of the sedimentary rock within the formation.<sup>559</sup>

This heterogeneity, according to Mr. Wireman, allegedly affects groundwater flow and well yields and is further increased by structural deformation of the sedimentary rocks that comprise the aquifers. He concluded that aquifer testing, monitoring, and flow modeling of these aquifers must consider the heterogeneity, claiming that the aquifer test data indicated that hydraulic conductivity and transmissivity of the BC/CPF near the pumping well is an order of magnitude lower than at the outlying monitoring wells.<sup>560</sup>

CBR witnesses Lewis, Nelson, and Pavlick, acknowledging that within the MEA the BC/CPF is not homogeneous and isotropic on a local scale, nonetheless stated that CBR's assumptions of homogeneity and isotropy are reasonably satisfied over the scale of the BC/CPF pumping test. As a result, these CBR witnesses declared, with Staff witnesses Back, Lancaster, and Dr. Striz agreeing, that the BC/CPF Formation underlying the MEA can be treated as homogeneous and isotropic for analytical purposes.<sup>561</sup>

In response to Mr. Wireman's assertion that the aquifer testing at the MEA was inadequate, CBR witnesses Lewis, Nelson, and Pavlick referenced their responses to a similar challenge by Dr. Kreamer,<sup>562</sup> and noted that the May 2011 aquifer pumping test was sufficient to characterize the portions of the site that would be affected by development of the first four MUs at Marsland, given that such testing was consistent with industry practice and NRC guidance relative to these four MUs and that additional site-specific pumping tests would be performed, as required, as additional MUs are added.<sup>563</sup> These CBR witnesses also disagreed with Mr. Wireman's characterization that transmissivity and hydraulic conductivity near the pumped well is an order of magnitude lower than the outlying monitor wells. Rather, these CBR witnesses claimed that those values were within a factor of two to four (with the exception of well Monitor-3, which is two to nine times lower than other monitor well locations), thus suggesting relative homogeneity.<sup>564</sup> Finally, these CBR witnesses asserted there is no evidence of the hypothetical structural heterogeneities cited by Mr. Wireman.<sup>565</sup>

Staff witnesses Back, Lancaster, and Dr. Striz likewise disputed OST's subsurface characterization of the BC/CPF, testifying that methodologies such as

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<sup>559</sup> *See id.*

<sup>560</sup> *See id.*

<sup>561</sup> *See* CBR Rebuttal Test. at 11-12 (citing Test #8 Rep. at 11); Staff Rebuttal Test. at 30.

<sup>562</sup> *See* CBR Rebuttal Test. at 7-8, 18; *see also infra* section VII.A.5.a.

<sup>563</sup> *See id.* at 18.

<sup>564</sup> *See id.*

<sup>565</sup> *See id.*

core examination and geophysical logging show there are no major impermeable or permeable features that would indicate significant heterogeneity at the MEA to the extent these features would impact the aquifer test analysis results.<sup>566</sup> According to these Staff witnesses, the lack of significant heterogeneity is also reflected in the potentiometric surface of the BC/CPF aquifer, which is smooth and essentially has a flat and relatively constant hydraulic gradient that indicates there are no significant changes in transmissivity that would impact the BC/CPF aquifer groundwater flow.<sup>567</sup>

*b. Board Findings on Wireman Opinion 3 — MEA Aquifer Testing*

In his critique of CBR's aquifer pumping test, Mr. Wireman called for more aquifer testing, stating that "[l]ithologic and hydraulic data included in the TR for the Arikaree and Brule aquifers indicate significant heterogeneity."<sup>568</sup> We find, however, that CBR in its TR defines the groundwater levels in the unconfined Arikaree and Brule aquifers,<sup>569</sup> noting that groundwater flow in these overlying strata is northwest near the existing CBR ISR facility area and southeast near the MEA. This observation clearly indicates that a flow divide exists between the existing CBR ISR facility area and MEA in the shallow aquifers due to significant recharge to the shallow formations exposed along the Pine Ridge escarpment.<sup>570</sup> Given this characterization, we find that Mr. Wireman in his Opinion 3 failed to provide sufficient contradictory evidence to justify the need for additional hydrogeologic detail regarding the surficial, unconfined Arikaree and Brule aquifers, nor did he justify how any additional definitions of the hydraulic properties of the Arikaree and Brule aquifers would reveal relevant information about the containment properties of the BC/CPF, which is located hundreds of feet below the ground surface and the Brule and Arikaree aquifers.

The Board also finds that Crow Butte has adequately established that the single May 2011 aquifer pumping test is sufficient to characterize the portions of the site that would be affected by development of the first four MEA MUs.<sup>571</sup> This is particularly so because not only must an additional pumping test be conducted prior to the opening of each new MU, but CBR's pumping test plan must be submitted for Staff review and verification 60 days before performing the aquifer pumping test, and those pumping test results must, in turn, be part

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<sup>566</sup> See Staff Rebuttal Test. at 27 (citing Test #8 Rep. at 5).

<sup>567</sup> See *id.* (citing Tech. Rep. Figs. at 113-16 (figs. 2.9-6a to -6d)).

<sup>568</sup> Wireman Initial Test. at 4.

<sup>569</sup> See Tech. Rep. Figs. at 105-08 (figs. 2.9-4a to -4d), 109-12 (figs. 2.9-5a to -5d).

<sup>570</sup> See CBR Rebuttal Test. at 14 (Lewis, Nelson, Pavlick).

<sup>571</sup> See *id.* at 18; see also *infra* section VII.A.5.a.

of the wellfield package submitted for Staff verification 90 days prior to the planned start of lixiviant injection at each new MU.<sup>572</sup>

With regard to the heterogeneity of the aquifers, the Board finds that CBR's subsurface characterization of the BC/CPF (using the examination of cores and geophysical logging) shows there are no major impermeable or permeable features that would indicate significant heterogeneity at the MEA to the degree that these features would impact the aquifer test analysis results.<sup>573</sup> We also agree with the Staff that the lack of significant heterogeneity is reflected in the potentiometric surface of the BC/CPF aquifer, which the evidence indicates is smooth and has an essentially flat and relatively constant hydraulic gradient.<sup>574</sup>

The Board agrees with the Staff as well that, at some scale, all formations are heterogeneous.<sup>575</sup> And more specifically, we agree with the Staff and CBR that the BC/CPF is not homogeneous and isotropic on a local scale.<sup>576</sup> But for reasons documented elsewhere in this decision,<sup>577</sup> we also find that the assumptions of homogeneity and isotropy are reasonably satisfied over the scale of the BC/CPF pumping test and conclude that the BC/CPF Formation underlying the MEA can be treated as homogeneous and isotropic for analytical purposes.<sup>578</sup>

Finally, we find no credible evidence supporting the hypothetical structural heterogeneities cited by Mr. Wireman,<sup>579</sup> and conclude that transmissivity and hydraulic conductivity near the May 2011 pumping test well is within a factor of 2 to 4 lower than the outlying monitor wells (with the exception of well Monitor-3, which is 2 to 9 times lower than other monitor well locations), thus suggesting relative homogeneity.<sup>580</sup>

#### **4. Wireman Opinion 4 — Applicable Groundwater Restoration Standards**

In his initial testimony outlining his Opinion 4, Mr. Wireman questioned the applicable groundwater restoration standards for the MEA, which he asserted were confusing. In lieu of CBR's proposed standards, Mr. Wireman suggested

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<sup>572</sup> See CBR Rebuttal Test. at 7-8 (Lewis, Nelson, Pavlick); Tr. at 438-39 (Shriver); CBR License Amend. 3, at 21 (License Condition 11.3.4).

<sup>573</sup> See Staff Rebuttal Test. at 27 (Back, Lancaster, Striz) (citing Test #8 Rep. at 5).

<sup>574</sup> See *id.* (citing Tech. Rep. Figs. at 113-16 (figs. 2.9-6a to -6d)).

<sup>575</sup> See *id.* at 25 (Back, Lancaster, Striz).

<sup>576</sup> See *id.* at 30 (Back, Lancaster, Striz); CBR Rebuttal Test. at 12 (Lewis, Nelson, Pavlick) (citing Test #8 Rep. at 11).

<sup>577</sup> See *supra* section V.A.; *infra* section VII.D.

<sup>578</sup> See Test #8 Rep. at 11.

<sup>579</sup> See CBR Rebuttal Test. at 18 (Lewis, Nelson, Pavlick).

<sup>580</sup> See *id.* at 18.

additional investigation is required to establish appropriate restoration monitoring requirements and compliance standards.<sup>581</sup>

*a. Parties' Positions on Applicable Groundwater Restoration Standards*

In explaining his confusion, Mr. Wireman started by noting that both the CBR TR and the Staff EA state that the primary goal of the MEA groundwater restoration program is to return groundwater affected by uranium recovery operations to pre-injection baseline values on a mine-unit average, as determined by the baseline water quality sampling program, and that this goal invokes NRC regulatory requirements set forth in Criterion 5B(5) of Appendix A to 10 C.F.R. Part 40,<sup>582</sup> which states:

At the point of compliance, the concentration of a hazardous constituent must not exceed —

(a) The Commission approved background concentration of that constituent in the groundwater;

(b) The respective value given in the table in paragraph 5C if the constituent is listed in the table and if the background level of the constituent is below the value listed; or

(c) An alternate concentration limit [(ACL)] established by the Commission.<sup>583</sup>

Mr. Wireman alleged that CBR is skipping the first Criterion 5B(5) standard by assuming that restoration efforts will not achieve background concentrations for some constituents because the Applicant (1) provided sample restoration tables for MU-1 in anticipation of using restoration values set by NDEQ for Class III UIC permits rather than background values;<sup>584</sup> and (2) indicated it will continue to provide tables for each of the other 11 MEA MUs that include the baseline average, the range for all restoration parameters, and the NDEQ restoration standards.<sup>585</sup> Mr. Wireman also noted CBR's commitment to apply "diligent application of best [practicable] technology [(BPT)]" to achieve baseline values and to meet the NDEQ compliance standards if restoration efforts are unable to achieve background conditions.<sup>586</sup> As a result, Mr. Wireman questioned whether

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<sup>581</sup> See Wireman Initial Test. at 5.

<sup>582</sup> See *id.* (citing Tech. Rep. at 6-4; EA at 2-9).

<sup>583</sup> 10 C.F.R. Part 40, app. A, criterion 5B(5)(a)-(c).

<sup>584</sup> See Wireman Initial Test. at 5 (citing Tech. Rep. at 6-4).

<sup>585</sup> See *id.* (citing Tech. Rep. at 6-5).

<sup>586</sup> See *id.* (citing Tech. Rep. at 6-4). The Board notes that Mr. Wireman misquoted the CBR

(Continued)

NDEQ standards will be considered ACLs that allow for public involvement and require NRC approval, as well as what criteria will be used to determine when BPT is achieved.<sup>587</sup> And thereafter at the hearing, Mr. Wireman summarized his confusion as mainly dealing with whether NDEQ standards are applicable as restoration standards at the MEA and, if so, whether they essentially comprise an ACL.<sup>588</sup>

At the hearing, both CBR witness Pavlick and Staff witness Dr. Striz confirmed that initially the Applicant is required to attempt to meet background water quality, unless background water quality is lower than the water quality standard values (i.e., maximum contaminant levels) provided in the Criterion 5C table in Appendix A to 10 C.F.R. Part 40, in which case the higher Criterion 5C table value controls, i.e., CBR is not required to meet groundwater quality values lower than the maximum contaminant levels in the Criterion 5C table.<sup>589</sup> With regard to Criterion 5B(5)(b), the Staff's EA states that under EPA requirements, groundwater restoration at ISR facilities must meet Uranium Mill Tailings Radiation Control Act (UMTRCA) standards rather than those associated with the Safe Drinking Water Act or analogous state regulations, and that those UMTRCA standards are reflected in the Criterion 5C table's maximum values for groundwater protection.<sup>590</sup> CBR witnesses Lewis, Nelson, and Pavlick added that the groundwater quality standards in 10 C.F.R. Part 40, Appendix A, Criterion 5B(5) for all restored aquifers conform to the standards promulgated by the EPA in 40 C.F.R. § 192.32(a)(2).<sup>591</sup>

Providing further clarification, Dr. Striz stated that the Criterion 5C table lists the NRC's maximum values for groundwater protection, which is reflected in CBR's TR Table 6.1-1 under the column heading "NRC UMTRCA Groundwater Protection Standards."<sup>592</sup> CBR's TR Table 6.1-1 also lists NDEQ's maximum concentration limits (MCLs) in the column headed "NDEQ Title 118 Groundwater Standard."<sup>593</sup> As NDEQ restoration standards exist separate and apart from NRC requirements,<sup>594</sup> CBR witnesses Pavlick and Nelson and Staff witness Dr. Striz testified that CBR is required to meet the more restrictive of the NRC Criterion 5C table UMTRCA standards or NDEQ's Title 118 MCL groundwa-

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TR by stating "best available technology" instead of "best practicable technology," the phrase used in CBR's TR.

<sup>587</sup> See *id.*

<sup>588</sup> See Tr. at 687.

<sup>589</sup> See Tr. at 694-95.

<sup>590</sup> See EA at 2-9 (citing 40 C.F.R. Part 192).

<sup>591</sup> See CBR Rebuttal Test. at 18-19.

<sup>592</sup> See Tr. at 689-90; Tech. Rep. Tbls. at 227 (tbl. 6.1-1).

<sup>593</sup> See Tech. Rep. Tbls. at 227 (tbl. 6.1-1).

<sup>594</sup> See CBR Rebuttal Test. at 19 (Lewis, Nelson, Pavlick).

ter standards.<sup>595</sup> Based on these CBR and Staff representations that Crow Butte is required to meet the lowest value of these two regulations for each individual constituent, Mr. Wireman expressed satisfaction that this concern had been addressed.<sup>596</sup>

Dr. Striz also indicated that prior to requesting agency approval to use ACL restoration standards in accordance with Criterion 5B(5)(c), a licensee is required to show that it has made practicable efforts using all reasonable technologies available to achieve either NRC-approved background or the maximum contaminant levels in the Criterion 5C table, whichever is higher.<sup>597</sup> CBR witnesses Lewis, Nelson, and Pavlick testified that the NRC will assess whether a licensee has employed the best available technology as part of the review process for determining if an MU is restored or eligible for consideration for an ACL. Furthermore, according to these CBR witnesses, the outcome of that review will depend on the efforts undertaken to restore the aquifer once mining ends, and the need for an ACL may not even be necessary depending on the status of restoration efforts.<sup>598</sup>

But if restoration efforts have not achieved the higher of background levels or the lowest of either NRC's UMTRCA Criterion 5C table levels or NDEQ's standards using BPT so that an ACL is necessary, CBR witnesses Lewis, Nelson, and Pavlick indicated, Crow Butte must submit an application to the NRC to use an ACL that addresses all the factors listed under Criterion 5B(6) of 10 C.F.R. Part 40, Appendix A, and then obtain NRC approval of that application pursuant to Criterion 5B(5)(c).<sup>599</sup> Further, Dr. Striz testified that when she reviews an ACL application, she looks to see if enough restoration effort has been made using the reasonable technologies that are available to demonstrate that no further decrease can be achieved for the constituent value at issue, i.e., until the value is as low as reasonably achievable (ALARA).<sup>600</sup>

On a related matter, Mr. Wireman pointed out that NRC and NDEQ have different standards regarding MU restoration stability, noting that NRC regulations require that regulated constituent concentrations be stable for four consecutive quarters before closure can occur, while NDEQ regulations require monthly sampling for only six months prior to declaring stabilization.<sup>601</sup> And in that regard, CBR's TR agrees with Mr. Wireman, noting that CBR's NDEQ Class III UIC permit requires that the specified ore zone monitoring wells be

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<sup>595</sup> See Tr.at 691-93.

<sup>596</sup> See Tr. at 693.

<sup>597</sup> See Tr. at 699.

<sup>598</sup> See CBR Rebuttal Test. at 19.

<sup>599</sup> See *id.*

<sup>600</sup> See Tr. at 697, 699-700.

<sup>601</sup> See Wireman Initial Test. at 5.

sampled once a month for a minimum of six months to demonstrate successful restoration, and that CBR's NRC-issued license requires that the wells be sampled once each quarter until stabilization is deemed complete, which occurs when the most recent four consecutive quarters indicate there is no statistically significant increasing trend for all constituents of concern.<sup>602</sup>

To mesh the two different requirements, CBR witnesses Lewis, Nelson, and Pavlick indicated the Applicant will conduct stability sampling to meet both NDEQ and NRC regulations regarding stabilization phase monitoring, which will result in some concurrent sampling to meet both criteria.<sup>603</sup> Specifically, CBR witness Nelson clarified that there is six months of monthly sampling to meet NDEQ requirements, which includes the quarterly sampling for NRC requirements.<sup>604</sup> At the conclusion of the six months of monthly sampling, CBR performs two more quarters of quarterly sampling, which will end stabilization monitoring if constituent levels meet the trend requirements. Staff witness Dr. Striz concurred, noting that this sampling is over and above what NRC requires, but welcomed the additional data points to establish the trend of CBR's stabilization efforts.<sup>605</sup>

*b. Board Findings on Applicable Groundwater Restoration Standards*

Based on the parties' testimony clarifying the restoration standards that must be adhered to by CBR regarding applicable hazardous constituents,<sup>606</sup> the Board finds that in accordance with Criterion 5B(5), using diligent application of best practicable technologies and efforts, the Applicant must first attempt to return

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<sup>602</sup> See Tech. Rep. at 6-10 to -11. The TR also states that "[t]he sampling frequency will be one sample every other month for four quarters, and if the six samples show that the restoration values for all wells are maintained during the stabilization period with no significant increasing trends, restoration shall be deemed complete." *Id.* at 6-11. Because this statement is in conflict with the other information in that TR section, as well as with the testimony of CBR witnesses Pavlick and Nelson at the hearing, *see* Tr. at 702-03, we accept the statements of the hearing witnesses, which are consistent with the balance of the TR section, as reflecting the actual stabilization monitoring schedule that CBR will follow.

<sup>603</sup> See CBR Rebuttal Test. at 19.

<sup>604</sup> See Tr. at 702-03.

<sup>605</sup> See Tr. at 702.

<sup>606</sup> In connection with Mr. Wireman's allegations that there is excessive uncertainty regarding applicable groundwater restoration standards, CBR also labeled this issue outside the scope of Contention 2 because, it alleged, restoration standards are not relevant to any of the concerns in Contention 2. *See* CBR Rebuttal Test. at 18 (Lewis, Nelson, Pavlick). As we noted in our September 2018 in limine ruling, we disagree with this assertion, finding that Mr. Wireman's Opinion 4 dealing with groundwater restoration standards is within the scope of the contention given that any residual groundwater quality degradation after restoration has environmental impacts that might need to be assessed by the Staff as part of its NEPA responsibilities. *See* Board In Limine Ruling at 9.



a constituent in the BC/CPF aquifer to the NRC-approved background concentration for that constituent,<sup>607</sup> or, if background concentrations are less than the UMTRCA levels in the Criterion 5C table, meet the groundwater protection standard listed for that constituent in the Criterion 5C table.<sup>608</sup> CBR then is further required to meet NDEQ's Title 118 MCL groundwater standards. As a result, the Board concludes that after exhausting BPT to restore to the NRC-approved background level for that constituent, CBR must meet the lowest value of either NRC's UMTRCA groundwater protection standard in the Criterion 5C table or NDEQ's Title 118 groundwater standard for that constituent.<sup>609</sup>

If, after exhausting this effort, CBR cannot meet either of these two standards, it may seek NRC approval for an ACL, as provided in Criterion 5B(5). In assessing the adequacy of the effort in establishing an ACL under that regulation, however, the Staff requires a licensee to achieve a value that is "as low as reasonably achievable, after considering practicable corrective actions,"<sup>610</sup> by using all reasonable technologies available with sufficient sampling and analysis required to reach ALARA levels.<sup>611</sup> Further, in making its determination about whether to approve a site-specific ACL for a groundwater constituent, the Staff considers whether the constituent will pose a substantial present or potential future hazard to human health or the environment. And in making this constituent hazard finding, the Staff will consider the nine factors regarding potential adverse effects on groundwater quality and the ten factors relating to potential adverse effects on hydraulically-connected surface water quality that are listed in Criterion 5B(6).<sup>612</sup>

Additionally, as Staff witness Dr. Striz indicated, a CBR request for an ACL would need to be submitted as a license amendment that would, in turn, trigger the opportunity for a public adjudicatory hearing. As Dr. Striz explained, this is a detailed process that receives the same extensive technical review that is given to every license amendment.<sup>613</sup> Moreover, as Dr. Striz observed, CBR would be free in such an amendment request to propose values for an ACL that would be the same as the NDEQ Title 118 water quality standards so long as the request is found to meet all the requirements of Criterion 5B(6).<sup>614</sup>

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<sup>607</sup> See Tr. at 699 (Striz).

<sup>608</sup> See Tr. at 697 (Striz) (citing 10 C.F.R. Part 40, App. A, Criteria 5B(5), 5B(6), and 5C).

<sup>609</sup> See Tr. at 691-93 (Pavlick, Nelson, Striz); *see also* Tech. Rep. at 6-4; Tech. Rep. Tbls. at 227 (tbl. 6.1-1).

<sup>610</sup> 10 C.F.R. Part 40, App. A, Criterion 5B(6).

<sup>611</sup> See Tr. at 699-700 (Striz).

<sup>612</sup> See Tr. at 697 (Striz) (citing 10 C.F.R. Part 40, App. A, Criterion 5B(6)).

<sup>613</sup> See Tr. at 697-98.

<sup>614</sup> See Tr. at 696.

Relative to Mr. Wireman's concern about stabilization monitoring of an MU, the NDEQ requires that the specified ore zone monitoring wells be sampled once a month for a minimum of six months to demonstrate restoration success, while NRC mandates that the wells be sampled once each quarter until there is no statistically significant increasing trend for constituents of concern for four consecutive quarters.<sup>615</sup> Per its representations before the Board, we find that CBR will meet both NDEQ and NRC regulations regarding stabilization phase monitoring. CBR will conduct six months of monthly sampling to meet NDEQ requirements that, concurrently, include the quarterly sampling mandated by NRC requirements, followed by two more quarters of quarterly sampling so as to be able to complete stabilization monitoring if constituent levels meet the trend requirements.<sup>616</sup>

In sum, in accordance with Criterion 5B(5), the Board finds that CBR must restore an MEA groundwater constituent to a concentration that does not exceed (1) an NRC-approved background groundwater concentration for that constituent; (2) the lowest constituent value given in either the NRC's UMTRCA groundwater protection standards table in Criterion 5C or NDEQ's Title 118 groundwater standards if the constituent is listed and if the constituent's NRC-approved background level is below the NDEQ's Title 118 value; or (3) an ACL established by the agency through a license amendment, subject to a public hearing opportunity. Further, we agree with Dr. Striz that CBR must show that it has made practicable efforts to restore a specific hazardous constituent to the highest of either the agency-approved groundwater concentration background level or the maximum contaminant level. The maximum contaminant level is the lowest of either NRC's requirements (i.e., Criterion 5C table UMTRCA levels) or NDEQ's requirements (i.e., Title 118 levels).<sup>617</sup> Finally, to meet both NDEQ and NRC requirements, the Board finds that CBR will undertake stabilization monitoring of an MU by conducting six months of monthly sampling to meet NDEQ requirements, which concurrently includes NRC quarterly sampling requirements, followed by two more quarters of quarterly sampling to complete stabilization monitoring if constituent levels meet the trend requirements.

##### **5. *Wireman Opinion 5 — Wastewater Disposal***

In his Opinion 5, Mr. Wireman claimed that there is inadequate information regarding CBR's planned disposal of wastewater at the MEA and, more specif-

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<sup>615</sup> See Tech. Rep. at 6-10 to -11.

<sup>616</sup> See CBR Rebuttal Test. at 19 (Lewis, Nelson, Pavlick); Tr. at 702-03 (Pavlick, Nelson, Striz).

<sup>617</sup> See Tr. at 699 (Striz); see also Tech. Rep. Tbls. at 227 (tbl. 6.1-1).

ically, CBR's plans to use deep disposal wells (DDWs) to dispose of the waste fluids from the ISR process.<sup>618</sup>

*a. Parties' Positions on Wastewater Disposal*

As support for OST's claims that there is inadequate information regarding disposal of wastewater at the MEA, Mr. Wireman stated that CBR proposes to use one or two DDWs to inject waste fluids comprised primarily of bleed water and groundwater restoration wastewater. According to Mr. Wireman, however, CBR's TR does not include any water quality data or hydrogeologic information about the geologic formations into which CBR proposes to dispose of waste fluids. This lack of information on these disposal wells, Mr. Wireman asserted, raises questions about whether any of these formations are a Federal Safe Drinking Water Act (FSDWA)<sup>619</sup>-defined underground source of drinking water (USDW). If so, Mr. Wireman contended, the Applicant will need to either demonstrate that there are no USDWs below the proposed disposal area or request an aquifer exemption.<sup>620</sup> Mr. Wireman concluded that the appropriate hydrogeologic and water-quality data need to be included in CBR's TR and the Staff's EA.<sup>621</sup>

CBR witnesses Lewis, Nelson, and Pavlick sought to address his concern, testifying that Crow Butte currently has two non-hazardous DDWs at the existing CBR ISR facility that for the past 15 years have operated with excellent results under an NDEQ-issued Class I UIC permit,<sup>622</sup> and the CBR already has prepared a permit application for the use of DDWs at Marsland in accordance with NDEQ regulatory requirements.<sup>623</sup>

These CBR witnesses also testified that the Lower Dakota, Morrison, and Sundance Formations are the geologic strata that will serve as the injection zones for receiving the waste fluids,<sup>624</sup> a fact the Staff acknowledged in its EA.<sup>625</sup> Moreover, information regarding the siting, construction, and operation of the proposed DDWs, including the hydrogeology of the Lower Dakota, Morrison, and Sundance Formations, is provided in CBR's TR and in the Staff's

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<sup>618</sup> See Wireman Initial Test. at 6.

<sup>619</sup> See 42 U.S.C. §§ 300f-300j-27.

<sup>620</sup> See Wireman Initial Test. at 6 (citing Tech. Rep. at 7-22).

<sup>621</sup> See *id.*

<sup>622</sup> See CBR Rebuttal Test. at 20; *see also* ER at 3-99.

<sup>623</sup> See CBR Rebuttal Test. at 20; *see also* ER at 3-99.

<sup>624</sup> See CBR Rebuttal Test. at 20.

<sup>625</sup> See Staff Rebuttal at 12 (Back, Lancaster, Striz) (citing EA at 3-30; ER at 3-99; Tech. Rep. at 4-11, 7-20).

EA and SER.<sup>626</sup> CBR witnesses Lewis, Nelson, and Pavlick testified that those formations, which are the same formations currently in use at the existing CBR ISR facility,<sup>627</sup> are located below the lowermost USDW and exhibit water quality that is not considered to be a drinking water compliant source under state and federal regulations due to measured concentrations of total dissolved solids (TDS).<sup>628</sup>

In its TR, CBR confirms that DDWs will be used in the management of liquid wastewaters generated at the MEA site during production and restoration. The primary sources of liquid waste will be well-development water, process bleed fluids to maintain inward gradients, concentrated brine produced during aquifer restoration, and other generated process liquid wastewater (e.g., laundry water and plant washdown water).<sup>629</sup> Furthermore, the Staff's EA indicates that CBR will monitor the quality of injected water in the Morrison and Sundance formations on a daily or weekly basis, depending on the parameter, so that water quality in the deep injection formations will not be adversely affected beyond that permitted for DDW operations.<sup>630</sup> The Crow Butte TR also states that the two DDWs will be the only wastewater disposal option at the MEA site for the first five years of operation, whereupon CBR will assess the need for additional disposal options (e.g., additional DDWs, surge tanks, surge/evaporation ponds) to handle increased wastewater volumes during groundwater restoration, and only then will CBR submit a request for an amendment to its NRC license and/or NDEQ permit as needed to implement any chosen option.<sup>631</sup>

Noting that DDW licensing and regulation is not within NRC's jurisdiction, Staff witnesses Back, Lancaster, and Dr. Striz further stated that Crow Butte has applied to NDEQ for a separate Class I UIC permit to construct and operate DDWs at the MEA.<sup>632</sup> And to manage wastewater generation over the life of the project, besides including a specific permit request for the first two wells to accommodate wastewater generated during initial operations, Crow Butte's application seeks an area permit to install and operate up to six Class I UIC DDWs within the MEA license boundary over the expected multi-year life of the project.<sup>633</sup>

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<sup>626</sup> See Tech. Rep. at 3-23 to -25, 4-10 to -12, 7-20, 7-22 to -24; EA at 3-3, 4-20 to -21, 4-23 to -24, 5-19; SER at 90-92, 93, 95-96.

<sup>627</sup> See Tech. Rep. at 3-24.

<sup>628</sup> See CBR Rebuttal Test. at 20; *see also* ER at 3-99; EA at 4-23; Tech. Rep. at 4-11.

<sup>629</sup> See Tech. Rep. at 3-23 to -24; *see also* EA at 5-19.

<sup>630</sup> See EA at 5-19.

<sup>631</sup> See Tech. Rep. at 8-7 to -8; *see also* CBR License Amend. 3, at 15 (License Condition 10.3.4).

<sup>632</sup> See Staff Rebuttal Test. at 13 (citing ER at 3-99).

<sup>633</sup> See Tech. Rep. at 4-11; EA at 2-5.

Referencing provisions of the EA, SER, ER, and TR, Staff witnesses Back, Lancaster, and Dr. Striz testified that these injection zone formations are separated from the BC/CPF sandstone aquifer by several thousand feet of low-permeability units, including at least 750 ft of Pierre Shale, a regional aquitard with a very low hydraulic conductivity (on the order of  $1 \times 10^{-10}$  cm/sec).<sup>634</sup> Specifically, in its TR Crow Butte states that the two MEA DDWs will be completed into the injection zone at an approximate depth of 4000 ft to 5000 ft and will be isolated from any underground source of drinking water by approximately 1800 ft of shale (i.e., Pierre and Graneros shales).<sup>635</sup> The receiving formations of the proposed MEA injection zone are the same ones used by DDWs at the existing CBR ISR facility.<sup>636</sup> While the Staff's EA indicates that injection of the MEA wastewater will increase pressures within these units, it also notes that the Morrison Formation has demonstrated a capacity to accept large volumes of an injected waste stream over an extended period at the existing CBR ISR facility.<sup>637</sup>

The Staff's EA also states that the MEA DDWs would be separated by at least 6 miles from those at neighboring existing and proposed ISR areas (i.e., the existing CBR ISR facility, the NTEA, and the TCEA).<sup>638</sup> Although CBR in its TR recognizes there may be some overlap in pressure responses within the Lower Dakota, Morrison, or Sundance formations from MEA DDW injections, it also declares (and the Staff's EA agrees) that the subsurface geologic characteristics beneath the proposed expansion areas would prevent injected disposal fluids from impacting the overlying fresh-water Arikaree/Brule and BC/CPF aquifers.<sup>639</sup>

Between the lowermost BC/CPF and the injection zone formations resides a separating aquitard of more than 2500 ft of sediments primarily consisting of low-permeability shale that both CBR's TR and the Staff's EA agree protects against vertical migration of injected fluids to the overlying Brule and Chadron Formations. Shales above and below the injection zone will encase the disposal fluids within the receiving formations, and CBR has identified no structural elements (i.e., faults or fractures) with the potential to disrupt the natural vertical containment.<sup>640</sup> As a result, both the CBR TR and the Staff EA maintain that liquid discharges to the DDWs are expected to have little to no potential impact

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<sup>634</sup> See Staff Rebuttal Test. at 13 (citing EA at 3-29 to -30, 3-32, 5-19; SER at 52-53; Tech. Rep. at 2-52 to -53, 7-20; ER at 7-24).

<sup>635</sup> See Tech. Rep. at 8-7; *see also* EA at 4-23.

<sup>636</sup> See Tech. Rep. at 3-24.

<sup>637</sup> See EA at 5-19.

<sup>638</sup> See *id.*

<sup>639</sup> See Tech. Rep. at 7-24 to -25; EA at 5-19.

<sup>640</sup> See Tech. Rep. at 7-20; EA at 5-19.

on water resources because they would be isolated from any USDW by hundreds of feet of low-permeability shale.<sup>641</sup>

With respect to the wastewater wells themselves, CBR in its TR indicates that because the primary environmental concerns with DDWs are the potential release of injection fluid into drinking water aquifers or into the production zone, these disposal wells are double cased into the Pierre Shale Formation with continuous pressure and flow monitoring of the injection fluid, pressure monitoring in the casing annulus, and MIT testing every two years. And to further minimize the potential impacts from surface spills, pipe failure, or casing failures, the DDW system components are continuously monitored and alarmed to quickly detect and respond to leakage incidents. This combination of controls, the CBR TR asserts, will effectively control the potential impacts of DDW operations to the environment.<sup>642</sup>

And according to the Staff analysis in its SER, as a result of the DDW monitoring required under the NDEQ UIC permit to ensure the health and safety of workers and the public, there are no safety concerns associated with the proposed MEA DDW waste disposal system that were not previously reviewed.<sup>643</sup> Furthermore, based on the required well MIT testing, implementation of the leak detection system, and hydraulic isolation of the injection zone from the overlying aquifers, the Staff in its EA concludes that the potential long-term impacts on groundwater quality from wastewater disposal into the DDWs would be “SMALL.”<sup>644</sup>

Relative to the water quality within the Lower Dakota, Morrison, and Sundance injection formations and their eligibility to serve as injection zones, CBR witnesses Lewis, Nelson, and Pavlick stated that those formations exhibit water quality that under state and federal regulations would not be considered USDW due to measured TDS concentrations. They also declared that those formations are located below the lowermost USDW.<sup>645</sup> Further in that regard, Staff witnesses Back, Lancaster, and Dr. Striz indicated that CBR’s TR estimates the TDS concentrations within the injection zone to be in excess of 10,000 mg/L,<sup>646</sup> and the Applicant did not expect any harmful or reactive incompatibility between the formation brine and the constituents of the wastewater.<sup>647</sup> In its EA, the Staff states that the TDS levels observed in the Morrison and Sundance formations at the existing CBR ISR facility varied from approximately 24,000 mg/L to 40,000

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<sup>641</sup> See Tech. Rep. at 7-24 to -25; EA at 4-24.

<sup>642</sup> See Tech. Rep. at 4-11.

<sup>643</sup> See SER at 93.

<sup>644</sup> See EA at 4-24.

<sup>645</sup> See CBR Rebuttal Test. at 20.

<sup>646</sup> See Staff Rebuttal Test. at 12 (citing Tech. Rep. at 4-11, 7-20).

<sup>647</sup> See *id.* (citing Tech. Rep. at 4-11, 7-20; ER at 3-99).

mg/L, respectively, while the EPA secondary drinking water standard for TDS is 500 mg/L.<sup>648</sup> CBR witness Pavlick also testified that because an aquifer with a TDS reading of over 10,000 mg/L is not considered a potential source of drinking water, as the formations in the MEA injection zone are in excess of this value, none of those formations have the potential to serve as a USDW as defined by the FSDWA.<sup>649</sup>

Mr. Wireman raised questions about the water quality suitability of the planned MEA injection formations, however, stating that based on his experience in the Rocky Mountains, the Madison Formation, a well-known regional aquifer occurring below the injection zone formations has TDS well below 10,000 mg/L so as to require USDW consideration in connection with overlying injection formations.<sup>650</sup> Dr. Striz testified, however, that the existing CBR ISR facility and the MEA just 11 miles to the south contain different characteristics. She posited that with the DDWs for the MEA being placed in the same formations as those DDWs currently in use at the existing ISR facility for which CBR has NDEQ permits, there are no lower USDW formations in the Marsland area consistent with NDEQ DDWs permitting requirements at the existing CBR ISR facility. Otherwise, Dr. Striz claimed, NDEQ would not have issued the Class I UIC permit for the existing facility DDWs, which CBR is required as a condition to its NRC license to have in order to operate.<sup>651</sup>

Finally, the Staff's EA concludes that the vertical hydraulic separation of the DDW injection zone from overlying aquifers and the low permeability of the LCUs, in conjunction with compliance monitoring, helps ensure that the MEA DDW system will not cause significant impacts to natural resources. Therefore, the Staff in its EA indicates that when the potential incremental impacts from amending the CBR license to include the MEA are added to other past, present, and reasonably foreseeable future actions, cumulative impacts from liquid wastes would not be significant.<sup>652</sup>

*b. Board Findings on Wastewater Disposal*

Mr. Wireman's concerns in his Opinion 5 regarding an alleged inadequate description by CBR and the Staff of wastewater disposal by deep well injection is based primarily on his claims that (1) CBR failed to provide any geologic and

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<sup>648</sup> See EA at 4-23.

<sup>649</sup> See Tr. at 708.

<sup>650</sup> See Tr. at 709.

<sup>651</sup> See Tr. at 711. As part of that dialogue, Staff witness Lancaster noted that License Conditions 10.3.4 and 12.5 require CBR to have that NDEQ Class I UIC permit. See Tr. at 711; see also CBR License Amend. 3, at 15, 22.

<sup>652</sup> See EA at 5-19.

hydrogeologic information on the formations that will be used as the injection zone for the MEA DDWs; and (2) the existence of the regional Madison Formation aquifer raises a question whether a useable source of drinking water exists in a strata below the formations that are to be used for the MEA DDWs.<sup>653</sup>

With regard to Mr. Wireman's allegations that CBR does not provide any information on the geologic formations and aquifers into which CBR proposes to inject waste fluids,<sup>654</sup> CBR plans to drill into the same formations that have been used for the DDWs at its existing ISR facility, i.e., the Lower Dakota, Morrison, and Sundance Formations.<sup>655</sup> And as CBR witness Pavlick confirmed, License Condition 10.3.4 stipulates that the Applicant obtain NDEQ authorization to drill a minimum of two DDWs for the Marsland area, which will be at depths of between 3400 ft and 3600 ft into these formations.<sup>656</sup> Mr. Pavlick also testified that the MEA injection zone is located below the lowermost underground source of drinking water and exhibits water quality that, due to the measured concentration of TDS, is not considered to be a USDW under state and federal regulations.<sup>657</sup> Based on this information, in conjunction with the other material in the evidentiary record supporting CBR's assertion that the lowermost drinking water source is isolated from the injection zone by more than 2500 ft of sediments primarily consisting of low-permeability shale (including at least 750 ft of Pierre Shale aquitard),<sup>658</sup> we find that the overlying Arikaree/Brule and the BC/CPF aquifers are protected by these aquitards against vertical migration of injected wastewater fluids.

The evidentiary record also establishes that to ensure the health and safety of workers and the public, CBR monitoring of the MEA DDWs will be required by CBR's NDEQ UIC permit, which includes continuous flow and pressure monitoring of the injection fluid, pressure monitoring in the casing annulus, and biannual MIT testing of the well casings. And to further minimize the

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<sup>653</sup> See Wireman Initial Test. at 6; Tr. at 709.

<sup>654</sup> We also note that CBR again used its written testimony in this regard to make the legal claim that Mr. Wireman's Opinion 5 is outside the scope of Contention 2. See CBR Rebuttal Test. at 20 (Lewis, Nelson, Pavlick). We disagree for the reasons previously stated in our ruling on the Staff's in limine motion in which a similar challenge was raised. As we observed there,

[b]ecause DDWs can impact surrounding groundwater quality, testimony questioning the MEA DDWs' locale and use during operations and restoration are within the scope of this contention so long as they are restricted to the topics of groundwater quality. Furthermore, the fact that the NRC is not the permitting agency for DDWs does not place this discussion of the topic outside of Contention 2's scope.

Board In Limine Ruling at 10.

<sup>655</sup> See Tech. Rep. at 3-24.

<sup>656</sup> See Tr. at 707.

<sup>657</sup> See Tr. at 707, 737.

<sup>658</sup> See, e.g., Tech. Rep. at 2-53, 2-85, 7-24 to -25, 8-7.



potential impacts from DDW-associated surface spills, pipe failure, or casing failures, the DDWs are continuously monitored and alarmed to quickly detect and respond to leakage incidents.<sup>659</sup> We note in addition that CBR will monitor the quality of disposed water in the injection zone on a daily or weekly basis (depending on the parameter) and, as a result, water quality in the deep injection formations would not be adversely impacted beyond that allowed by permit for DDW operation.<sup>660</sup> The Board concludes that the combination of natural isolation of the deep, non-potable injection zone formations and the DDW monitoring program will effectively control the potential impacts to the environment,<sup>661</sup> and will help ensure that no safety concerns are posed by the MEA's DDW waste disposal system.<sup>662</sup>

And while CBR did not conduct a detailed hydrogeologic investigation for each of the Lower Dakota, Morrison, and Sundance Formations, the Board finds that the level of understanding of the hydraulic behavior of these layers and their interactions, in conjunction with the detailed hydrogeologic understanding that exists of these formations' overlying strata (which are consistent throughout the existing CBR ISR facility to the southwest extent of the MEA), and the successful deployment of this disposal technique currently at the existing CBR ISR facility to the north,<sup>663</sup> is sufficient to conclude that its use can be replicated safely for the MEA DDWs.

As to Mr. Wireman's allegation, first raised at the hearing, that based on his experience in the Rocky Mountains, the well-known regional Madison Formation aquifer raises questions about whether there is a USDW below the planned MEA injection zone,<sup>664</sup> the Board finds that his concern lacks evidentiary support. Consistent with statements in CBR's TR and ER and the Staff's EA that the TDS levels observed in the injection zone formations at the existing CBR ISR facility varied from approximately 24,000 mg/L to 40,000 mg/L,<sup>665</sup> CBR witness Pavlick testified at the hearing that the MEA injection zone formations have TDS values in excess of 10,000 mg/L, thereby eliminating these strata as a potential source of drinking water and confirming that none of these injection zone formations have the potential to serve as an FSDWA USDW.<sup>666</sup> In addition, Mr. Pavlick declared that there are no aquifers that meet the USDW definition

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<sup>659</sup> See *id.* at 4-11.

<sup>660</sup> See EA at 5-19.

<sup>661</sup> See *id.*

<sup>662</sup> See SER at 93.

<sup>663</sup> See *id.* at 91-92.

<sup>664</sup> See Tr. at 709.

<sup>665</sup> See Tech. Rep. at 7-20; ER at 4-11; EA at 4-23.

<sup>666</sup> See Tr. at 708, 737.

below the Lower Dakota/Morrison/Sundance injection zone.<sup>667</sup> Further, as Staff witness Dr. Striz indicated, NDEQ currently allows these same Lower Dakota, Morrison, and Sundance Formations to house Class I UIC injection wells at the existing CBR ISR facility just 11 miles to the north of the MEA, an activity that NDEQ would not have allowed if the TDS levels in these geologic layers were below 10,000 mg/L or there were USDW formations below this level.<sup>668</sup> In the face of Mr. Wireman's essentially unsupported speculation about the possible existence of a USDW source beneath the planned MEA injection zone formations, we find that the preponderance of the evidence establishes Mr. Wireman's USDW-related concern is without merit.<sup>669</sup>

Accordingly, the Board finds that Crow Butte has provided sufficient geologic and hydrogeologic characterization of the injection zone aquifers in the area of the existing CBR ISR facility and proposed MEA. We also find that the preponderance of the evidence compels the conclusion that there is no USDW formation below the injection zone, and that the TDS is more than 10,000 mg/L in the formations proposed for DDW use at Marsland, which disqualifies the Lower Dakota, Morrison, and Sundance Formations as USDWs and makes them eligible as DDW injection zones. We also agree with the Staff's assertion that the vertical hydraulic separation of the DDW injection zone from overlying aquifers and the low permeability of the confining units, in conjunction with compliance monitoring, helps ensure no significant impacts to the environment from DDW operations. Finally, we agree with the Staff's claim that when the potential incremental impacts from amending the CBR license (to include the MEA) are added to other past, present, and reasonably foreseeable future actions, the cumulative impacts from liquid wastes are not likely to be significant.<sup>670</sup>

## VII. CONCERN 2 — ABSENCE OF SITE HYDROGEOLOGY DESCRIPTION

The second major concern expressed by OST in the context of its Contention 2 involves the safety implications of the lack of a sufficient description of MEA site hydrogeology. In this regard, in his initial testimony OST witness Dr. Kreamer presented seven "opinions" indicating why, in his view, the Applicant

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<sup>667</sup> See Tr. at 737.

<sup>668</sup> See Tr. at 711.

<sup>669</sup> In this regard, we note as well that the question of whether an NDEQ Class I UIC injection well permit has been or could be properly issued is a matter that would need to be raised with the NDEQ. See *Northern States Power Co.* (Tyrone Energy Park, Unit 1), ALAB-464, 7 NRC 372, 375 (1978) (indicating requirements of state law are matters for state regulatory bodies).

<sup>670</sup> See EA at 5-19.

failed to meet the standards of professional hydrogeological practice in characterizing the MEA site. In Opinion 1 of his initial testimony, Dr. Kreamer listed eight deficiencies with MEA hydrogeologic characterization associated with the aquifer pumping test data. Specifically, he raised challenges that included the adequacy of the initial pumping test attempt, data selectivity, appropriate use of the Cooper-Jacob methodology, proper analysis of monitoring wells 2 and 8, insufficient MEA coverage from a single pumping test, the impact of off-site influences, the effect of variations in aquifer thickness, and issues with monitoring wellscreen intervals. In his other six opinions, Dr. Kreamer asserted there were additional problems, including an insufficient description of the site hydrogeology relative to the previous pumping test analyses for the existing CBR ISR facility, an improper use of alternative pumping test methods, questionable homogeneity/anisotropy assumptions, improper analysis for anisotropy, discontinuities in how BC/CPF thickness was used as the basis for calculating transmissivity, and selective analysis of pumping test data.<sup>671</sup>

Each of these facets of Concern 2 are reviewed in this section, with reference to the overarching issues previously discussed in section V above, as appropriate.

#### **A. Kreamer Opinion 1 — Mischaracterization of the Hydrogeologic Environment**

Dr. Kreamer first opined generally that there are several deficiencies with CBR's MEA hydrogeologic characterization as it relates to the report on the May 2011 pumping test, declaring that much of the collected pumping test data were selectively ignored, the solitary pumping test covered only a portion of the MEA site while leaving the majority of the site hydrogeologically undefined, and the analysis of the single pumping test was influenced by conditions outside the site boundary.<sup>672</sup> Moreover, as support for these characterization inadequacy claims, Dr. Kreamer proffered eight specific "bases" (labelled A through H) to establish that CBR, with the Staff's blessing, mischaracterized the hydrogeologic environment underlying the MEA.<sup>673</sup>

But before addressing these points, we note that, as we previously discussed (*see supra* sections V.A and V.B), Dr. Kreamer claimed that CBR failed to recognize (1) the failings of the aquifer pumping test (resulting in an inaccurate interpretation of the data obtained by this test); and (2) the presence of fractures ignored by CBR and the Staff and the contribution of these structures to heterogeneity and anisotropy that allegedly creates a lack of containment in

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<sup>671</sup> See Kreamer Initial Test. at 2, 7; Kreamer Rebuttal Test. at 1.

<sup>672</sup> See Kreamer Initial Test. at 1 (citing Test #8 Rep.).

<sup>673</sup> See *id.* at 1-2.

the BC/CPF aquifer. As we have already addressed these two criticisms, we will not repeat our findings here, other than to observe that relative to CBR's interpretation of the pumping test data, we found on the basis of the evidentiary record that CBR provided adequate justification for its approach to analyzing the aquifer pumping test data. We also found that the Intervenor failed to provide any corroborating evidence to support its position that significant localized aquifer leakage adversely impacts the efficacy of CBR's conceptual hydrogeologic model for the MEA. Thus, we determined that the Applicant's pumping test analysis was not only plausible, but consistent with other evidentiary elements demonstrating the containment and connectivity characteristics of the BC/CPF production zone (*see supra* section V.C). And with regard to the second issue of fracturing, we found that there was no evidence of excessive transmissive faulting or fracturing that would cause sufficient heterogeneity and anisotropy in the MEA geologic strata to refute the evidence in the record establishing the validity of the CBR and Staff conclusions regarding containment of processing fluids and the lack of aquifer interconnectivity required for safe ISR activities in the MEA proposed production area.

Against this background, we turn to our consideration of the eight bases underlying Dr. Kreamer's Opinion 1.

***1. Kreamer Opinion 1, Basis A: Initial Pumping Test Attempt***

***a. Parties' Positions on Kreamer Opinion 1, Basis A: Initial Pumping Test Attempt***

As an initial Basis A allegation supporting his Opinion 1, Dr. Kreamer noted that the report for the May 2011 pumping test failed to include data from one of the two tests actually done at the MEA. Allegedly, data from an initial 19-hour test, which CBR characterized as "failed," was not presented or discussed in its TR. Dr. Kreamer maintained that additional insight into the subsurface hydrogeological conditions could be gained from that initial test and that CBR did not adequately explain the "pump failure" cited as a justification for the termination of the test.<sup>674</sup> And in this same vein, OST witness Dr. LaGarry in his rebuttal testimony suggested CBR had improperly suppressed data and claimed that Dr. Kreamer's rebuttal testimony regarding unreported pumping tests indicated there was a lack of containment in the MEA.<sup>675</sup>

CBR's pumping test report stated that, in accordance with an NDEQ-approved plan, on November 18, 2010, an initial attempt at a pumping test was performed in the MEA on well CPW-1, but that this test was terminated after only 19 hours

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<sup>674</sup> See *id.* at 2 (citing Test #8 Rep. at 6).

<sup>675</sup> See LaGarry Rebuttal Test. at 2.

of operation due to “pump failure.”<sup>676</sup> CBR’s pumping test report did not discuss the causes for this problem nor did it analyze the data that were collected prior to terminating this first attempt. In its rebuttal testimony, CBR indicated that in addition to pump issues, there were problems with well installation of the CPW-1 pumping well, specifically that it was shown to be very inefficient with abnormally large drawdown values that prevented more ideal, higher pumping rates.<sup>677</sup>

The Staff in its rebuttal testimony stated that this issue was discussed in CBR’s March 2011 proposal to change the pumping test plan because of the poor hydraulic connection between the pumping well and the aquifer during the initial attempted CPW-1 test.<sup>678</sup> Finally, at the hearing CBR witness Lewis clarified that other problems were encountered during the first pumping attempt, i.e., it was impossible to control the pumping rates properly during the test due to both a pump problem and a well installation problem.<sup>679</sup>

CBR acknowledged that it did not formally analyze the hydrogeologic data, but asserted that it did gain information from the failed test that caused CBR to modify its plans and procedures associated with the second attempt at conducting a pumping test in the CPW-1 area. These changes were reflected in the March 2011 revised pumping plan, which also was approved by NDEQ and included modifications to the projected pumping rates, the expected ROI, and the selection of wells for monitoring during the second attempt.<sup>680</sup>

In its rebuttal testimony, the Staff stated that any data from the first attempt would not yield any materially different, useful information because the initial pumping well, CWP-1, was not hydraulically connected to the aquifer.<sup>681</sup> And in its rebuttal testimony, CBR agreed that an analysis of the failed pumping test data from the limited 19-hour period would not have been useful or insightful because the less-than-one-day run-time was a small fraction of the duration (i.e., four days are required to reach the drawdown targets that would trigger test termination) needed to measure significant drawdown in more distant wells.<sup>682</sup>

Given the limited data from the first attempt at CPW-1, CBR endeavored to rectify the situation by installing CPW-1A, a new well located approximately 67

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<sup>676</sup> See Test #8 Rep. at 3, 6; *see also* CBR Rebuttal Test. at 4 (Lewis).

<sup>677</sup> See CBR Rebuttal Test. at 4 (Lewis).

<sup>678</sup> See Staff Rebuttal Test. at 15-16 (Back, Lancaster, Striz) (citing Ex. CBR023, at 1 (Letter from Robert Lewis, Worley Parsons, to Lee Snowwhite, CBR (Mar. 16, 2011)) [hereinafter Revised Pumping Test Plan]).

<sup>679</sup> See Tr. at 377.

<sup>680</sup> See CBR Rebuttal Test. at 6-7 (Lewis); Tr. at 377 (Lewis); *see also* Revised Pumping Test Plan at 1.

<sup>681</sup> See Staff Rebuttal Test. at 17 (Back, Lancaster, Striz).

<sup>682</sup> See CBR Rebuttal Test. at 4 (Lewis).

ft west-southwest from former pumping well CPW-1, and by running a second testing attempt using the revised pumping plan.<sup>683</sup> The replacement pumping test on the new well was successfully conducted over a 4.3-day pumping period from May 16 to May 20, 2011, followed by the collection of recovery data.<sup>684</sup>

*b. Board Findings on Kreamer Opinion 1, Basis A: Initial Pumping Test Attempt*

Contrary to Dr. Kreamer's claim,<sup>685</sup> CBR's failure to report its first attempt to conduct a pumping test in the MEA was not done to conceal that the initial November 2010 attempt "failed" and was terminated after only 19 hours of operation.<sup>686</sup> Furthermore, although the data from this test attempt were not formally analyzed, the test clearly was used to modify the pumping test plan for the second attempt that resulted in a successful pumping test.<sup>687</sup>

Dr. Kreamer also asserted that CBR did not provide any details of the "pump failure" that were adequate to justify labeling the test as "failed."<sup>688</sup> While the Applicant's terse description in the pumping test report of a "pump failure" as the cause of the problem did not provide a particularly useful explanation, any deficiency in that regard was corrected by CBR's additional rebuttal and hearing testimony that made clear there was indeed a testing failure, as opposed to an attempt to conceal unfavorable test results.<sup>689</sup>

With regard to obtaining hydrogeologic insight from the initial pumping test attempt, CBR admits that while it did not formally analyze the data, information gained from the failed test resulted in a revised pumping plan with modifications approved by NDEQ that, after the installation of a new pumping well, resulted in a successful, long-term pumping test.<sup>690</sup> As Staff witness Back indicated, it is not unusual to encounter installation difficulties with well casings placed so deeply below the surface.<sup>691</sup> Moreover, the usefulness of the early data from this initial test likely would be limited.<sup>692</sup> It thus is not surprising, realizing that the 19-hour running time of the first attempt was a fraction of the time needed to

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<sup>683</sup> See Revised Pumping Test Plan at 1; Staff Rebuttal Test. at 16 (citing Test #8 Rep. at 9 of 10 (tbl. 7)).

<sup>684</sup> See Test #8 Rep. at 8.

<sup>685</sup> See Kreamer Initial Test. at 2 (citing Test #8 Rep. at 6).

<sup>686</sup> See Test #8 Rep. at 6.

<sup>687</sup> See *id.*; see also Revised Pumping Test Plan at 1.

<sup>688</sup> See Kreamer Initial Test. at 2.

<sup>689</sup> See CBR Rebuttal Test. at 4 (Lewis); Tr. at 377 (Lewis).

<sup>690</sup> See Revised Pumping Test Plan at 1-2; Test #8 Rep. at 3, 6-7; Tr. at 377 (Lewis).

<sup>691</sup> See Tr. at 376.

<sup>692</sup> See *supra* section V.A.1.b.i.

measure the necessary drawdown in the more distant wells (as is illustrated by the second attempt that lasted over 100 hours), that CBR did not include the data.<sup>693</sup>

And while Dr. LaGarry suggested CBR engaged in the suppression of adverse data,<sup>694</sup> we are unable to conclude there was any untoward motivation associated with the absence of the drawdown data in the pumping test report from the first test attempt, particularly given that the first attempt was revealed (albeit somewhat succinctly) in the report. Furthermore, although Dr. Kreamer opined that the unreported pumping test results showed a lack of containment, we were unable to locate any mention in Dr. Kreamer's testimony of a relation between the data from the first pumping test attempt and a lack of containment in the hydrogeology of the BC/CPF at the MEA.

We find, therefore, that CBR identified sufficiently the unsuccessful first attempt to conduct a pumping test in a portion of the MEA, which was replaced by a successful second attempt in the same area. While the details of the problem that caused the first attempt to fail were not well defined in the pumping test report, we find that the basis for the failure was sufficiently detailed in CBR's rebuttal and hearing testimony. With the replacement test essentially duplicating the data from the first 19-hour test and extending the data collection for an additional 80-plus hours followed by recovery analyses,<sup>695</sup> we have no reason to believe that the analysis of the failed pumping test data would have provided any pertinent information or changed any of the conclusions that were derived from CBR's analyses of the data collected during the second, successfully-completed long-term pumping test.

## ***2. Kreamer Opinion 1, Basis B: Data Selectivity***

Also as support for his challenge to the adequacy of the May 2011 pumping test, in Basis B for his Opinion 1 Dr. Kreamer asserted that CBR arbitrarily analyzed only selected portions of the resulting data (choosing late-time data in some cases and middle-time data in others), adding that there was no justifiable basis for analyzing only a selected portion of the pumping data that, if analyzed in toto, might demonstrate lack of containment of the BC/CPF.<sup>696</sup> Because this issue seemed to apply to several of the concerns raised as the bases for Contention 2, we have addressed it as an overarching issue imbedded within OST's allegations that the Applicant and the Staff have misinterpreted the

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<sup>693</sup> See CBR Rebuttal Test. at 4 (Lewis).

<sup>694</sup> See LaGarry Rebuttal Test. at 2.

<sup>695</sup> See Staff Rebuttal Test. at 16-17 (Back, Lancaster, Striz).

<sup>696</sup> See Kreamer Initial Test. at 2, 7.

aquifer pumping test (*see supra* section V.A). Specifically, the parties' positions addressing Dr. Kreamer's claims that CBR did not consider the entire test data are presented in detail above in section V.A.1.b and need not be repeated here.

And in this regard, section V.A.2.b above details our findings that (1) Dr. Kreamer's claims about data selectivity are unsupported because all data points for all of the observation wells used in the MEA aquifer pumping test are presented in the drawdown and recovery response curves;<sup>697</sup> (2) CBR's rationale for analyzing the portions of the aquifer pumping test data was clearly explained by the Applicant and is consistent with recommended practice;<sup>698</sup> (3) less weight should be given to the early data because it may not closely represent the theoretical drawdown equation due to, among other things, inconsistency in well discharge and the effects of wellbore storage and near-wellbore effects;<sup>699</sup> (4) the late-time deviation responses in the drawdown of two wells (attributed to a lack of containment within the BC/CPF by Dr. Kreamer) could have been the result of other causes (i.e., higher transmissivities at distances from the pumping well, additional aquitard storage-water release, or misinterpretation of wellbore storage/near-wellbore effects) that could mimic the same response in the graphs;<sup>700</sup> and (5) while the CBR and Staff theories are consistent with the many other site observations and characteristics that support the Applicant's position that production zone fluids will be contained,<sup>701</sup> Dr. Kreamer provided no corroborating evidence to support his position that UCU leaks of sufficient magnitude exist to either jeopardize containment or prevent CBR from controlling its production fluids during facility operation and restoration.

### **3. Kreamer Opinion 1, Basis C: Cooper-Jacob Methodology**

Contesting the adequacy of the May 2011 pumping test analysis on another front, Dr. Kreamer in Basis C to his Opinion 1 criticized CBR for not including in the pumping test report an assessment employing the Cooper-Jacob technique, an analytical tool that can identify a recharge boundary that is consistent with a lack of confinement of an aquifer.<sup>702</sup> As with Basis B just discussed, this matter applies to several of OST's Contention 2-supporting Concerns so that it has

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<sup>697</sup> See Test #8 Rep. at PDF 79-96 (figs. C1 to C17); Staff Rebuttal Test. at 17 (Back, Lancaster, Striz).

<sup>698</sup> See Test #8 Rep. at 13.

<sup>699</sup> See CBR Rebuttal Test. at 4-6 (Lewis, Nelson, Pavlick).

<sup>700</sup> See Test #8 Rep. at 13; *id.* app. C at PDF 80, 82 (graphs C1 & C3); Staff Rebuttal Test. at 19-20 (Back, Lancaster, Striz).

<sup>701</sup> See *supra* section V.C and *infra* sections IX.A.2 and IX.B.2 for a summary of the site observations and characteristics that support BC/CPF aquifer containment.

<sup>702</sup> See Kreamer Initial Test. at 2 (citing Test #8 Rep. at 11).



been addressed in the context of the overarching issue of OST's allegations that the Applicant and Staff have misinterpreted the aquifer pumping test (*see supra* section V.A) and will not be repeated in detail here.

But briefly summarizing, the parties' positions regarding Dr. Kreamer's assertion that CBR did not analyze the pumping data using the Cooper-Jacob distance-drawdown method and the resulting Board findings are presented above in sections V.A.1.a and V.A.1.b. Regarding his allegations that CBR did not analyze the pumping test data using the Cooper-Jacob distance-drawdown method, we found that (1) CBR analyzed the pumping test data using both the Theis drawdown and recovery methods and the Cooper-Jacob distance-drawdown methods;<sup>703</sup> and (2) in the pumping test report CBR not only presented the graphical results of the Cooper-Jacob analysis but also analyzed the data to derive the hydraulic parameters of transmissivity and storativity.<sup>704</sup>

#### **4. Kreamer Opinion 1, Basis D: Analysis of Monitor-2 and Monitor-8 Wells**

##### *a. Parties' Positions on Kreamer Opinion 1, Basis D: Analysis of Monitor-2 and Monitor-8 Wells*

Also in support of his position that the May 2011 pumping test analysis was inadequate, Dr. Kreamer in Basis D for his Opinion 1 stated that the pumping test report did not include an analysis of data from water-level changes in wells Monitor-2 or Monitor-8 as part of CBR's evaluation of the aquifer response to pumping, even though these wells were reported to be within the ROI of the pumped well.<sup>705</sup>

In response, CBR witnesses Lewis, Nelson, and Pavlick testified that wells Monitor-2 and Monitor-8 were not part of the formal monitoring well network because, in developing the revised pumping test plan, CBR estimated these wells would have less than the NDEQ drawdown criteria of 0.5 ft for inclusion into the network. Consequently, water-level changes from those wells were not going to be used to define the ROI relative to CBR's second aquifer pumping test. But because they showed drawdown of 0.42 ft and 0.76 ft, respectively, at the end of the test, the data from these wells were analyzed along with the other monitoring wells and the results presented in Table 8 of the testing report.<sup>706</sup>

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<sup>703</sup> See CBR Initial Test. at 29 (Lewis, Nelson, Pavlick).

<sup>704</sup> See CBR Rebuttal Test. at 10 (Lewis, Nelson, Pavlick); Test #8 Rep. figs. app. at PDF 50 (fig. 18).

<sup>705</sup> See Kreamer Initial Test. at 2.

<sup>706</sup> See CBR Rebuttal Test. at 7; Tr. at 431 (Lewis); Revised Pumping Plan at PDF 3 (tbl. 1 note);

(Continued)

Staff witnesses Back, Lancaster, and Dr. Striz further clarified that, because the initial attempt to perform a pumping test failed (as is discussed *supra* section VII.A.1), CBR refined the test design and, among other things, designated two different wells (Monitor-6 and Monitor-7) as the farthest wells for the purpose of formally estimating the ROI. But, according to these Staff witnesses, Monitor-2 and Monitor-8 were still monitored and analyzed as described in the original aquifer pumping test plan.<sup>707</sup> These Staff witnesses further noted that the data collected from these most-distant observation wells identified measurable drawdown in excess of 0.4 ft due to pumping, which CBR concluded were sufficiently reliable data to calculate aquifer parameters.<sup>708</sup>

*b. Board Findings on Kreamer Opinion 1, Basis D: Analysis of Monitor-2 and Monitor-8 Wells*

We find that the allegations in Dr. Kreamer's Opinion 1, Basis D, are baseless. Even though wells Monitor-2 and Monitor-8 were officially not going to be included in the formal monitoring network for the second pumping test (as they were predicted to have less than the 0.5 ft of drawdown required by NDEQ) and so were replaced with wells Monitor-6 and Monitor-7, CBR continued to monitor wells Monitor-2 and Monitor-8. And because wells Monitor-2 and Monitor-8 measured drawdown of 0.42 ft and 0.76 ft, respectively, their data were later analyzed along with all the other wells to estimate their hydraulic parameters.<sup>709</sup>

As Dr. Kreamer acknowledged at the hearing, the data for the Monitor-2 and Monitor-8 wells were presented in the pumping test results,<sup>710</sup> and we thus find Basis D for Dr. Kreamer's Opinion 1 without merit.

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Test #8 Rep. at 7, tbls. app. at 9 of 10 (tbl. 7), 10 of 10 (tbl. 8, n.1), app. C at PDF 81 (graph C2), PDF 87 (graph C8), PDF 90 (graph C11), PDF 96 (graph C17).

<sup>707</sup> See Staff Rebuttal at 16 (citing Test #8 Rep. at 1 of 1 (tbl. 3, n.1)), 21-22 (citing Test #8 Rep. at 14, app. C at PDF 81 (graph C2), PDF 87 (graph C8), PDF 90 (graph C11), PDF 96 (graph C17)).

<sup>708</sup> See *id.* at 21-22 (citing Test #8 Rep. at 14).

<sup>709</sup> See CBR Rebuttal Test. at 7 (Lewis, Nelson, Pavlick) (citing Test #8 Rep. app. C at PDF 81 (graph C2), PDF 87 (graph C8), PDF 90 (graph C11), PDF 96 (graph C17)).

<sup>710</sup> See Tr. at 431.

**5. Kreamer Opinion 1, Basis E: MEA Coverage from Single Pumping Test**

**a. Parties' Positions on Kreamer Opinion 1, Basis E: MEA Coverage from Single Pumping Test**

Because of their similarity, we consider together the claims of OST witnesses Wireman and Dr. Kreamer, as outlined in Basis E of Dr. Kreamer's Opinion 1, that CBR employed only a single pumping test that did not encompass the entire MEA. As a result, they contended, the hydrogeological response to pumping for a large portion of the MEA remains unknown or not adequately characterized, a paucity of coverage that is poor professional practice.<sup>711</sup> CBR's single pumping test for the MEA had an ROI of 8800 ft,<sup>712</sup> for a total coverage length of 3.2 miles, which is less than half of the 7.3-mile-long site.<sup>713</sup> And, as reflected earlier in this decision (*see supra* section VI.A.1), Mr. Wireman claimed that these limited data do not adequately characterize the subsurface heterogeneity and are inadequate for developing an acceptable site-wide conceptual hydrologic model.<sup>714</sup> Furthermore, according to Dr. Kreamer, it is unclear why CBR undertook only one test, given that the geologic strata in the MEA lack consistent thickness and are not entirely horizontal. To properly assess the hydraulic conditions of the subsurface consistent with normal professional practice, he maintained, it is necessary to conduct several pumping tests across the untested majority of the property area, and then undertake duplicate testing to determine the repeatability of the results.<sup>715</sup>

Disputing Dr. Kreamer, CBR witnesses Lewis, Nelson, and Pavlick testified that, with respect to Marsland, the pumping test was run only for the limited purpose of characterizing the area of the first four MUs to be developed. They testified as well that additional pumping tests of the other MUs at this time would provide little incremental value given the quality and reliability of existing data and analyses. They based this claim not only on the existing pumping test results, but on other evidence that demonstrates there was a strong basis for concluding there is containment across the site.<sup>716</sup> As a result, relative to the MEA site as a whole, it is their opinion that there is a substantial basis for

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<sup>711</sup> See Kreamer Initial Test. at 2; Wireman Initial Test. at 4; *see also* Tr. at 437 (Wireman).

<sup>712</sup> See Tech. Rep. at 2-82; EA at 3-31.

<sup>713</sup> See Tr. at 435 (Shriver); Staff Rebuttal at 23 (Back, Lancaster, Striz) (citing Text #8 Rep. figs. app. at PDF 33 (fig. 1), PDF 48 (fig. 16)).

<sup>714</sup> See Wireman Initial Test. at 4.

<sup>715</sup> See Kreamer Rebuttal Test. at 1.

<sup>716</sup> See CBR Rebuttal Test. at 7-8 (citing Hydraulic Containment Report).

concluding that containment exists even without additional pumping test data and analysis.<sup>717</sup>

Staff witnesses Back, Lancaster, and Dr. Striz agreed with CBR, stating that, based on the ROI of 8800 ft covering more than 3 miles of the approximately 7.5-mile length of the MEA site, there is no need to assess the response of the entire MEA site to pumping because the site geology is not complicated and cross-sections demonstrate the uniformity of hydrostratigraphic units and the continuity of the BC/CPF aquifer across the MEA.<sup>718</sup>

Regarding the claims of Mr. Wireman and Dr. Kreamer that performing a single pumping test that covered only a portion of the site is not consistent with professional practices, CBR witnesses Lewis, Nelson, and Pavlick responded that their approach was consistent with practice in other recent ISR proceedings and with the Staff's NUREG-1569 guidance that "[a]ny of a number of commonly used aquifer pumping tests may be used including single-well drawdown and recovery tests, drawdown versus time in a single observation well, and drawdown versus distance pumping tests using multiple observation wells."<sup>719</sup> Making clear that the one pumping test covering a portion of the site does not end its responsibilities relative to the balance of the site, CBR witness Shriver verified at the hearing that another site-specific pumping test will be performed for each new MU as it is slated for startup operations.<sup>720</sup> The additional pumping tests are required under License Condition 11.3.4, which indicates that as part of developing its wellfield packages for any new MUs at the MEA, CBR must perform an aquifer pumping test for each new area.<sup>721</sup>

Mr. Wireman, however, declared that it was important now, upfront as part of the licensing process, to conduct these additional pumping tests covering the remaining portion of the MEA. He emphasized that, while subsequent aquifer pumping tests will give CBR the hydraulic parameters for each new MU, such tests will not characterize the groundwater flow of the MU for licensing consideration and will not assist in evaluating the recovery operation risk of unwanted movement of contaminated groundwater needed for the Staff's EA assessments.<sup>722</sup>

Staff witness Back challenged Mr. Wireman's claim, maintaining that there is a wealth of other characterization data already available to achieve this goal in the form of actual borehole data, geophysical logs, and field water-level

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<sup>717</sup> See *id.* at 8.

<sup>718</sup> See Staff Rebuttal Test. at 23-24.

<sup>719</sup> CBR Rebuttal Test. at 7 (quoting NUREG-1569, at 2-24).

<sup>720</sup> See Tr. at 439.

<sup>721</sup> See CBR Rebuttal Test. at 7-8 (Lewis, Nelson, Pavlick) (citing CBR License Amend. 3, at 21 (License Condition 11.3.4)).

<sup>722</sup> See Tr. at 441.

measurements that were gathered from the entire MEA area. These data, he asserted, support the similarity of hydrogeologic conditions throughout the entire site.<sup>723</sup>

Mr. Wireman responded that notwithstanding these additional data, there still is insufficient information on the characteristics of the Brule aquifer, i.e., potentially water could be moving from one formation to the other. Such a circumstance, he declared, can best be assessed by aquifer pumping tests that could demonstrate either drawing water downward from the Brule aquifer or, given the aquifer's heterogeneities, the presence of pathways that would allow water to flow upward from the BC/CPF aquifer into the Brule aquifer. In Mr. Wireman's view, it remains critical for the additional aquifer tests to be completed as part of the license application review process.<sup>724</sup>

Finally, regarding the aquifer pumping test being only one of several lines of evidence demonstrating containment of the BC/CPF aquifer at the MEA, as we noted previously (*see supra* section V.C), in its initial testimony the Staff described several circumstances unrelated to the aquifer pumping test that support the conclusion ISR production fluids will be adequately contained within the BC/CPF underlying the MEA.<sup>725</sup> Moreover, the Staff confirmed in its rebuttal testimony that to further define and verify the site conceptual model, CBR is required by License Condition 11.3.4 to perform an aquifer pumping test for each wellfield as part of the wellfield packages that will be submitted prior to the startup of each MU.<sup>726</sup>

And when asked at the hearing what would happen if a future pumping test analysis associated with an MU indicated that previously undetected breaches in the containment of the BC/CPF would result in CBR being unable to control production fluids from undesired vertical or lateral migration, the Staff responded that CBR would be required to assess the situation, develop a plan for safe operations under those newly discovered conditions, and submit a license amendment (which would be subject to a hearing request) to address this unexpected situation and demonstrate it is safe to operate in that MU.<sup>727</sup>

*b. Board Findings on Kreamer Opinion 1, Basis E: MEA Coverage from Single Pumping Test*

The evidentiary record establishes that the May 2011 single pumping test

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<sup>723</sup> See Tr. at 442.

<sup>724</sup> See Tr. at 443.

<sup>725</sup> See Staff Initial Test. at 28-31 (Back, Lancaster).

<sup>726</sup> See Staff Rebuttal Test. at 14 (Back, Lancaster, Striz) (citing CBR License Amend. 3, at 21 (License Condition 11.3.4)).

<sup>727</sup> See Tr. at 444, 551-54 (Lancaster).

covered almost half of the MEA, monitoring the test impacts on nine wells in the BC/CPF and three wells in the overlying Brule aquifer. While contributing to the conceptual hydrogeologic model, we conclude that this single pumping test was never intended to be the sole source of information for that characterization. Rather, the information from the pumping test was augmented with site-specific hydrogeologic data including geological cross-sections and hydrogeologic isopach, structural contour, and potentiometric contour mapping based on the stratigraphic cuttings and geophysical logging of over 1600 boreholes drilled within the MEA.

While agreeing that there are multiple lines of evidence to support containment across the MEA site, independent of the pumping test results (*see supra* section V.C.3), we find that the additional pumping test prior to the operational start of each MU is still necessary to verify the absence of major preferential pathways for fluid migration at each location, and that the installation of the wells and performance of these additional pumping tests is assured by License Condition 11.3.4.

Mr. Wireman raised an important issue relating to the current need to characterize the hydraulic properties of the aquifers over the entire site with additional pumping tests to help verify the absence of major preferential pathways and to assist in evaluating the risk of the recovery operation with respect to unwanted movement of contaminated water. On the basis of the evidentiary record before us, however, we find that OST has not provided sufficient evidence to establish the need during the pre-licensing phase to place the large financial and time burden on the Applicant to perform the pumping tests for all 11 of the MEA MUs, as opposed to the four covered by the May 2011 test.<sup>728</sup> This is particularly so given the strong evidence of strata consistency displayed by the borehole information, geophysical logging, water-level measurements, and hydrogeological mapping, backed by the fact that, pursuant to License Condition 11.3.4, the desired pumping information relative to the opening of future MUs will be collected and assessed incrementally, albeit as a prerequisite to operating each MU rather than during the licensing process as desired by the Tribe. By the same token, should a previously undetected hydrogeologic anomaly be encountered during MEA operation that has the potential to prevent Crow Butte from controlling the migration of production fluids into neighboring surface waters

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<sup>728</sup> During the hearing, Mr. Wireman made the point that while there are tradeoffs in putting together such a data investigation, with cost being a factor, having the correct design/scope of work for a characterization study is critical and “that’s not just a cost factor.” Tr. at 592. While we agree with Mr. Wireman regarding the importance of establishing the proper scope for any characterization study, based on the evidentiary record before us we are unable to conclude that CBR has acted inappropriately in that regard so as to warrant the additional pre-licensing aquifer testing sought by the Tribe.

and groundwater, to avoid having to cease operations in that mine unit, under License Condition 9.4 CBR would be required to assess the situation, develop a plan for safe operations in those conditions, and submit a license amendment (which is subject to a hearing request) to address this situation and demonstrate it is safe to continue operations.

## **6. *Kreamer Opinion 1, Basis F: Off-Site Influences***

### ***a. Parties' Positions on Kreamer Opinion 1, Basis F: Off-Site Influences***

In his Opinion 1, Basis F, Dr. Kreamer focused on the purported pumping test impacts of the elongated nature of the MEA in its northwest to southeast direction.<sup>729</sup> Dr. Kreamer claimed in his initial testimony that this configuration resulted in hydrogeologic off-site influences impacting the CBR pumping test because of the ROI-associated cone of depression for this test extending significantly off-site, well past the boundaries of the narrow portion of the property. According to Dr. Kreamer, the pumping test withdrew water from these off-site locations, which was significant because much of the resulting analysis selectively addressed only late-time data that are more influenced by off-site factors.<sup>730</sup>

Contesting Dr. Kreamer's assertion, CBR witnesses Lewis, Nelson, and Pavlick in their rebuttal testimony responded that the aquifer properties derived from the test results are representative of average aquifer conditions for the BC/CPF over the test ROI, which includes all monitoring wells that were evaluated as part of the test. According to these witnesses, the fact that the ROI extends to the east and west of the MEA boundary is irrelevant to the testing results.<sup>731</sup> And providing further clarification on this issue at the hearing, CBR witness Lewis and OST witness Dr. LaGarry agreed that the BC/CPF pinches out approximately 7 miles to the west and 3 miles to the east of the MEA boundary, meaning that the test ROI remained within the limits of the BC/CPF.<sup>732</sup>

Staff witnesses Back, Lancaster, and Dr. Striz took issue with Dr. Kreamer's claim, stating that he neither elaborated on the off-site hydrogeological influences to which he referred nor explained how the pumping test conclusions would be adversely impacted. Furthermore, according to these Staff witnesses, the late-time data observed in the aquifer response curves from the more distant

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<sup>729</sup> See Tech. Rep. Figs. at 2 (fig. 1.3-1).

<sup>730</sup> See Kreamer Initial Test. at 2.

<sup>731</sup> See CBR Rebuttal Test. at 8.

<sup>732</sup> See Tr. at 448-49.

observation wells did not indicate there were any off-site influences significantly different from those observed in the middle-time data.<sup>733</sup>

Additionally, these Staff witnesses claimed Dr. Kreamer's allegation that "water was drawn from offsite" misconstrues the actual groundwater flow dynamics when pumping a confined aquifer like the BC/CPF aquifer. They asserted that the changes to the potentiometric surface (i.e., drawdowns) observed in the farthest monitoring wells were a response to the decrease in pressure caused by the pumping well and are unrelated to water movement from off-site.<sup>734</sup> And with regard to Dr. Kreamer's claim that offsite water was removed from the BC/CPF aquifer by the May 2011 pumping test, Staff witness Back clarified at the hearing that groundwater removal from a confined aquifer like the BC/CPF is not indicative of the withdrawal of water from the aquifer pore space, but rather suggests an expansion of the water and compression of the aquifer matrix caused by the pressure released during pumping, which, in turn, is reflected in the drop of the potentiometric levels that creates the ROI-defining cone of depression.<sup>735</sup> Dr. Kreamer, however, indicating he did not agree with the Staff's representation of water removal when pumping a confined aquifer, declined to alter his position that BC/CPF groundwater was coming from off-site during the pumping test.<sup>736</sup>

Finally, at the hearing CBR witness Lewis stated that the ROI of an MU production well during MEA operations is likely to be between 75 ft and 100 ft because, with the reinjection of the fluids, the amount of net water drawn off is small, i.e., one-half percent or less.<sup>737</sup>

*b. Board Findings on Kreamer Opinion 1, Basis F: Off-Site Influences*

Relative to Dr. Kreamer's concern about off-site influences affecting the pumping test results, the Board finds that the ROI for the May 2011 test remained within the boundaries of the BC/CPF such that the results were not affected by the hydraulic characteristics of any other formation, e.g., the Pierre Shale. Furthermore, based on the evidentiary record, there does not appear to be any widespread influence from zonal variations within those portions of the BC/CPF that lie beyond the MEA site boundary that differed significantly from the response within the portion of this formation underlying the MEA.

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<sup>733</sup> See Staff Rebuttal Test. at 23.

<sup>734</sup> See *id.*

<sup>735</sup> See Tr. at 453-55; see also EA at 4-16. As we noted previously, all the parties have agreed that the BC/CPF is a confined aquifer. See *supra* section IV.C.2; see also Joint Stipulation at 9; Tr. at 451-52.

<sup>736</sup> See Tr. at 453, 455.

<sup>737</sup> See Tr. at 456-57.



Regarding the debate about the source of fluid pumped during the test, all parties agreed that the BC/CPF is a confined aquifer and no party disputed that confined groundwater comes from expansion of the groundwater and compression of the geologic formation. While removal of water during the pumping test occurred as the pore water expanded and the aquifer formation compressed from the pressure release during pumping, the resolution of this argument has little bearing on our decision as we conclude it is evident that the limits of the BC/CPF extend beyond the boundary of the MEA, which helps assure that the water removed during the pumping test is coming from the BC/CPF aquifer and not from other off-site sources.

## **7. Kreamer Opinion 1, Basis G: Variations in Aquifer Thickness**<sup>738</sup>

### **a. Parties' Positions on Kreamer Opinion 1, Basis G: Variations in Aquifer Thickness**

The sole allegation in Basis G of Dr. Kreamer's Opinion 1 is that the aquifer pumping test report did not make clear whether the actual aquifer thickness, or only the average aquifer thickness, was used to calculate transmissivity.<sup>739</sup> CBR witnesses Lewis, Nelson, and Pavlick responded in their rebuttal testimony that, as was stated throughout the pumping test report, an average net sand thickness of 40 ft was used to calculate transmissivity of the BC/CPF sandstone at Marsland.<sup>740</sup> These CBR witnesses added that the production zone (i.e., where ore-grade uranium deposits exist underlying the MEA) is located in the BC/CPF where average thickness is 50 ft with an average net sand thickness of 40 ft.<sup>741</sup>

And while they acknowledged there is some variability in the aquifer thickness, these CBR witnesses claimed that the assumption of a uniform effective aquifer thickness is "reasonably satisfied over the test area."<sup>742</sup> Concerning Dr. Kreamer's allegation regarding the thickness used to calculate transmissivity, Staff witnesses Back, Lancaster, and Dr. Striz noted that aquifer thickness is

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<sup>738</sup> Dr. Kreamer raised a similar contested issue in his Opinion 6. *See infra* section VII.F.

<sup>739</sup> *See* Kreamer Initial Test. at 2.

<sup>740</sup> *See* CBR Rebuttal Test. at 9 (citing, e.g., Test #8 Rep. at 5, 13, 14, tbls. app. at 10 of 10 (tbl. 8)).

<sup>741</sup> *See id.* at 5. CBR witness Lewis clarified that net sand thickness is the difference between the total thickness of the BC/CPF (determined from the boreholes and geophysical logs) and an estimation of the claystone thickness within the formation as projected from the geophysical logs. Because the claystone does not contribute appreciably to the aquifer's transmissivity, Mr. Lewis opined that using this correction accounts for these low-permeability layers and is better than underestimating transmissivity using the full thickness of the BC/CPF aquifer. *See* Tr. at 458-59.

<sup>742</sup> *See* CBR Rebuttal Test. at 9 (quoting Test #8 Rep. at 11).

not needed to calculate transmissivity because transmissivities are obtained directly from aquifer pumping test data.<sup>743</sup>

*b. Board Findings on Kreamer Opinion 1, Basis G: Variations in Aquifer Thickness*

The aquifer pumping test report states numerous times that an average “net sand” thickness of 40 ft was used when calculating the hydraulic conductivity of the BC/CPF aquifer based on the transmissivity values obtained from analyzing the drawdown and recovery data from the May 2011 MEA pumping test.<sup>744</sup> Using “net sand” thickness accounted for the low-permeability claystone stringers within the BC/CPF and so provided a better estimate of the effective transmissivity of the BC/CPF aquifer than would have been the case had CBR used the full thickness of this layer.<sup>745</sup> Moreover, we do not consider CBR’s recognition there is some variability in the aquifer thickness as refuting the soundness of its showing that the assumption of a uniform effective aquifer thickness is reasonably satisfied over the test area.

With CBR’s definition of its method for selecting aquifer thickness thus clarified, we find that OST witness Dr. Kreamer’s Opinion 1, Basis G aquifer thickness claim is resolved in favor of the Applicant.<sup>746</sup>

**8. Kreamer Opinion 1, Basis H: Monitoring Well Screen Intervals**

*a. Parties’ Positions on Kreamer Opinion 1, Basis H: Monitoring Well Screen Intervals*

In Basis H, the final basis supporting his Opinion 1, Dr. Kreamer raised the possibility that the monitoring wells used in the May 2011 pumping test may not have spanned the entire thickness of the BC/CPF aquifer. His conclusion was based on his assertion that the thickness of the BC/CPF sandstone varied from 21 ft to 91 ft across the site while the screened intervals of the monitoring wells varied from 22 ft to 50 ft, per Figure 2.6-9 of the CBR TR.<sup>747</sup>

In their rebuttal testimony, CBR witnesses Lewis, Nelson, and Pavlick clarified that the monitoring wells used in the pumping test spanned all or nearly all of the BC/CPF thickness, such that there was sufficient penetration to charac-

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<sup>743</sup> See Staff Rebuttal Test. at 22 (citing Staff Initial Test. at 19-20).

<sup>744</sup> See Test #8 Rep. at 5, 13, 14, tbls. app. at 10 of 10 (tbl. 8).

<sup>745</sup> See Tr. at 458-59 (Lewis).

<sup>746</sup> A more detailed discussion regarding discontinuities in the thickness of the BC/CPF aquifer is provided *infra* in section VII.F.

<sup>747</sup> See Kreamer Initial Test. at 2 (citing Tech. Rep. Figs. at 75 (fig. 2.6-9)).

terize the full thickness of the aquifer. These CBR witnesses further stated that “given the relatively large distances from the pumped well to monitoring wells, partial penetration effects in observation wells are negligible.”<sup>748</sup>

During the hearing, CBR witness Shriver concurred in this response with a correction, stating that the observation wells in the Brule aquifer were not fully penetrating, while some of the wells in the BC/CPF were fully or nearly fully penetrating.<sup>749</sup> He clarified as well that the few monitoring wells that did not completely screen the entire interval of the BC/CPF were located where there was a sand layer, followed by a shale layer, at the top of the BC/CPF. In those instances, he indicated, the well screen was placed a few feet below what is considered to be the uppermost level of the BC/CPF.<sup>750</sup>

In their rebuttal testimony, Staff witnesses Back, Lancaster, and Dr. Striz declared that Dr. Kreamer’s assertions regarding pumping test penetration of the entire BC/CPF aquifer thickness were not valid, notwithstanding the fact that the range of the well screen intervals for the monitoring wells differed from the thickness of the BC/CPF. These Staff witnesses explained that the BC/CPF thickness ranges of 21 ft to 91 ft do not reflect the thicknesses at the locations of the aquifer pumping test observation wells, as evidenced by comparing the BC/CPF thickness contours with the locations of the BC/CPF observation wells.<sup>751</sup> Based on their review of these figures, they claimed that, except for well Monitor-5, all the observation wells were in areas where the thickness shown in CBR TR Figure 2.6-9 was less than 50 ft.<sup>752</sup> Moreover, these NRC witnesses stated that the completion reports provided in Appendix A of the aquifer pumping test report indicate that the BC/CPF observation wells were fully screened across the BC/CPF aquifer.<sup>753</sup>

When asked at the hearing about the potential impacts on the pumping test results of a slight partial penetration of the monitoring wells, Dr. Kreamer stated that some of the wells may be over-penetrating into either the UCU or the LCU,<sup>754</sup> indicating that, while not necessarily the case for pumping tests, the use of such wells is a poor monitoring technique for what he called “contaminant hydrology.”<sup>755</sup>

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<sup>748</sup> CBR Rebuttal Test. at 9.

<sup>749</sup> See Tr. at 473-74.

<sup>750</sup> See Tr. at 477-79.

<sup>751</sup> See Staff Rebuttal Test. at 24-25 (citing Tech. Rep. Figs. at 75 (fig. 2.6-9) (BC/CPF thickness contours), 97 (fig. 2.7-7) (observation wells)).

<sup>752</sup> See *id.* at 25.

<sup>753</sup> See *id.* (citing Test #8 Rep. app. A at PDF 53-65).

<sup>754</sup> See Tr. at 475 (citing Tech. Rep. at 2-49 to -50).

<sup>755</sup> Tr. at 476. “Contaminant hydrology” is a term that Dr. Kreamer used for the first time at  
(Continued)

*b. Board Findings on Kreamer Opinion 1, Basis H: Monitoring Well Screen Intervals*

Regarding Dr. Kreamer's Basis H allegation that the monitoring wells used by CBR in the May 2011 pumping test may either be partially penetrating or over-penetrating, the Board finds that the preponderance of the evidence indicates that while a small number of the wells were not fully penetrating, those that were not fully penetrating have a high percentage of partial penetration. We find as well that no evidence has been submitted by the Intervenor demonstrating any potential adverse effects from the partial well screen intervals on the pumping test analysis results, leading us to conclude that the impacts, if any, from the few partially penetrating wells are negligible, particularly given the relatively large distances between the pumped well and the observation wells. Also, in line with Dr. Kreamer's observation that the monitoring technique used by CBR was not unacceptable for pumping tests,<sup>756</sup> we find that no evidence has been submitted by the Intervenor demonstrating any potential adverse effects on the pumping test analysis results as a consequence of well screening interval issues.

**B. Kreamer Opinion 2 — Previous Pumping Test Analyses for the Renewal Site**

*1. Parties' Positions on Kreamer Opinion 2 — Previous Pumping Test Analyses for the Renewal Site*

In Opinion 2 of his initial testimony, Dr. Kreamer claimed that the summary of historical testing results provided for the existing CBR ISR facility mischaracterizes the BC/CPF hydrogeological test results for that facility. In particular, Dr. Kreamer maintained that the Pumping Test #8 report erroneously states that “[r]esults of previous testing indicate the [BC/CPF] is relatively homogeneous and isotropic.”<sup>757</sup> He then reiterated the concerns he expressed about the pumping tests that were conducted in conjunction with the renewal of the existing CBR ISR facility license. During the 2015 adjudication for that license renewal

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the hearing in connection with the use of screened monitoring wells associated with production pumping, such as aquifer pumping tests, and in discussing aquifer heterogeneity. *See* Tr. at 463, 464, 476, 866, 867, 869, 873, 890, 918, 997, 998. Given his isolated use of this term so late in the proceeding and the fact that the Intervenor's bases and written testimony regarding Contention 2 deal primarily with the hydraulic description and development of the conceptual hydrogeologic model of MEA site hydrology, and only peripherally with constituent transport through fractures, *see supra* sections V.B.1.c and V.B.2, and geochemical differences between the BC/CPF and the overlying Arikaree/Brule aquifer, *see supra* sections V.C.2 and V.C.3, we saw no need to explore further the definition of this term or its relevance to this hearing.

<sup>756</sup> *See* Tr. at 476.

<sup>757</sup> *See* Kreamer Initial Test. at 3 (quoting Test #8 Rep. at 6).

request, he claimed that, among other things, CBR reported aquifer leakage in five of the ten aquifer tests that were performed at or near the existing facility. Dr. Kreamer also stated that the Staff questioned CBR's use of a non-leaky analysis method for pumping test data that showed a significant deviation from the Theis type-curves, and that examination of the drawdown-time graphs for the observation wells indicated that some leakage from the BC/CPF occurred during the pumping tests.<sup>758</sup>

Dr. Kreamer's testimony for the existing CBR ISR facility license renewal proceeding presented annotated figures for some of the pumping tests as examples to show departure from the classic Theis type-curve consistent with leakage. Claiming that the same departure historically observed at the existing facility is evident in the MEA data, he re-submitted these figures as part of his initial testimony for this hearing.<sup>759</sup> Referencing this previous analysis, Dr. Kreamer claimed that the analytical mathematical approaches used for interpreting the MEA data are the same as the ones for the license renewal proceeding and, in both cases, CBR assumed homogeneity and isotropy. Instead, Dr. Kreamer maintained, such CBR assumptions were debunked in the renewal hearing by the quantification of anisotropy in the pumping tests.<sup>760</sup>

CBR witnesses Lewis, Nelson, and Pavlick responded that the same homogeneous and confined nature of the Basal Chadron aquifer that was discussed in the license renewal hearings for the existing CBR ISR facility extends to the BC/CPF at the MEA, which is also relatively homogeneous, isotropic, and confined for purposes of aquifer characterization.<sup>761</sup> And concerning Dr. Kreamer's testimony during the renewal proceeding, these CBR witnesses stated that his presentation was not relevant to the Marsland site as the drawings he provided in conjunction with his testimony are specific to the pumping tests performed at the existing CBR ISR area, not the pumping test performed at the MEA.<sup>762</sup>

In their rebuttal testimony, Staff witnesses Back, Lancaster, and Dr. Striz agreed that the BC/CPF can be treated as homogeneous and isotropic for analytical purposes and that Dr. Kreamer has repeated arguments he made in the Crow Butte *Renewal Site* proceeding regarding the presence of recharge boundaries based on his re-analysis of the aquifer pumping test data to match early-time data. In the estimation of these Staff witnesses, however, it was inappropriate for

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<sup>758</sup> See *id.*

<sup>759</sup> See *id.* at 3-5.

<sup>760</sup> See *id.* at 5.

<sup>761</sup> See CBR Rebuttal Test. at 9-10 (citing *Renewal Site*, LBP-16-13, 84 NRC at 330).

<sup>762</sup> See *id.* at 10. These CBR witnesses also pointed out that Dr. Kreamer's concerns about the purported misuse of early-time data in reanalyzing the aquifer pumping test in the main license area was rejected by the licensing board in the license renewal proceeding. See *id.* (citing *Renewal Site*, LBP-16-13, 84 NRC at 330).

Dr. Kreamer to use such early-time data.<sup>763</sup> These witnesses also stated that Dr. Kreamer's only reference to the MEA test data as part of his Opinion 2 was his assertion that the MEA response curves show departures from the Theis curve that are consistent with leakage, another allegation they addressed previously in their rebuttal testimony.<sup>764</sup> Lastly, these Staff witnesses stated that it is not clear how Dr. Kreamer's statement about the hydrogeologic conditions at the existing Crow Butte ISR facility were relevant to the interpretation of the results of the MEA aquifer pumping test and, more generally, to the demonstration of BC/CPF aquifer confinement at the MEA.<sup>765</sup>

## **2. Board Findings on Kreamer Opinion 2 — Previous Pumping Test Analyses for the Renewal Site**

Given the fact that the Board in this initial decision is called upon to address the homogeneity and isotropy associated with the pumping test in the BC/CPF underlying the MEA,<sup>766</sup> relative to his Opinion 2 concern, the Board finds that Dr. Kreamer's re-analysis of aquifer pumping test data for the renewal of the existing CBR ISR facility license has no bearing on the issues in this case regarding the interpretation of the MEA aquifer pumping test or BC/CPF confinement at the MEA. Regarding Dr. Kreamer's evaluation of pumping test data initially provided in the 2015 license renewal hearing, the Board finds that these challenges to the hydrogeologic characterization of the BC/CPF underlying the existing CBR ISR facility have already been adjudicated and Dr. Kreamer has failed to provide any justification for applying that information to the MEA site. We find no reason to revisit the issues that have already been resolved by another licensing board and the Commission.<sup>767</sup>

Indeed, on the issues of the adequacy of the MEA pumping test analysis and BC/CPF confinement at the MEA, the application of regionally-based information to site-specific matters seems untoward, as the hydrogeologic performance in the main facility 11 miles north of the MEA has little, if any, bearing in establishing whether CBR can control processing fluids circulated in the operation and restoration of the MEA.<sup>768</sup> The hydraulic characteristics and hydrogeological conceptual model for the MEA must be established on its own merit, regardless

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<sup>763</sup> See Staff Rebuttal Test. at 30-31.

<sup>764</sup> See *id.* at 31 (citing *id.* at 18-21).

<sup>765</sup> See *id.* at 31.

<sup>766</sup> See *supra* section V.B; *infra* sections VII.D.2 and VII.E.2.

<sup>767</sup> See *Renewal Site*, LBP-16-13, 84 NRC at 329-30, *aff'd*, CLI-18-8, 88 NRC at 166-67.

<sup>768</sup> This same conclusion seemingly would apply to any of the other proposed CBR recovery sites in the region, e.g., the NTEA and the TCEA.

of the past performance of the existing CBR ISR facility — a position that was accepted by all the parties at the hearing.<sup>769</sup>

Thus, the adjudication for the renewal of the existing CBR ISR facility license is not controlling regarding site-specific, fact-based disputes concerning the adequacy of CBR's Marsland application. While the same geologic strata generally underlie each area, hydrogeologic performance may vary between sites and, as such, CBR must demonstrate safe facility operation and restoration for each site. Likewise, the Staff must prepare a NEPA-compliant assessment of environmental impacts from the licensing action for the MEA area. Therefore, were Dr. Kreamer to apply the techniques used in the renewal case, it would have been necessary for him to use the site-specific data from the pumping test conducted at the MEA. Dr. Kreamer's analysis, while interesting, simply carries no evidentiary weight as it fails to demonstrate any connection to the hydrogeologic behavior of the BC/CPF within the MEA. Rather, we address the issues of homogeneity/anisotropy raised by Dr. Kreamer in his Opinion 2 elsewhere in this decision as specifically applicable to the pumping test and other hydrogeologic data gathered within the MEA.<sup>770</sup>

### **C. Kreamer Opinion 3 — Utilization of Alternative Pumping Test Methods**

As previously discussed,<sup>771</sup> Dr. Kreamer claimed that CBR is derelict for not considering other forms of pumping test analyses such as the De Glee, Hantush-Jacob, or Walton methods, and that the Staff is equally deficient in not requiring more scientifically appropriate analyses that consider the leakage into or out of the confined aquifer.<sup>772</sup> In this same vein, in his Opinion 3 Dr. Kreamer specifically criticized CBR for using only the Theis method for analyzing the aquifer pumping test data. He also noted, as he had done in Opinion 1, Basis C, that while CBR referred to using the Cooper-Jacob technique, CBR nonetheless failed to present the results of this supplemental analysis, which might identify a recharge boundary that could, in turn, indicate a lack of BC/CPF aquifer containment.<sup>773</sup>

The parties' positions and Board findings on the utilization of alternative pumping test methods were discussed earlier and need not be repeated here.<sup>774</sup> But summarizing our findings: (1) CBR conducted the pumping test accord-

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<sup>769</sup> See Tr. at 407-12.

<sup>770</sup> See *supra* section V.B.2; see also *infra* sections VII.D.2 and VII.E.2.

<sup>771</sup> See *supra* sections V.A.1.a and V.A.2.a.

<sup>772</sup> See Kreamer Rebuttal Test. at 2-3.

<sup>773</sup> See Kreamer Initial Test. at 6; see also *id.* at 2.

<sup>774</sup> See *supra* section V.A.1.a.

ing to its NDEQ-approved plan using the Theis drawdown/recovery and the Cooper-Jacob Distance-Drawdown methods, which are accepted industry testing and analysis procedures that are incorporated into ASTM standards;<sup>775</sup> (2) CBR analyzed both the drawdown and recovery data to estimate aquifer transmissivity and storativity and saw no need to use a more complex method based on the apparent consistency of the hydraulic parameters resulting from these analyses;<sup>776</sup> (3) the need to perform hypothetical aquifer leakage analyses demanded by the Intervenor has no conceptual support;<sup>777</sup> (4) OST witness Dr. Kreamer did not provide an independent estimate for the rate of leakage based on his alternative interpretation of the Marsland pumping test data using the suggested alternative, allegedly superior methods (i.e., De Glee, Hantush-Jacob, and Walton Methods) to support his call for these techniques to be implemented at the MEA by Crow Butte;<sup>778</sup> and (5) Dr. Kreamer conceded that his suggested, more complex analysis methods may employ the same assumptions of aquifer homogeneity, isotropy, uniform thickness, and lateral extent as do the Theis and Cooper-Jacob methods.<sup>779</sup>

#### **D. Kreamer Opinion 4 — Homogeneity and Isotropy Assumptions**

##### ***1. Parties' Positions on Kreamer Opinion 4 — Homogeneity and Isotropy Assumptions***

Dr. Kreamer in his Opinion 4 maintained that the major requirement inherent in the Theis approach used to evaluate the MEA pumping test data lies in the assumptions that the BC/CPF sandstone aquifer must be “homogeneous and isotropic, and of uniform effective thickness over the area influenced by pumping.”<sup>780</sup> Dr. Kreamer then asserted that the data and evidence show these foundational assumptions have been violated. Dr. Kreamer claimed that the allegedly wide range of transmissivities (i.e., 230 ft<sup>2</sup>/d to 1780 ft<sup>2</sup>/d) and storage

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<sup>775</sup> See Staff Initial Test. at 26 (Back, Lancaster) (citing ER at 3-45; Tech. Rep. at 2-82); *see also* ASTM Theis Analysis Standards.

<sup>776</sup> See CBR Rebuttal Test. at 10 (Lewis, Nelson, Pavlick); Tr. at 485-88.

<sup>777</sup> See CBR Rebuttal Test. at 10-11 (Lewis, Nelson, Pavlick) (citing Test #8 Rep. at 12-13).

<sup>778</sup> See *id.*

<sup>779</sup> See Tr. at 507-08.

<sup>780</sup> Kreamer Initial Test. at 6 (quoting Test #8 Rep. at 11). Dr. Kreamer's claims about the impact of the homogeneity and isotropy assumptions are discussed in this section, while the thickness of the BC/CPF referenced in the quoted language will be addressed in section VII.F, *infra*, dealing with Dr. Kreamer's Opinion 6 regarding discontinuities in the thickness variations within the BC/CPF. The potential for heterogeneity/anisotropy caused by fractures and faults has already been reviewed, *see supra* section V.B, a discussion that need not be reiterated at this point.



coefficients ( $1.7 \times 10^{-3}$  to  $8.32 \times 10^{-5}$ ) are not consistent with homogeneous conditions.<sup>781</sup>

Further, with regard to these assumptions and the overlying Arikaree/Brule aquifer, Dr. Kreamer claimed that the limited monitoring well array in the heterogeneous Brule Formation is insufficient to adequately measure the hydrogeological response to production pumping and injection in the BC/CPF, and that the extrapolation of observations from isolated, widely-spaced wells over many square miles of the property is inconsistent with good professional practice.<sup>782</sup> According to Dr. Kreamer, data analysis of the May 2011 pumping test indicates BC/CPF aquifer leakage that refutes the Applicant's position, adopted by the Staff, that the Brule Formation is homogeneous.<sup>783</sup>

As a consequence, at the hearing Dr. Kreamer, along with OST witness Wireman, again advanced the need to further characterize the homogeneity of the BC/CPF within the MEA by conducting additional pumping tests to address the containment properties of these strata.<sup>784</sup>

Also with regard to the Brule aquifer, Mr. Wireman indicated his agreement with Dr. Kreamer, stating that the only aquifer test that was conducted at the MEA was limited to obtaining data to assess the hydraulic properties of the BC/CPF and that no pumping test was performed on the Arikaree/Brule aquifer. As a result, Mr. Wireman asserted, "[a]quifer testing conducted at the MEA is inadequate for developing an acceptable site wide conceptual hydrologic model and does not adequately characterize the subsurface heterogeneity."<sup>785</sup> He further supported this argument by declaring that the lithologic and hydraulic data included in CBR's TR for the Arikaree/Brule aquifer indicate significant heterogeneity. Additionally, he stated that sediment comprising these formations was deposited in a variety of fluvial environments resulting in changes in the characteristics of the sedimentary rock within the formations.<sup>786</sup>

Furthermore, according to Mr. Wireman, this heterogeneity affects groundwater flow and well yields and is further increased by structural deformation of the sedimentary rocks that comprise the aquifers. Consistent with Dr. Kreamer's position that the MEA aquifer testing was inadequate, Mr. Wireman concluded that aquifer testing, monitoring, and flow modeling of these aquifers must take into consideration that heterogeneity, claiming that the aquifer test data indicate that hydraulic conductivity and transmissivity of the BC/CPF near the pumping

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<sup>781</sup> See Kreamer Initial Test. at 6.

<sup>782</sup> See Kreamer Rebuttal Test. at 1-2.

<sup>783</sup> See *id.* (citing CBR Initial Test. at 31, 35 (Lewis, Nelson, Pavlick); Staff Initial Test. at 30 (Back, Lancaster)).

<sup>784</sup> See Tr. at 436-37, 440-41; *supra* section VII.A.5.

<sup>785</sup> Wireman Initial Test. at 4; see Tr. at 442-43.

<sup>786</sup> See Wireman Initial Test. at 4.

well used in the May 2011 test is an order of magnitude lower than at the outlying monitoring wells.<sup>787</sup>

Disputing Mr. Wireman's assertions that the MEA aquifer testing was inadequate, Crow Butte witnesses Lewis, Nelson, and Pavlick testified that CBR previously established the technical sufficiency of the aquifer pumping test to characterize the portions of the site that would be affected by development of the first four mine units at Marsland.<sup>788</sup> These CBR witnesses also disagreed with Mr. Wireman's characterization of transmissivity and hydraulic conductivity near the pumped well as being an order of magnitude lower than the outlying monitoring wells, claiming that these values were within a factor of two to four (with the exception of well Monitor-3, which is two to nine times lower than other monitoring well locations) and so as to suggest relative homogeneity.<sup>789</sup> Finally, these CBR witnesses claimed there is no evidence of the hypothetical structural heterogeneities cited by Mr. Wireman.<sup>790</sup>

Regarding the well Monitor-3 issue, Dr. Kreamer proffered a specific claim regarding heterogeneity by attempting to show that during the May 2011 pumping test, well Monitor-3 detected a preferential pathway for groundwater flow that indicated leakage in the containment of the production zone.<sup>791</sup> In his Opinion 3, Dr. Kreamer backed this claim by referencing the fact that the drawdown data for both the pumping well (i.e., CWP-1A) and the observation wells that are close to the pumping well (i.e., CPW-1 and Monitor-3) show a late-time flattening of the curve not suitable for Theis type-curve fitting. According to Dr. Kreamer, this isolated flattening of the curve may be indicative of leakage in the containment of the production zone.<sup>792</sup>

Staff witnesses Back, Lancaster, and Dr. Striz disagreed with Dr. Kreamer, testifying that the subsurface characterization of the BC/CPF using the examination of cores and geophysical logging shows that there are no major impermeable or permeable features that would indicate significant heterogeneity at the MEA to the extent such features would impact the aquifer test analysis results.<sup>793</sup> According to the Staff, the lack of significant heterogeneity is also reflected on the potentiometric surface of the BC/CPF aquifer, which is smooth and has an essentially flat and relatively constant hydraulic gradient.<sup>794</sup>

Additionally, Staff witness Dr. Striz indicated that she re-analyzed the data

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<sup>787</sup> See *id.*

<sup>788</sup> See CBR Rebuttal Test. at 17-18; see also *supra* section VII.A.5.a.

<sup>789</sup> See CBR Rebuttal Test. at 17-18.

<sup>790</sup> See *id.*

<sup>791</sup> See Kreamer Initial Test. at 6; see also *supra* section V.A.1.b.

<sup>792</sup> See Kreamer Initial Test. at 6.

<sup>793</sup> See Staff Rebuttal Test. at 27 (citing Test #8 Rep. at 5).

<sup>794</sup> See *id.* (citing Tech. Rep. Figs. at 113-16 (figs. 2.9-6a to -6d)).

from well Monitor-3 because it is close to the pumping well (i.e., within 100 ft) and likely was impacted from well effects, phenomena Mr. Wireman agreed should not be ignored when selecting the portion of the drawdown curve to be evaluated.<sup>795</sup> Her re-analysis resulted in the appearance of well effects for approximately 800 minutes, followed by fully developed radial flow that is necessary to be able to use the Theis solution. Fitting the type-curve to the later time data of this test because of the early-time well effects, Dr. Striz estimated transmissivity of 700 ft<sup>2</sup>/d (a value that is in line with the results from the other wells), and a storage coefficient of  $1 \times 10^{-5}$  (a value that indicates a confined aquifer).<sup>796</sup>

Further, in disputing Dr. Kreamer's claim regarding MEA site homogeneity, Staff witnesses Back, Lancaster, and Dr. Striz cited Driscoll, a well-established reference volume known to all the parties,<sup>797</sup> for that text's discussion of the need for homogeneity of the hydraulic parameters and uniform aquifer thickness in the analytical solutions provided to determine aquifer properties. With regard to how close these homogeneity and thickness constraints need to be satisfied to obtain meaningful results, as referenced by the Staff,<sup>798</sup> this portion of Driscoll states

These assumptions appear to limit severely the use of the [Theis] equations. In reality, however, they do not . . . [because while] uniform hydraulic conductivity is rarely found in a real aquifer, . . . average hydraulic conductivity [values,] as determined from pumping tests[, have] proved to be reliable for predicting well performance. In confined aquifers where the well is fully penetrating and open to the formation, the assumption of no stratification is not an important limitation.

Assumption of constant thickness is not a serious limitation because variation in aquifer thickness within the cone of depression in most situations is relatively small, especially in sedimentary rocks.<sup>799</sup>

Although acknowledging his familiarity with Driscoll, Dr. Kreamer asserted that text refers to the use of fully penetrating screened monitoring wells for monitoring pumping.<sup>800</sup> And while Dr. Kreamer affirmed the application of Driscoll's comments to well production from screened monitoring wells, he implied that it is inappropriate to apply Driscoll's guidance to "contaminant hydrology."<sup>801</sup>

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<sup>795</sup> Tr. at 565-66.

<sup>796</sup> See Tr. at 502-05, 530.

<sup>797</sup> See Tr. at 462 (Kreamer), 465 (Back), 480 (Lewis).

<sup>798</sup> See Staff Rebuttal Test. at 26 (citing Driscoll Text at 214).

<sup>799</sup> Driscoll Text at 214.

<sup>800</sup> See Tr. at 463, 464.

<sup>801</sup> See Tr. at 463, 464.

## 2. Board Findings on Kreamer Opinion 4 — Homogeneity and Isotropy Assumptions

With respect to the homogeneity and isotropy analysis assumptions that Dr. Kreamer challenged, while we concur with the parties that all geologic strata exhibit heterogeneity and anisotropy at some scale,<sup>802</sup> we find that the Theis and Cooper-Jacob techniques are routinely applied in practice with an understanding of the homogeneity and isotropy assumptions inherent to their use.<sup>803</sup> Thus, the CBR pumping test acknowledged that within the MEA, the BC/CPF is not homogeneous and isotropic on a local scale, but concluded that the assumptions of homogeneity and isotropy are reasonably satisfied over the scale of the BC/CPF pumping test.<sup>804</sup> And the Staff agreed that the CBR pumping test analysis demonstrated that the BC/CPF formation underlying the MEA can be treated as homogeneous and isotropic for analytical purposes.<sup>805</sup> We agree as well, noting that even Dr. Kreamer used the graphs in the pumping test report, which are based on the Theis and Cooper-Jacob solution techniques, to support his conclusion that recharge boundaries indicating vertical leakage from heterogeneity were detected in some of the well data.<sup>806</sup>

OST witness Dr. Kreamer also claimed that the allegedly wide range of transmissivities (i.e., 230 ft<sup>2</sup>/d to 1780 ft<sup>2</sup>/d) and storage coefficients ( $1.7 \times 10^{-3}$  to  $8.32 \times 10^{-5}$ ) from the May 2011 pumping test are not consistent with homogeneous conditions.<sup>807</sup> We disagree, based on the apparent consistency of the hydraulic parameters resulting from the pumping test analyses,<sup>808</sup> which are for values that OST agrees can often vary by an order of magnitude or more.<sup>809</sup> We also observe that the derived storativity values from the pumping test are within the range expected for a confined aquifer,<sup>810</sup> and agree with the Staff that the smoothness of the potentiometric surface, as shown in the pumping test results, indicates there are no significant changes in transmissivity that impact the groundwater flow in the BC/CPF aquifer.<sup>811</sup> It seems clear to us also that

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<sup>802</sup> See CBR Rebuttal Test. at 11 (Lewis, Nelson, Pavlick); Staff Rebuttal Test. at 25 (Back, Lancaster, Striz); Tr. at 491-94 (Kreamer).

<sup>803</sup> See Staff Rebuttal Test. at 25 (Back, Lancaster, Striz); CBR Rebuttal Test. at 11 (Lewis, Nelson, Pavlick).

<sup>804</sup> See Test. #8 Rep. at 11.

<sup>805</sup> See Staff Rebuttal Test. at 30 (Back, Lancaster, Striz) (citing Test #8 Rep. at 11).

<sup>806</sup> See Kreamer Rebuttal Test. at 2; Tr. at 940-41, 1021, 1024-25.

<sup>807</sup> See Kreamer Initial Test. at 6.

<sup>808</sup> See Test #8 Rep. tbls. app. at 10 of 10 (tbl. 8).

<sup>809</sup> See Tr. at 485-88 (Kreamer).

<sup>810</sup> See Staff Rebuttal Test. at 15 (Back, Lancaster, Striz) (citing Todd Text at 45-46 (stating that storativity values for a confined aquifer range between  $5 \times 10^{-5}$  and  $5 \times 10^{-3}$ )).

<sup>811</sup> See Staff Rebuttal Test. at 27 (citing Test #8 Rep. figs. app. at PDF 48 (fig. 16)).

well Monitor-3, which is only 100 ft from the pumping well for the May 2011 pumping test, was impacted by well effects. Consequently, we are persuaded by Dr. Striz's re-analysis of the information by matching with the later time data, which reflected values of transmissivity and a storage coefficient that are more in line with the other wells and indicative of a confined aquifer.<sup>812</sup>

Concerning Dr. Kreamer's specific claim that well Monitor-3 detected a preferential pathway for groundwater flow indicating leakage in the containment of the production zone,<sup>813</sup> we find the drawdown data for distant observation wells exhibited a more typical confined aquifer drawdown response than did the drawdown data for the pumping well (i.e., CWP-1A) or the observation wells that are close to the pumping well (i.e., CPW-1 and Monitor-3) and that these results show a late-time flattening of the drawdown data.<sup>814</sup> While it is Dr. Kreamer's position that this isolated flattening of the curve may be a recharge boundary indicative of leakage in the containment of the production zone, he presented no corroborating evidence supporting his position that the UCU is leaking sufficiently to jeopardize containment or prevent CBR from controlling its production fluids during operations and restoration. Certainly, as the Staff indicated, if there were a significant recharge boundary as alleged by Dr. Kreamer, it would be unlikely that the drawdown would have reached out to 8800 ft during the short period of time that the well was pumped.<sup>815</sup>

We also find that OST has provided no convincing evidence disputing the Staff's showing that well Monitor-3 was impacted by well effects during the early-time period, an effect OST agrees should not be ignored when selecting the portion of the drawdown curve to be evaluated.<sup>816</sup> We thus find that Staff witness Dr. Striz's re-analysis matching the Theis type-curves to the later time data was warranted and that the resulting transmissivity and storage coefficient values, as revised, are more in line with the other wells so as to be even more representative of a confined aquifer.<sup>817</sup>

Also, in its rebuttal testimony the Staff cited the Driscoll text in concluding that it is not necessary for the analytical assumptions in the Theis and Cooper-Jacob methods to be strictly met. We find the aquifer pumping test data provide no suggestion that any diversions existed sufficient to impact significantly the results and conclusions in the Applicant's conceptual model of the BC/CPF aquifer at the MEA such that CBR should not have employed the assumptions

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<sup>812</sup> See Tr. at 502-05, 530.

<sup>813</sup> See *supra* section V.A.1.b; Kreamer Initial Test. at 2.

<sup>814</sup> See Staff Rebuttal Test. at 19-20 (Back, Lancaster, Striz).

<sup>815</sup> See Tr. at 502 (Striz).

<sup>816</sup> See Tr. at 565-66 (Wireman).

<sup>817</sup> See Tr. 502-05, 530.

made during its pumping tests.<sup>818</sup> Furthermore, we observe that the May 2011 MEA aquifer pumping test was a multi-day test with a large ROI, which prompts us to concur with the Staff that this aquifer test averages the hydraulic behavior over the ROI, thereby minimizing the impact of small scale anisotropy and heterogeneity.<sup>819</sup>

When asked during the hearing to comment about the Staff's citation to Driscoll with regard to how well the homogeneity and isotropy assumptions need to be verified, Dr. Kreamer stated that he was familiar with the reference but indicated that Driscoll's comments are only relevant to well production from screened monitoring wells.<sup>820</sup> We find that his suggested criteria for applying Driscoll's comments is consistent with CBR's use of screened monitoring wells in gathering and analyzing the data from the May 2011 aquifer pumping test at the MEA.<sup>821</sup> And based on Driscoll, we conclude that CBR's calculation for the average hydraulic conductivity, as determined by the transmissivity derived from an analysis of the monitoring wells during the May 2011 pumping test, has proved reliable for predicting well performance. In addition, we find that the assumption of no stratification is not an important limitation in the confined BC/CPF aquifer with the fully or nearly fully penetrating monitoring wells that are open in the formation.<sup>822</sup>

Also at the hearing, Dr. Kreamer claimed there is a need to further characterize the homogeneity of the BC/CPF within the MEA with additional pumping tests to address the containment properties of these strata,<sup>823</sup> but he failed to explain how additional pumping tests in the production zone would generate these data. As a result, we find that Dr. Kreamer failed to provide any evidence to support this position nor did he show why or how efforts at an additional definition of homogeneity would demonstrably change CBR's understanding of the containment behavior of the MEA during operation and restoration.

Finally, we observe that there are two matters dealt with elsewhere in this decision that bear some relationship to the issues raised in the context of Dr. Kreamer's Opinion 4. Regarding the previously discussed impact of faults/frac-

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<sup>818</sup> See Staff Rebuttal Test. at 26 (Back, Lancaster).

<sup>819</sup> See *id.*

<sup>820</sup> See Tr. at 463.

<sup>821</sup> See *supra* note 756 and accompanying text.

<sup>822</sup> See *supra* section VII.A.8. We note as well that, because there is no evidence in the record indicating any attempt to apply Driscoll's comments in the context of Dr. Kreamer's "contaminant hydrology," we conclude that Driscoll's comments about the success of using the Theis method to evaluate heterogeneous/anisotropic aquifers seems to be in agreement with the Staff's acceptance of CBR's analysis of pumping test data at the MEA.

<sup>823</sup> See Tr. at 436-37, 440-41; *supra* section VII.A.5.

turing on the homogeneity/isotropy of the BC/CPF,<sup>824</sup> the Board found that (1) there is likely some degree of structural fracturing of the geologic strata underlying the MEA; (2) the mere presence of fractures is not the issue, rather the transmissivity of this feature is the critical factor; (3) there is no evidence in the hydrogeologic data that conclusively supports the presence of extensive, transmissive, heterogeneous fractures that would provide a preferential flow for contaminants; and (4) in the unlikely event that detrimental, transmissive fracturing were encountered during ISR activity within the MEA, the presence of such features would not be significant enough to lead to unsafe conditions based on the multiple signs of containment presented above.<sup>825</sup>

Similarly, Mr. Wireman's Opinion 3, alleging inadequacies with CBR's aquifer pumping test discussed previously,<sup>826</sup> can be summarized as follows: (1) Mr. Wireman failed to justify how more detailed hydrogeologic characterization with an additional pumping test of the surficial, unconfined Arikaree and Brule aquifers relates to the containment properties of the BC/CPF located hundreds of feet below the ground surface; (2) Crow Butte has addressed the basis for concluding that the aquifer pumping test is sufficient to characterize the portions of the site that would be affected by development of the first four mine units at Marsland,<sup>827</sup> and that additional pumping tests will be conducted within the MEA prior to opening new MU;<sup>828</sup> (3) there is no evidence of the hypothetical structural heterogeneities cited by Mr. Wireman, while the transmissivity and hydraulic conductivity near the pumped well is within a factor of two to four lower than the outlying monitor wells (with the exception of well Monitor-3, which is two to nine times lower than other monitor well locations) so as to suggest relative homogeneity;<sup>829</sup> (4) the subsurface characterization of the BC/CPF using the examination of cores and geophysical logging shows that there are no major features that would indicate significant heterogeneity at the MEA to the extent that they would impact the aquifer test analysis results, and the lack of significant heterogeneity is also reflected on the potentiometric surface of the BC/CPF aquifer, which is smooth and has an essentially flat and relatively constant hydraulic gradient.<sup>830</sup>

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<sup>824</sup> See *supra* section V.B.

<sup>825</sup> See *supra* sections V.B.2 and V.B.3.

<sup>826</sup> See *supra* section VI.B.3.a.

<sup>827</sup> See CBR Rebuttal Test. at 17-18 (Lewis, Nelson, Pavlick); see also *supra* section VII.A.5.a.

<sup>828</sup> See CBR Rebuttal Test. at 7-8 (Lewis, Nelson, Pavlick); Tr. at 438-39 (Shriver); CBR License Amend. 3, at 21 (License Condition 11.3.4).

<sup>829</sup> See CBR Rebuttal Test. at 17-18 (Lewis, Nelson, Pavlick).

<sup>830</sup> See Staff Rebuttal Test. at 27 (Back, Lancaster, Striz) (citing Test #8 Rep. at 5; Tech. Rep. Figs. at 113-16 (figs. 2.9-6a to -6d)).

## **E. Kreamer Opinion 5 — Analysis for Anisotropy**

### **1. Parties' Position on Kreamer Opinion 5 — Analysis for Anisotropy**

Dr. Kreamer in his Opinion 5 stated that “[r]igorous analyses for anisotropy were not demonstrated or undertaken for the EA or hydrologic report, and the nature of directional hydraulic conductivity differences remains undefined and not quantified, particularly in the vertical direction.”<sup>831</sup> Dr. Kreamer further argued that CBR’s claim (supposedly accepted in the Staff’s EA) that no anisotropy has been shown to exist in the MEA is flawed because it is based on the questionable results of the analysis presented in Figure 16 of the pumping test report.<sup>832</sup> According to Dr. Kreamer, rather than being a standard, serious, data-based evaluation, this figure used a technique not consistent with professional practice by incorporating two-dimensional hand-drawn contours derived from only a few data points to visually represent isotropy indicated by the uniform horizontal flow to the pumping well.<sup>833</sup>

Disputing Dr. Kreamer’s assertion in their rebuttal testimony, CBR witnesses Lewis, Nelson, and Pavlick clarified that drawdown data from all 11 monitoring wells were used to create the cone of depression at the end of the pumping test that is shown in the referenced figure.<sup>834</sup> Furthermore, CBR witness Lewis explained at the hearing that the contour lines in Figure 16 showing flow in a horizontal plane are not hand-drawn and are non-biased, having been created with the commercially-available computer contouring program SURFER.<sup>835</sup> CBR’s conclusion was that more detailed analyses of horizontal anisotropy are not necessary given the lack of a conceptual basis in the geometry of the drawdown cone.<sup>836</sup>

Along these lines, Staff witnesses Back, Lancaster, and Dr. Striz noted in their rebuttal testimony that if there were a significant anisotropy within the production zone, the aquifer test would have shown elliptical drawdown curves, a shape not apparent in the plot from the MEA aquifer pumping test results.<sup>837</sup> At the hearing, Dr. Kreamer agreed that if one considered the pump test data

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<sup>831</sup> Kreamer Initial Test. at 7.

<sup>832</sup> See *id.* Although Dr. Kreamer cited to “[EA] at 70 & 255” as support for his statement that the Staff accepted CBR’s argument of no anisotropy in the MEA, *id.*, assuming the citation is to PDF pages, we have been unable to find anything on those pages to support his statement. Also we note that because Concern 2 is limited to the consideration of safety matters, see *supra* note 5 and accompanying text, we consider Dr. Kreamer’s Opinion 5, to the degree it is based on EA references, in that context.

<sup>833</sup> See *id.*

<sup>834</sup> See CBR Rebuttal Test. at 12.

<sup>835</sup> See Tr. at 537-39.

<sup>836</sup> See CBR Rebuttal Test. at 12 (Lewis, Nelson, Pavlick).

<sup>837</sup> See Staff Rebuttal Test. at 29.



used to create the figure is sound, the figure does illustrate consistent isotropy in the horizontal plane.<sup>838</sup>

And in addition to declaring Dr. Kreamer provided no support for his assertion that further analysis of anisotropy is necessary to meet the aquifer pumping test's objectives, Staff witnesses Back, Lancaster, and Dr. Striz observed that anisotropy (and heterogeneity for that matter) is unrelated to the vertical containment of a production zone aquifer and is only important in meeting one of the objectives of the MEA aquifer pumping test, i.e., to show interconnectivity as it may affect the ability of the operator to balance the wellfields and maintain an inward gradient. In fact, according to these Staff witnesses, if there is any vertical anisotropy in the production zone aquifer, it would benefit ISR operations by creating a preferred horizontal flow within the sandstone aquifer.<sup>839</sup>

## **2. Board Findings on Kreamer Opinion 5 — Analysis for Anisotropy**

In his Opinion 5, Dr. Kreamer asserted that (1) directional differences in hydraulic conductivity for the BC/CPF remain undefined and not quantified, particularly in the vertical direction; and (2) CBR's claim of no anisotropy is based on a crude plot of limited pumping test data presented on a hand-drawn visual representation of isotropy that violates professional practice.<sup>840</sup> We cannot agree on either count. Figure 16 of the CBR pumping test analysis was created using the monitoring well network data and software-generated contours to create the non-biased horizontal flow patterns displayed in this figure from the pumping test result.<sup>841</sup> As shown, the drawdown contours from the May 2011 aquifer pumping test presented in the MEA aquifer pumping test report are far from the elliptical shape that would indicate significant directional hydraulic conductivity from lateral anisotropy.<sup>842</sup> With no dispute from Dr. Kreamer about what Figure 16 shows as drawn,<sup>843</sup> the plot illustrates near circular contour lines of potentiometric levels indicative of isotropic flow in a horizontal plane of the BC/CPF.<sup>844</sup> As a consequence, we find that CBR is justified in stating that, given lack of conceptual basis in the geometry of the drawdown cone, more detailed analyses of horizontal anisotropy are not necessary.<sup>845</sup> Dr. Kreamer, on the other hand, failed to provide any reasonable indication, to say nothing of

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<sup>838</sup> See Tr. at 539-40.

<sup>839</sup> See Staff Rebuttal Test. at 29.

<sup>840</sup> See Kreamer Initial Test. at 7.

<sup>841</sup> See CBR Rebuttal Test. at 12 (Lewis, Nelson, Pavlick); Tr. at 537-39 (Lewis).

<sup>842</sup> See Staff Rebuttal Test. at 27 (Back, Lancaster, Striz).

<sup>843</sup> See Tr. at 539-40.

<sup>844</sup> See Staff Rebuttal Test. at 29 (Back, Lancaster, Striz).

<sup>845</sup> See CBR Rebuttal Test. at 12 (Lewis, Nelson, Pavlick).

concrete evidence, that supports his assertion that anisotropy is not defined or quantified and that this lack of definition has a significant impact on the safe operation of the proposed Marsland ISR.

The Board also finds that the necessity of having horizontal isotropic conditions for safe MEA operation has not been justified by the Intervenor. We recognize that isotropy is likely needed to assure hydraulic interconnectivity to give a facility operator the ability to balance the wellfields and maintain an inward gradient. But we also find that anisotropy of the BC/CPF is unrelated to vertical confinement of the production zone aquifer controlled by the hydraulic characteristics of the UCU and LCU.<sup>846</sup> Staff witnesses were unchallenged when they noted that any vertical anisotropy that might exist within the BC/CPF sandstone aquifer will likely be beneficial for ISR operations because it creates the preferred horizontal flow.<sup>847</sup> Indeed, we find this Staff position consistent with Dr. Kreamer's recognition that with sandstones, there is usually greater hydraulic conductivity in the horizontal direction than in the vertical direction so as to result in preferential horizontal flow that is beneficial to CBR in controlling the vertical migration of production fluids.<sup>848</sup>

Given that anisotropy of the BC/CPF plays, at best, a minor role in the determination of the containment properties of the production zone (and may even help the operator control production fluids during operations and restoration), when combined with the Intervenor's scant evidence supporting its position that the Applicant needed to define directional differences in the hydraulic conductivity of the production zone to a greater degree, we conclude that the results of the May 2011 pumping test as reflected in the record before us were sufficient to indicate manageable anisotropy of the BC/CPF.

## **F. Kreamer Opinion 6 — Discontinuities in BC/CPF Thickness and Infinite Extent**

### ***1. Parties' Position on Kreamer Opinion 6 — Discontinuities in BC/CPF Thickness and Infinite Extent***

According to Dr. Kreamer's Opinion 6 (and the related portions of his Opinions 3 and 4),<sup>849</sup> both the Theis and Cooper-Jacob mathematical solutions employed in the MEA pumping test report require the same assumption that the BC/CPF sandstone aquifer is "of uniform effective thickness over the area in-

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<sup>846</sup> See Staff Rebuttal Test. at 29 (Back, Lancaster, Striz).

<sup>847</sup> See *id.*

<sup>848</sup> See Tr. at 544-46.

<sup>849</sup> See *supra* sections VII.C and VII.D.

fluenced by pumping,”<sup>850</sup> and is “confined and has apparent infinite extent.”<sup>851</sup> He claimed that these foundational requirements are not consistent with the data and evidence.<sup>852</sup>

*a. Thickness Variations*

Looking first at alleged variations in aquifer thickness, Dr. Kreamer testified that there are significant discontinuities in the thickness of the BC/CPF sandstone aquifer because the formation is not entirely horizontal nor of equal thickness and, like heterogeneity and anisotropy, these differences invalidate the Theis/Cooper-Jacob approach used to characterize the BC/CPF’s hydrological properties of transmissivity and storage coefficient.<sup>853</sup>

In their rebuttal testimony, Staff witnesses Back, Lancaster, and Dr. Striz contradicted Dr. Kreamer’s suggestion that the local geology is complex with significant discontinuities, stating that, based on CBR’s subsurface investigations, there is ample evidence that the local stratigraphy around the MEA is relatively uniform and uncomplicated.<sup>854</sup> In particular, according to these Staff witnesses, the site-specific and regional cross-sections provided by CBR show that the stratigraphic units, and specifically the BC/CPF, are relatively uniform in thickness over the site.<sup>855</sup> Furthermore, these Staff witnesses maintained that if there were significant heterogeneities, such as large variations in aquifer thickness over short distances, these variations would be apparent from the potentiometric surface mapping, which instead showed smooth contours that indicate relative homogeneity.<sup>856</sup>

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<sup>850</sup> Kreamer Initial Test. at 6 (quoting Test #8 Rep. at 11).

<sup>851</sup> *Id.* (quoting Test #8 Rep. at 11).

<sup>852</sup> *See id.*

<sup>853</sup> *See id.* at 7.

<sup>854</sup> *See* Staff Rebuttal Test. at 29 (citing Staff Initial Test. at 10-11, 24-25 (summarizing CBR’s subsurface investigations)).

<sup>855</sup> *See id.* at 29 (citing Staff Initial Test. at 12-13; Tech. Rep. Figs. at 49-62 (figs. 2.6-3a to -3n), 87-90 (figs. 2.6-21 to -24)). Relative to the cited TR figures 2.6-21 to 2.6-24 that present the geophysical logs of a series of wells that lie on a designated section line, the Board notes that these are drawn to a vertical exaggeration of 10. As other TR figures present the same information, albeit not at a constant exaggeration, *see* Tech. Rep. Figs. at 35-40 (figs. 3-8), 49-62 (figs. 2.6-3a to -3n), 68-70 (figs. 2.6-3r to -3t), this was likely done for figures 2.6-21 to 2.6-24 to better show the vertical stratification and geophysical information. While the vertical depths of the logs are to scale, upon closer inspection the wells are placed horizontally next to each other with the numeric interval distance labels between the logs, but with no apparent attempt to maintain any true scale of the horizontal distances between each well. As a result, there is still a vertical exaggeration, but it is not constant for these figures.

<sup>856</sup> *See* Staff Rebuttal Test. at 27, 29; *see also* Tech. Rep. Figs. at 113-17 (figs. 2.9-6a to -6d) (potentiometric surface maps).

In his review of CBR's geologic cross-sections, Dr. Kreamer concluded that while the lower boundary of the BC/CPF is rather flat, the upper boundary of the BC/CPF changes elevation repeatedly and fairly abruptly, causing these impermissible changes in aquifer thickness.<sup>857</sup> And according to Dr. Kreamer, the notable difference between the upper and lower boundary of the BC/CPF is not adequately explained by the Staff's conjecture in its EA that the lack of continual thickness of the BC/CPF Formation is due to the creation of paleo channels as the sediment was being deposited.<sup>858</sup> Staff witnesses Back, Lancaster, and Dr. Striz responded that Dr. Kreamer must have misunderstood the EA because his reference says nothing about the variation in thickness of the BC/CPF sandstone at (or near) the MEA.<sup>859</sup> According to these Staff witnesses, another section of the EA, which describes the thickness of the BC/CPF sandstone as ranging from 20 ft to 90 ft over the MEA, indicates these figures are based on site-specific cross-sections and geophysical logging.<sup>860</sup> This level of variation, these Staff witnesses asserted, is expected in sedimentary systems and, as pointed out by Driscoll, will not preclude obtaining reliable results from an aquifer pumping test because the assumption of constant thickness is not a serious limitation given that the variation in aquifer thickness within the cone of depression in most situations is relatively small, especially in sedimentary rocks such as the BC/CPF.<sup>861</sup>

In his rebuttal testimony, Dr. Kreamer repeated his claim that the MEA geologic strata are not of consistent thickness, nor are they entirely horizontal.<sup>862</sup> But when given the opportunity at the hearing to point out the cross-sections on which he based his opinion that there were abrupt changes in the upper boundary of the BC/CPF that led to thickness variations, Dr. Kreamer could not recollect what he used to reach this opinion.<sup>863</sup>

*b. Confinement and Lateral Extent*

Staff witnesses Back, Lancaster, and Dr. Striz also challenged Dr. Kreamer's allegations regarding the aquifer's lack of confinement and lateral extent by noting that the BC/CPF aquifer is a confined aquifer by definition because its

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<sup>857</sup> See Kreamer Initial Test. at 6 (citing Tech. Rep. Figs. at 67-69 (figs. 2.6-3s to -3u); Test #8 Rep. at PDF 35-40 (figs. 3-8)).

<sup>858</sup> See *id.* (citing EA at 3-28).

<sup>859</sup> See Staff Rebuttal Test. at 28.

<sup>860</sup> See *id.* (citing EA at 3-10).

<sup>861</sup> See *id.* at 26-27, 28 (citing Driscoll Text at 214); see also *supra* note 799 and accompanying text.

<sup>862</sup> See Kreamer Rebuttal Test. at 1.

<sup>863</sup> See Tr. at 469-71.

potentiometric surface rises above the top elevation of the aquifer.<sup>864</sup> At the hearing, Dr. Kreamer agreed that the BC/CPF is a confined aquifer, albeit, in his view, a leaky one.<sup>865</sup> Regarding the assumption of apparent infinite lateral extent, it was these Staff witnesses' opinion that the site-specific and regional cross-sections that are based on borehole data and geophysical logging demonstrate that the BC/CPF aquifer is present over the entire MEA site and well beyond.<sup>866</sup> This conclusion is also supported by the lack of boundary conditions observed during the aquifer pumping test, especially in the most distant observation wells.<sup>867</sup>

## **2. Board Findings on Kreamer Opinion 6 — Discontinuities in BC/CPF Thickness**

Dr. Kreamer alleged that the foundational requirements necessary for a Theis and Cooper-Jacob solution, i.e., a confined aquifer with uniform thickness over an apparent infinite extent, are violated at the MEA site.<sup>868</sup> Based on the evidentiary record before us, this Board finds that not to be the case.

### *a. Thickness Variations*

We agree with the Staff's position that there is ample evidence that the local stratigraphy around the MEA is relatively uniform and uncomplicated and, specifically, that the site-specific and regional cross-sections provided by CBR show the BC/CPF is relatively uniform in thickness over the site.<sup>869</sup> We also find that if there were significant variations in aquifer thickness, there would be some signs of deviations not evident from the smooth uniform contours presented in CBR's potentiometric surface maps.<sup>870</sup> While Dr. Kreamer in his Opinion 6 stated there are significant discontinuities in the thickness of the BC/CPF sandstone aquifer, he did not point to any specific examples of such discontinuities in those geologic cross-sections, other than his general reference to the geologic cross-sections presented in the CBR TR and pumping test report.

In citing cross-sections in the CBR TR and the pumping test report, Dr. Kreamer did indicate as part of his initial testimony that the upper boundary

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<sup>864</sup> See Staff Rebuttal Test. at 27 (citing Staff Initial Test. at 30).

<sup>865</sup> See Tr. at 451.

<sup>866</sup> See Staff Rebuttal Test. at 28 (citing Tech. Rep. Figs. at 49-62 (figs. 2.6-3a to -3n), 87-90 (figs. 2.6-21 to -24)).

<sup>867</sup> See *id.* (citing Test #8 Rep. at 13).

<sup>868</sup> See Kreamer Initial Test. at 6-7.

<sup>869</sup> See Staff Rebuttal Test. at 29 (Back, Lancaster, Striz).

<sup>870</sup> See *id.*

of the BC/CPF changes elevation repeatedly and fairly abruptly, causing impermissible variations in aquifer thickness for the purpose of employing the Theis and Cooper-Jacob methodologies. Yet, he offered this opinion without reference to specific locations on the geologic cross-sections where he considered the variation in BC/CPF thickness to exist.<sup>871</sup> Moreover, Dr. Kreamer's opinion in this regard did not address the effect vertical exaggeration in these cross-sections might have played in his conclusion that there were abrupt changes in the upper boundary of the BC/CPF, even when given the opportunity to do so at the hearing.<sup>872</sup>

In contrast, the Staff's SER describes the thickness of the BC/CPF sandstone as ranging from 20 ft to 90 ft over the MEA based on site-specific cross-sectional data and geophysical logging,<sup>873</sup> a level of variation expected in sedimentary systems consistent with Driscoll.<sup>874</sup> We thus conclude that this range of aquifer thickness will yield reasonably reliable results from an aquifer pumping test, such as that conducted in May 2011, because the assumption of constant thickness associated with the Theis and Cooper-Jacob distance drawdown methods is not a serious limitation, given that the variation in aquifer thickness within the cone of depression appears to be relatively small in the area of the BC/CPF aquifer pumping test.<sup>875</sup>

*b. Confinement and Lateral Extent*

Consistent with the definition of a "confined aquifer" recognized by Dr. Kreamer,<sup>876</sup> we conclude that the BC/CPF aquifer is a confined aquifer because its potentiometric surface rises above the top elevation of the aquifer.<sup>877</sup> Also, with respect to the issue of lateral extent, we find that the BC/CPF aquifer is present over the entire MEA site, and in fact goes well beyond the site limits, based on the site-specific regional cross-sections derived from borehole data

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<sup>871</sup> See Kreamer Initial Test. at 6 (citing Tech. Rep. Figs. at 67-69 (figs. 2.6-3s to -3u); Test #8 Rep. at PDF 35-40 (figs. 3-8)).

<sup>872</sup> See Tr. at 467-71 (Shriver, Kreamer). While we find that the visual representations on the geologic cross-sections in question may at times illustrate an apparent abrupt change in the upper surface of the BC/CPF, we also conclude that it is reasonably likely this is an artifact of the exaggerated scales of these graphs. See *supra* note 855. If drawn to true vertical and horizontal scale, the boundaries would appear flat and the thickness of the BC/CPF extremely thin, in some places possibly just the width of a pencil line. See Tr. at 468 (Shriver).

<sup>873</sup> See SER at 29.

<sup>874</sup> See Staff Rebuttal Test. at 28 (Back, Lancaster, Striz).

<sup>875</sup> See *id.* at 26-27 (Back, Lancaster, Striz).

<sup>876</sup> See Tr. at 451-52.

<sup>877</sup> See Staff Rebuttal Test. at 27 (Back, Lancaster, Striz) (citing Staff Initial Test. at 30).

and geophysical logging that is consistent with the lack of definitive boundary conditions observed during the aquifer pumping test.<sup>878</sup>

#### **G. Kreamer Opinion 7 — Analysis of Selected Pumping Test Data**

In his Opinion 7, Dr. Kreamer claimed that CBR had no justifiable basis for analyzing only a selected portion of the pumping data, which can bias the results by only considering a small area of the site through an arbitrary selection process. The Board finds that Opinion 7 is repetitive of the same allegation presented in Dr. Kreamer's Opinion 1, Basis B,<sup>879</sup> which, in turn, was a subject in our detailed discussion of the overarching issue regarding CBR's alleged misinterpretation of aquifer pumping test data.<sup>880</sup> Details of the parties' positions and the Board's findings on Dr. Kreamer's claim that CBR selected only portions of the pumping data during its analysis are provided above in sections V.A.1.b and V.A.2.b, respectively.

#### **H. Summary of Board Findings Regarding Concern 2 — Absence of Site Hydrogeology Description**

Exclusively as a safety matter, the Board reviewed all the initial and rebuttal testimony, as well as the hearing transcripts, relating to the absence of an adequate description of the site hydrogeology that is the subject of OST's Contention 2-associated Concern 2. Our detailed findings on each of Dr. Kreamer's seven Concern 2-related opinions (the first of which contains eight bases), which deal specifically with the May 2011 pumping test performed within the MEA and various test-related hydraulic characteristics of the BC/CPF aquifer, can be found in individual subsections of our Concern 2-related discussion. Within these findings, each of the eight bases proffered for Dr. Kreamer's first opinion dealing with the mischaracterization of the hydrogeologic description from the pumping test results is also addressed. As to each of the major topics, in summary we find that:

1. The challenge to CBR's efforts to properly define the MEA site hydrogeology, expressed in Dr. Kreamer's seven opinions (with Opinion 1 comprised of eight bases), covers several issues, including the aquifer pumping test, geologic cross-sections derived from site-specific investigations (including numerous borings, geophysical logs, and water-level

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<sup>878</sup> See *id.* at 28 (Back, Lancaster, Striz) (citing Test #8 Rep. at 13; Tech. Rep. Figs. at 67-69 (figs. 2.6-3s to -3u); Test #8 Rep. figs. app. at PDF 35-40 (figs. 3-8)).

<sup>879</sup> See *supra* section VII.A.2.

<sup>880</sup> See *supra* section V.A.

readings), and structural, potentiometric contour, and isopach mapping derived from CBR's field measurements.<sup>881</sup>

2. Although there is likely some degree of structural fracturing of the geologic strata underlying the MEA, the mere presence of fractures is not the issue; instead, the transmissivity of this feature is the critical factor and, in this regard, no evidence has been provided by OST demonstrating that there are sufficient preferential flow paths from any cause (including fractured flow) sufficient to alter the CBR and Staff conclusions that (a) containment within the BC/CPF provides isolation of the Arikaree/Brule aquifer from the production zone; (b) the BC/CPF is internally interconnected to allow CBR to control operational fluids injected into these strata during ISR operations and restoration; and (c) multiple pieces of evidence support the containment of the processing lixiviant within the production zone.<sup>882</sup>
3. Crow Butte's May 2011 regional aquifer pumping test was performed to address several objectives, including (a) demonstrating hydraulic communication (connection) within the BC/CPF Sandstone aquifer (production zone); (b) assessing the hydrological characteristics of the BC/CPF sandstone aquifer; (c) evaluating the presence or absence of hydraulic boundaries in the BC/CPF sandstone aquifer within the test area; and (d) demonstrating sufficient vertical containment to isolate the overlying Arikaree/Brule aquifer from the BC/CPF sandstone aquifer.<sup>883</sup>
4. The goals of the pumping test were achieved, with the pumping test report (a) providing the bases for demonstrating containment (i.e., hydraulic isolation) between the production zone and the overlying Arikaree/Brule aquifer as no drawdown was observed in the overlying Brule Formation observation wells during the test period; and (b) presenting drawdown data vs. time plots for each observation well, which determined that confined aquifer analytical methods were appropriate for the analysis of pumping test data.<sup>884</sup>
5. OST's claims that only selective portions of the data were analyzed are unsupported because all data points for all of the observation wells were presented in the drawdown and recovery response curves, while

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<sup>881</sup> See *supra* note 671 and accompanying text.

<sup>882</sup> See *supra* sections V.B and VI.B.2.

<sup>883</sup> See *supra* section V.A; see also CBR Initial Test. at 28 (Lewis, Nelson, Pavlick); Tech. Rep. at 2-82; EA at 3-31.

<sup>884</sup> See *supra* sections V.A and VI.B.3; see also CBR Rebuttal Test. at 4-6 (Lewis, Nelson, Pavlick).



CBR's rationale for analyzing the aquifer pumping test data was clearly explained by the Applicant in that, consistent with recommended practice, less weight should be given to the early-time pumping data for lack of theoretical representation due to well effects and the late-time deviation responses in the drawdown of two wells (attributed by OST to a lack of containment within the BC/CPF) could have been a result of three other causes (outlined in item 6 below) that would mimic the same response in the plots.<sup>885</sup>

6. While OST provided no corroborating evidence supporting its position that leakage through the UCU is of sufficient magnitude to jeopardize containment or prevent CBR from controlling its production fluids during operations and restoration, the CBR pumping test data, in conjunction with the CBR and Staff explanations about the source of late-time deviations detected at two well locations (i.e., higher transmissivities encountered at distances from the pumping well, additional water release from aquitard storage, and misinterpretation of wellbore storage/near-wellbore effects, all of which mimic recharge deviations in the Theis graphs), verified other multiple lines of evidence demonstrating the containment and connectivity properties of the BC/CPF.<sup>886</sup>
7. OST failed to provide credible evidence or expert opinion refuting the CBR conclusion (supported by the Staff) that the lack of a response in the Brule aquifer observation wells during the pumping test is evidence of containment within the BC/CPF aquifer provided by the thick, low-permeability UCU.<sup>887</sup>
8. OST failed to justify the need for any additional pre-licensing pumping testing efforts.<sup>888</sup>
9. The single pumping test in May 2011, which covered almost half of the MEA by monitoring nine wells in the BC/CPF and three wells in the overlying Brule aquifer, was never intended to be the sole source of site characterization information given (a) additional pumping tests will be performed prior to the startup of each MU; and (b) the information from the existing test is backed by other site-specific hydrogeologic data, including geological cross-sections and hydrogeologic isopach, structural contour, and potentiometric contour mapping based on the

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<sup>885</sup> See *supra* section V.A.2.b.

<sup>886</sup> See *supra* section V.A.2.b; see also section V.C and *infra* sections IX.A.2 and IX.B.2 for a summary of the site observations and characteristics that support BC/CPF aquifer containment.

<sup>887</sup> See *supra* section V.C.3.

<sup>888</sup> See *supra* section VII.A.5.b.

stratigraphic cuttings and geophysical logging of over 1600 boreholes drilled within the MEA.<sup>889</sup>

10. While all geologic strata exhibit heterogeneity and anisotropy at some scale, application of the Theis and Cooper-Jacob techniques is routinely done in practice with an understanding of the assumptions of homogeneity and isotropy inherent to their use, and CBR acknowledged that within the MEA, the BC/CPF is not homogeneous and isotropic on a local scale, but the assumptions of homogeneity and isotropy are reasonably satisfied over the scale of the BC/CPF pumping test.<sup>890</sup>
11. With the BC/CPF conforming to the definition of a confined aquifer, the assumptions of homogeneity, isotropy, and lateral extent of the BC/CPF aquifer underlying the MEA are reasonably satisfied and, consistent with Driscoll, can be treated for analytical purposes as homogeneous, isotropic, and of uniform thickness with infinite lateral extent.<sup>891</sup>
12. Offering no corroborating evidence of co-existing factors supporting its position that there is localized leakage of sufficient magnitude to impact the containment properties and internal interconnections of the aquifer so as to significantly impede CBR ability to control fluid migration within the BC/CPF, OST's claim that the flattening of the pumping test drawdown curve detected in two close wells indicates a recharge boundary from vertical leakage is not consistent with site observations, particularly given that other scenarios proffered by CBR and NRC Staff are consistent with many other MEA characteristics that support the Applicant's position that the fluids in the production zone are contained.<sup>892</sup>

### **VIII. CONCERN 3 — UNACCEPTABLE SITE HYDROLOGIC CONCEPTUAL MODEL (HCM)**

Concern 3 of OST Contention 2, as both a safety and environmental issue, deals with the alleged failures of (1) the Applicant to develop an acceptable HCM based on site characterization data; and (2) the Staff to evaluate properly, from an environmental perspective, the adequacy of this model in accordance

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<sup>889</sup> See *id.*

<sup>890</sup> See *supra* section VII.D.2.

<sup>891</sup> See *supra* sections VII.A.7.b, VII.D.2, and VII.F.2.

<sup>892</sup> See *supra* section V.C and *infra* sections IX.A.2 and IX.B.2 for a summary of these site observations and characteristics that support BC/CPF aquifer containment.

with section 2.7 of NUREG-1569.<sup>893</sup> According to this concern, an acceptable model is one that demonstrates (with scientific confidence) that the MEA's surface water hydrology and groundwater hydrogeology assure containment of extraction fluids and expected operational and restoration performance.<sup>894</sup>

OST witness Wireman challenged the adequacy of CBR's HCM directly in section 1 of his rebuttal testimony, as well as in a passing reference in his initial testimony, when challenging the specific structural geologic characterization of fractures/faults and the interpretation of aquifer pumping test results.<sup>895</sup>

This portion of our initial decision summarizes Mr. Wireman's initial and rebuttal testimony for Concern 3 that directly applies to the adequacy of CBR's HCM, the associated initial and rebuttal testimony from the Applicant and the Staff, and pertinent testimony from the evidentiary hearing.

#### **A. Parties' Positions on HCM**

Mr. Wireman directly contested CBR's HCM by alleging that (1) characterization of the structural geology is insufficient to develop an acceptable conceptual model of site hydrology that is adequately supported by site characterization data, primarily as a result of the Applicant's disregard for the fractures and

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<sup>893</sup> At the hearing, the Board's questions to the parties went beyond the HCM to encompass other models CBR used to help create the initial design of the site and to document the procedures necessary for safe and environmentally sound operation and restoration of the MEA ISR facility. *See* Tr. at 875-928 (Lewis, Shriver, Back, Lancaster, Kreamer). Specifically, in support of its development of the HCM, CBR also created a geologic stratification model, *see supra* section 4.2 for the undisputed geologic stratification model, and several numerical models to assist with analyzing (1) the potential impact from well casing leaks on irrigation water quality, *see* Tech. Rep. at 2-117 to -119, 3-25 to -27; (2) hydrologic containment under normal and extended facility shut-down scenarios, *see* Hydraulic Containment Report at 4; Tech. Rep. at 3-26 to -27; and (3) the impact of aquifer drawdown on surface and groundwater resources, *see* Ex. CBR017 (Tech. Rep. app. GG (AquiferTek, Re: Drawdown Impact Assessment, [MEA] (May 11, 2016)) [hereinafter Drawdown Impact Assessment]). While OST witnesses did not provide any written initial or rebuttal testimony regarding these numerical models, the Board asked questions at the hearing regarding the HCM and the details of the numerical models to better understand their use in the development of the Marsland license amendment application. Most, but not all, of the questions were directly related to the HCM, but those that were not nonetheless assisted the Board in acquiring background information to better understand CBR's process for preparing its application for this site. As the numerical models were not specifically contested in the Intervenor's initial or rebuttal written testimony for Concern 3, this decision only discusses the testimony proffered for these numerical models to the degree any of those models had an impact on the HCM as a mathematical aid in integrating HCM-related concepts.

<sup>894</sup> *See* LBP-18-3, 88 NRC at 53.

<sup>895</sup> *See* Wireman Rebuttal Test. at 1-2; Wireman Initial Test. at 3, 4. OST's other two witnesses, Dr. Kreamer and Dr. LaGarry, did not address the HCM, instead focusing on OST's claims regarding the aquifer pumping test, *see supra* section VII, and stratigraphic characterization, *see supra* section VI, respectively.

faults within the stratigraphy underlying the MEA;<sup>896</sup> (2) the May 2011 aquifer pumping test conducted at the MEA is inadequate for developing an acceptable site-wide conceptual hydrologic model as it does not adequately characterize the subsurface heterogeneity;<sup>897</sup> and (3) neither CBR's TR nor the Staff's EA contain sufficient data and information to develop an adequate conceptual model of site hydrology.<sup>898</sup> In addition to Mr. Wireman's testimony on this topic, CBR and the Staff also submitted initial, rebuttal, and hearing testimony describing their positions on the extent to which the Applicant's HCM meets the acceptance criteria of section 2.7.3 of NUREG-1569.<sup>899</sup>

Most, if not all, of the issues associated with the creation of the CBR's HCM were previously addressed as part of our Concern 1 discussion dealing with OST's allegations of an inadequate description of the affected environment for the Marsland site.<sup>900</sup> As context for this discussion of the HCM, presented below are the parties' positions regarding the generic components of HCM and a summary of MEA hydrology at issue in Contention 2, followed by the parties' positions relating to each of Mr. Wireman's opinions dealing with Concern 3.

### ***1. Parties' Positions on HCM Components and MEA Hydrology***

According to Staff witnesses Back, Lancaster, and Dr. Striz, a hydrologic conceptual model that is consistent with NUREG-1569 guidance includes descriptions of both surface water and groundwater hydrology. The description of the surface water hydrology includes the presence, characteristics, and behavior of regional and local surface water bodies, while the groundwater hydrogeology description discusses the presence and behavior of regional and local groundwater aquifers within the geologic setting of the proposed ISR facility.<sup>901</sup>

For surface water hydrology, the conceptual model includes watersheds and drainages; surface water feature types (e.g., streams, impoundments); size, and morphology (e.g., stream cross-sections); peak flow rates at storm recurrence intervals; flooding potential; typical seasonal ranges of surface water levels; seasonal surface water quality; and past, current, and anticipated surface water use. For groundwater hydrogeology, the conceptual model describes, among other things, regional and local groundwater aquifers, which includes hydrostratigra-

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<sup>896</sup> See Wireman Initial Test. at 3.

<sup>897</sup> See *id.* at 4.

<sup>898</sup> See Wireman Rebuttal Test. at 1-2.

<sup>899</sup> See CBR Initial Test. at 25-26, 38 (Lewis, Nelson, Pavlick); CBR Rebuttal Test. at 6-17 (Lewis, Pavlick, Shriver), 26 (Lewis, Nelson, Pavlick, Shriver); Staff Initial Test. at 22-41 (Back, Lancaster, Striz).

<sup>900</sup> See *supra* section VI.B.

<sup>901</sup> See Staff Initial Test. at 22-23 (citing NUREG-1569, at 2-20 to -26).

phy (i.e., depth and thickness of aquifers and aquitards); hydraulic properties of the aquifers/aquitards; aquifer potentiometric surfaces and hydraulic gradients; aquifer groundwater flow directions and magnitudes; preferential flow pathways; aquifer recharge/discharge areas; aquifer water quality; and past, current, and anticipated groundwater use.<sup>902</sup>

As is relevant to Contention 2, surface water hydrology for the HCM focused on identification of ephemeral drainages and a detailed description of the Niobrara River as the only significant water body in the region of the MEA, with no surface water impoundments, lakes, ponds, or other rivers identified within the proposed MEA license area.<sup>903</sup>

With regard to the hydrogeology of the MEA for the HCM, CBR in its TR presents the regional and local stratigraphic columns beneath the MEA that listed the aquifers at the site, including the shallow unconfined Arikaree/Brule aquifer and the deeper confined BC/CPF aquifer.<sup>904</sup> Within the MEA, the UCU for the BC/CPF includes up to 450 ft of clay-rich mudstone and siltstones of the middle and upper Chadron,<sup>905</sup> and as a result, the unconfined Arikaree/Brule aquifer is vertically and hydraulically isolated from the underlying BC/CPF aquifer. The LCU of the BC/CPF in the vicinity of the MEA consists of 750 ft or more of black marine shale deposits of the Pierre Shale, a non-water-bearing unit that exhibits very low permeability and is considered a regional aquiclude that hydraulically isolates the BC/CPF from underlying sandstones.<sup>906</sup>

In addition to this hydrostratigraphy, the Staff stated that the groundwater HCM includes an assessment of preferential flow paths, aquifer recharge/discharge, and aquifer water quality.<sup>907</sup> In this regard, the CBR TR references a potentiometric map and cross-sections of the BC/CPF as indicating a confined groundwater flow as a result of an elevated recharge zone that most likely is located west or southwest of the MEA.<sup>908</sup> In the vicinity of the MEA, groundwater flow in the basal sandstone of the Chadron Formation is predominantly to the northwest toward the White River drainage at a lateral hydraulic gradient of 0.0004 ft/ft. Regional water-level information for the BC/CPF sandstone of the Chadron Formation suggests a discharge point located past Crawford, pre-

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<sup>902</sup> See *id.*

<sup>903</sup> See Tech. Rep. at 2-77 to -78; 2-119 to -123; 2-128; 5-57 to -58; EA at 3-18 to -23; SER at 59-60.

<sup>904</sup> See Tech. Rep. at 2-84 (citing Tech. Rep. Tbls. at 62-63 (tbls. 2.6-1 to -2)).

<sup>905</sup> See *id.* (citing Tech. Rep. Figs. at 49-62 (figs. 2.6-3a to -3n), 74 (fig. 2.6-8)).

<sup>906</sup> See *id.* at 2-84 to -85.

<sup>907</sup> See Staff Initial Test. at 22-23 (Back, Lancaster).

<sup>908</sup> See Tech. Rep. at 2-86 (citing Tech. Rep. Figs. at 49-62 (figs. 2.6-3a to -3n), 113-16 (figs. 2.9-6a to -6d)).

sumably at a location where the basal sandstone of the Chadron Formation is exposed.<sup>909</sup>

In contrast, the CBR TR indicates the groundwater of the Arikaree/Brule Formation generally flows to the southeast across the entire MEA toward the Niobrara River at a lateral hydraulic gradient of 0.011 ft/ft. Though the Arikaree/Brule aquifer is the primary groundwater supply in the vicinity of the MEA, low production rates indicate that the discontinuous sandstone lenses may not be fully connected hydraulically. Recharge to the Arikaree/Brule likely occurs directly within the MEA, as the unit is overlain by 0 to 30 ft of unconsolidated alluvial deposits. At the MEA, groundwater elevations for the Arikaree/Brule aquifer are distinctly different from those of the BC/CPF.<sup>910</sup> The available water-level data suggest hydrologic isolation of the BC/CPF with respect to the overlying water-bearing intervals in the MEA.<sup>911</sup>

According to Staff witnesses Back and Lancaster, the above descriptions of the conceptual models for surface water hydrology and groundwater hydrogeology are consistent with the regulatory guidance of NUREG-1569.<sup>912</sup> Of these components, Mr. Wireman's testimony focused on (1) characterization of the structural geology relating to fractures and faults within the stratigraphy underlying the MEA; (2) the May 2011 aquifer pumping test conducted at the MEA; and (3) characteristics of regional hydrology associated with sources of groundwater recharge and discharge, groundwater flow in the BC/CPF underlying the MEA, perimeter groundwater monitoring wells, description of surface water hydrology, and groundwater baseline restoration wells.<sup>913</sup>

Seeking to counter Mr. Wireman's allegation that the Applicant failed to develop an HCM based on site characterization data and that the Staff failed adequately to consider the HCM in its EA for the proposed MEA license amendment, CBR quotes portions of NUREG-1569 section 2.7.3 in setting forth the six criteria that must be met for acceptance as an adequate HCM.<sup>914</sup> Of those six criteria, Mr. Wireman's testimony challenging CBR and Staff attempts to show compliance with these regulatory guidance items seems to rely primarily on two criteria: (1) Criterion 1, stating that the Applicant is to characterize surface-water bodies and drainages within the proposed facility and affected surroundings and identify the interconnection between surface water and groundwater; and (2) Criterion 3, stating that the Applicant will describe the local and re-

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<sup>909</sup> *See id.*

<sup>910</sup> *See id.* (citing Tech. Rep. Figs. at 49-62 (figs. 2.6-3a to -3n); Tech. Rep. Tbls. at 114 (tbl. 2.9-7)).

<sup>911</sup> *See id.*

<sup>912</sup> *See* Staff Initial Test. at 16-17.

<sup>913</sup> *See* Wireman Initial Test. at 3, 4; Wireman Rebuttal Test. at 1-2.

<sup>914</sup> *See* CBR Initial Test. at 9-11 (Lewis, Nelson, Pavlick) (quoting NUREG-1569, at 2-23 to -26).

gional hydraulic gradient and hydrostratigraphy, including, but not limited to, (a) subsurface water-level measurements; (b) potentiometric maps presenting hydraulic gradient data, potentiometric levels, and water-surface elevations; (c) hydrogeologic cross-sections for illustrating the interpreted hydrostratigraphy; and (d) hydraulic parameters.

The parties' positions and the Board's findings on Mr. Wireman's claims regarding these criteria as they relate to Concern 1 were already covered in detail above, *supra* section VI.B. References explaining how these positions may apply to Concern 3 are presented in the next section. After offering our findings on CBR's and the Staff's attempts to show that the NUREG-1569 acceptance criteria for an HCM have been met relative to CBR's application, in subsequent sections we present our findings on NUREG-1569 Criteria 1 and 3.

## ***2. Parties' Positions on HCM — Structural Geology Characterization***

Mr. Wireman presented his position dealing with the characterization of the structural geology in Opinion 2 of his initial testimony and in his rebuttal testimony, which has already been discussed in this decision in section VI.B.2, referencing the overarching issue of heterogeneity from fracturing/faulting in section V.B, and is not repeated here.

## ***3. Parties' Positions on HCM — Aquifer Pumping Test***

Mr. Wireman presented his position dealing with the May 2011 aquifer pumping test in Opinion 3 of his initial testimony and in his rebuttal testimony, which has already been discussed, along with the CBR and Staff initial and rebuttal testimony and the parties' hearing testimony, in this decision in section VI.B.3, as it references the overarching issue of misinterpretation of aquifer pumping test data in section V.A, and so is not repeated here.

## ***4. Parties' Positions on HCM — CBR and Staff Insufficient Data and Information on Regional Hydrogeology and Groundwater Flow***

Other issues raised by the Intervenor regarding regional hydrogeology and groundwater flow aspects of the Applicant's HCM were already discussed in this decision in section VI.B relative to Mr. Wireman's Concern 1B and include:

- Recharge sources and discharge locations of the BC/CPF aquifer (section VI.B.1.a);
- Downgradient MEA BC/CPF groundwater flow (section VI.B.1.b);
- Perimeter groundwater monitoring wells (section VI.B.1.c);

- Surface water hydrology (section VI.B.1.d); and
- Groundwater baseline restoration wells (section VI.B.1.e).

Mr. Wireman's position, as well as those of CBR and the Staff, is delineated in each of the above referenced sections and so will not be repeated herein.

## **B. Board Findings on HCM**

As was noted above, in its initial testimony CBR quotes portions of NUREG-1569 section 2.7.3 that it asserts set forth the review and acceptance criteria to be met for providing an adequate HCM.<sup>915</sup> Of the six acceptance criteria, Mr. Wireman's testimony challenging CBR and Staff compliance with this regulatory guidance appears to apply only to two criteria: Criterion 1, which establishes that the Applicant is to characterize surface-water bodies and drainages within the proposed facility and affected surroundings and identify the interconnection between surface water and groundwater; and Criterion 3, which indicates that the Applicant will describe the local and regional hydraulic gradient and hydrostratigraphy including, but not limited to, (a) subsurface water-level measurements; (b) hydraulic parameters; (c) potentiometric maps presenting hydraulic gradient data; potentiometric levels, and water-surface elevations; and (d) hydrogeologic cross-sections for illustrating the interpreted hydrostratigraphy.<sup>916</sup> After offering below our general findings on the CBR and Staff attempts to meet the acceptance criteria for an HCM, in the subsequent sections we present our findings about each of the contested criteria.

### ***1. Board Findings on Addressing NUREG-1569 Acceptance Criteria***

As a general matter, relative to Contention 2, Concern 3, the Board finds that CBR and the Staff have provided sufficient information to meet the NUREG-1569 section 2.7.3 acceptance criteria regarding the adequacy of site geology and hydrogeology descriptions as they relate to the containment properties of the BC/CPF aquifer and the aquifer's ability to control the groundwater flow of production fluids. This is apparent from the extensive presentation concerning the Applicant's conceptual model of site hydrology presented in section 2.7.2.3 of its TR, which also was discussed in section 2.4 of the Staff's SER and was summarized in CBR's initial and rebuttal testimony.<sup>917</sup> Besides the Staff's

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<sup>915</sup> See CBR Initial Test. at 9-11 (Lewis, Nelson, Pavlick) (quoting NUREG-1569, at 2-23 to -24).

<sup>916</sup> See *id.* at 9-10 (Lewis, Nelson, Pavlick).

<sup>917</sup> See Tech. Rep. at 2-84 to -87; SER at 45-58; CBR Initial Test. at 25-26 (Lewis, Nelson, Pavlick); CBR Rebuttal Test. at 16-17 (Lewis, Shriver, Pavlick).



SER description of CBR's HCM, we find that most of section 3.2, "Geology, Soils, and Seismology," and section 3.3 "Water Resources," in the Staff's EA provide the fundamental understanding of the site's geology, hydrology, and hydrogeology that is foundational to the MEA HCM as challenged by OST in Contention 2.<sup>918</sup> The Board also concludes that CBR's HCM is supported by a plethora of site characterization data provided in its TR's tables,<sup>919</sup> maps,<sup>920</sup> and appendices.<sup>921</sup>

As the Staff noted, an applicant must provide sufficient information in its HCM to demonstrate containment of the production zone aquifer.<sup>922</sup> In meeting the regulatory guideline acceptance criteria, the Board finds that a key aspect of the Staff's safety and environmental reviews for ISR facilities is the applicant's demonstration of the containment and interconnectivity of the production zone aquifer. In the Staff's safety review, an applicant's demonstration of containment directly impacts its ability to ensure that production fluids can be controlled within the production zone of the host aquifer, while in the Staff's environmental review, the demonstration of containment directly influences the evaluation of potential impacts to surface water and groundwater resources.<sup>923</sup>

In its review of the MEA application, the Staff concluded that CBR's hydrologic conceptual model for the MEA is supported by extensive and reliable site characterization data from CBR's comprehensive subsurface investigation of the MEA. These data include geophysical logs and observations of drill cuttings that provide data on the thickness, extent, and continuity of stratigraphic units; cross-sections covering the entire MEA site constructed using data from 57 boreholes; isopach maps and structure contour maps created using borehole

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<sup>918</sup> See EA at 3-5 to -36.

<sup>919</sup> See, e.g., Tech. Rep. Tbls. at 62-63 (tbls. 2.6-1 to-2) (presenting MEA-vicinity regional and local stratigraphic columns).

<sup>920</sup> See, e.g., Tech. Rep. Figs. at 48-69 (figs. 2.6-2a to -3u) (MEA geologic structural cross-sections), 72-75 (figs. 2.6-6 to -9) (isopach thickness contour maps), 76-79 (figs. 2.6-10 to -13) (structural surface elevation contour maps), 87-90 (figs. 2.6-21 to -24) (regional geologic cross-sections), 109-16 (figs. 2.9-4a to -6d) (MEA potentiometric surface elevations).

<sup>921</sup> See, e.g., Initial Well Impact Analysis; Revised Well Impact Analysis; Hydraulic Containment Report; Ex. CBR015 (Tech. Rep. app. EE (Kozeny-Carman Calculations)); Test #8 Rep.; Drawdown Impact Assessment; Ex. CBR018 (Tech. Rep. app. HH (J. Shriver, Final Report, Deep Brule Monitor Well Installation Program, MEA, Dawes Cty., Neb. (May 3, 2017))); Ex. CBR019 (Tech. Rep. app. K-1 (Arcadis, U.S., Inc., Hydrologic and Erosion Study, MEA (Apr. 12, 2012))); Ex. CBR020 (Tech. Rep. app. K-2 (Arcadis, U.S., Inc., Hydrologic and Flood Study, MEA (May 2013))); Ex. CBR031 (Tech. Rep. app. G-1 (Mineralogy, Inc., Test Rep. (June 6, 2011)) (providing mineralogical and particle size distribution test results)); Ex. CBR032 (Tech. Rep. app. G-2 (Letter from Michael Mark Brady, PTS Labs., Inc., to Wade Beins, CBR (Oct. 10, 2013)) (providing mineralogical and particle size distribution test results)).

<sup>922</sup> See Staff Initial Test. at 27-28 (Back, Lancaster, Striz).

<sup>923</sup> See *id.*

data; and physical and chemical properties of the overlying aquifers, upper and lower confining units, and production zone aquifer based on drill cuttings and analysis of core samples from over 1600 boreholes drilled within the MEA, and over 2100 boreholes drilled within the 2.25-mile radius of the MEA's AOR.<sup>924</sup>

Based on this extensive volume of work and the pertinent data amassed, the Board finds that CBR has provided the necessary hydrologic and hydrogeologic characterization of the MEA based on the extensive field data necessary for a scientifically sound HCM of the MEA and that the Staff has appropriately incorporated this model into its assessment of potential environmental impacts from operation and restoration of the MEA site.

## **2. Board Findings on Structural Geology Aspects of Fractures/Faults**

Detailed discussion of the Board's findings dealing with the structural geology aspects of fractures/faults and the impacts of the Pine Ridge escarpment on groundwater flow beneath the MEA have been presented previously,<sup>925</sup> and will not be repeated here except as the following summary of the findings that relate to the HCM: (1) there is likely some degree of structural fracturing of the geologic strata underlying the MEA, but the mere presence of fractures is not the issue, the transmissivity of such features being the critical factor; (2) based on structure contour maps derived from field data and groundwater potentiometric maps that used measured water levels to establish the contour flow maps documenting a constant northwest flow along the axis of the MEA, the Pine Ridge escarpment impacts groundwater flow in the Arikaree/Brule aquifer, but not in the deep BC/CPF aquifer; and (3) erosion surface contours illustrate that the surficial formations have been significantly eroded on the north side of the Pine Ridge escarpment as compared to the south side where the MEA is proposed.

Based on these conclusions and others presented in the above-referenced sections, we find that the Intervenor failed to establish that CBR's characterization of the MEA's structural geology and subsurface heterogeneity is insufficient. Rather, a clear preponderance of the evidence demonstrates that CBR's conceptual model of site hydrology is sufficiently supported by the MEA-acquired site characterization data (including that related to the structural geologic aspects of fractures/faults generally and, more specifically, the impacts of the Pine Ridge escarpment on groundwater flow) to establish an acceptable site-wide HCM.

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<sup>924</sup> See *id.* at 24-26 (Back, Lancaster) (citing Tech. Rep. at 3-7; ER at 3-6).

<sup>925</sup> See *supra* section VI.B.2 (citing section V.B).

### **3. Board Findings on MEA Aquifer Pumping Test**

Detailed discussion of the Board's findings dealing with the MEA aquifer pumping test have been presented previously,<sup>926</sup> and again are not repeated here except as the following summary of the findings that relate to the HCM: (1) CBR has adequately explained why the May 2011 aquifer pumping test was sufficient to characterize the portions of the site that would be affected by development of the first four MUs at Marsland;<sup>927</sup> (2) in its call for more pre-licensing testing for the Arikaree/Brule aquifer, because of what the Tribe asserted are the indications of significant heterogeneity, OST failed to justify how additional definition of the hydraulic properties of the Arikaree/Brule aquifer relates to the containment properties of the BC/CPF located hundreds of feet below the ground surface; (3) additional pumping tests will be conducted by CBR within the MEA prior to opening each new MU;<sup>928</sup> (4) subsurface characterization of the BC/CPF using the examination of cores and geophysical logging shows that there are no major impermeable or permeable features that would indicate significant heterogeneity at the MEA;<sup>929</sup> and (5) lack of significant heterogeneity is also reflected by a consistently smooth, nearly flat hydraulic gradient of the BC/CPF aquifer's potentiometric surface.<sup>930</sup>

The Board concludes that while the BC/CPF may not be homogeneous and isotropic on a local scale,<sup>931</sup> the assumptions of homogeneity and isotropy are reasonably satisfied over the scale of the BC/CPF pumping test.<sup>932</sup> Based on these factors, the Board concludes that the BC/CPF formation underlying the MEA can be treated as homogeneous and isotropic for analytical purposes.<sup>933</sup>

### **4. Board Findings on Regional Groundwater Flow**

Our previous findings on regional groundwater flow focused on OST's indirect challenges dealing with issues that include recharge sources and discharge locations of the BC/CPF aquifer; downgradient MEA BC/CPF groundwater flow; perimeter groundwater monitoring wells; surface water hydrology; and groundwater baseline restoration wells. Because each of these topics is associ-

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<sup>926</sup> See *supra* section VI.B.3 (citing section V.A).

<sup>927</sup> See CBR Rebuttal Test. at 17-18 (Lewis, Nelson, Pavlick); see also *supra* section VII.A.5.a.

<sup>928</sup> See CBR Rebuttal Test. at 7-8 (Lewis, Nelson, Pavlick), Tr. at 438-39 (Shriver); see also CBR License Amend. 3, at 21 (License Condition 11.3.4).

<sup>929</sup> See Staff Rebuttal Test. at 27 (Back, Lancaster, Striz) (citing Test #8 Rep. at 5).

<sup>930</sup> See *id.* (citing Tech. Rep. Figs. at 113-16 (figs. 2.9-6a to -6d)).

<sup>931</sup> See *id.* at 30 (Back, Lancaster, Striz); Test #8 Rep. at 11.

<sup>932</sup> See *supra* sections V.A and VII.D.

<sup>933</sup> See Test #8 Rep. at 11.

ated with Concern 3 relative to its potential effect on the development of the HCM, we address each in the sections below.

*a. Board Findings on Recharge/Discharge Zones*

Detailed discussion of the Board's findings dealing with the recharge sources and discharge locations of the BC/CPF aquifer has been presented above,<sup>934</sup> and is not repeated here except as the following summary of the findings that relate to the HCM: (1) contrary to OST's claim that CBR failed to discuss this topic in its application,<sup>935</sup> sources of recharge/discharge of groundwater in the BC/CPF are presented in CBR's TR as well as in the Staff's EA;<sup>936</sup> (2) locations of the discharge and recharge areas were based on the potentiometric maps and geologic cross-sections of the BC/CPF derived from actual field data and backed by a conceptual map that pictorially represents the flow regime from south of the MEA toward the northwest;<sup>937</sup> (3) CBR's theory of BC/CPF recharge and discharge plausibly claims that recharge occurs as direct infiltration where the formation is exposed above an elevation of 3715 ft amsl at distant locations west and south of the MEA, that discharge currently occurs from pumped wells at the existing CBR ISR facility and to flowing wells located near the town of Crawford, and that, prior to the existing CBR ISR facility's development, discharge occurred to the tributaries north of Crawford and by evapotranspiration in drainages east and north of Crawford where the BC/CPF is exposed at or near the surface;<sup>938</sup> and (4) confined conditions exist at the MEA as a result of an elevated recharge zone most likely located west or southwest of the MEA,<sup>939</sup> but such distant recharge and discharge areas will not affect the behavior of the BC/CPF aquifer at the MEA.<sup>940</sup>

While OST advocated for more refinement of the recharge and discharge locations of the BC/CPF, the Board finds that OST has not justified the need for such supplemental studies because it has failed to provide any evidence indicating that the refinement would have any impact on the conclusions reached in the CBR TR and the Staff EA. Furthermore, the acceptance criteria in NUREG-1569 do not require a higher level of detail on the discharge and recharge zones

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<sup>934</sup> See *supra* section VI.B.1.a.ii.

<sup>935</sup> See Wireman Initial Test. at 2.

<sup>936</sup> See Tech. Rep. at 2-86; EA at 3-23 to -24.

<sup>937</sup> See Tech. Rep. at 2-86; EA at 3-23 to -24, 3-29 (fig. 3-8); CBR Initial Test. at 33-34 (Lewis, Nelson, Pavlick); CBR Rebuttal Test. 13-14 (Lewis, Nelson, Pavlick, Shriver); Staff Rebuttal Test. at 2-3 (Back, Lancaster, Striz).

<sup>938</sup> See CBR Rebuttal Test. at 13 (Lewis, Nelson, Pavlick, Shriver).

<sup>939</sup> See CBR Initial Test. at 33 (Lewis, Nelson, Pavlick).

<sup>940</sup> See CBR Rebuttal at 13 (Lewis, Nelson, Pavlick, Shriver).

of the production aquifer than what has already been provided by the Applicant. As a result, based on the evidentiary record before us, we conclude that CBR's description of discharge and recharge zones in its TR is adequate to meet the applicable NUREG-1569 criteria and that CBR's definition of recharge and discharge areas of the BC/CPF is sufficiently supported by the site characterization data acquired at the MEA to establish an acceptable site-wide HCM.

*b. Board Findings on Downgradient BC/CPF Flow*

A detailed discussion of the Board's findings addressing the downgradient BC/CPF flow has been presented previously,<sup>941</sup> and is not repeated here except as the following summary of the findings that relate to the HCM: (1) while OST stated that there is no discussion supporting the lack of effect by the Pine Ridge escarpment on groundwater flow in the BC/CPF aquifer,<sup>942</sup> both the conceptual map<sup>943</sup> and the plots of potentiometric levels and cross-sections of the BC/CPF<sup>944</sup> clearly indicate uniform northwesterly BC/CPF groundwater flow from recharge areas farther south of Dawes County, then northwesterly through the MEA and the existing CBR ISR facility until historically discharging where erosion has exposed this formation on the land surface north of Crawford;<sup>945</sup> (2) groundwater in the Arikaree/Brule aquifer flows to the southeast across the MEA toward the Niobrara River at a lateral hydraulic gradient of 0.011 ft/ft,<sup>946</sup> while groundwater in the BC/CPF flows to the northwest through the MEA at a lateral hydraulic gradient of 0.0004 ft/ft,<sup>947</sup> a showing about which OST provides no conflicting evidence; (3) notwithstanding OST's doubts that the Pine Ridge escarpment affects the Brule formation but not the BC/CPF,<sup>948</sup> the structural upheaval associated with the Pine Ridge escarpment did not affect the deposition of the BC/CPF and the overlying formations because the BC/CPF, middle and upper Chadron, and Brule and Arikaree formations were deposited during the same period of time as the structural deformation and, subsequently, erosion occurred on the north side to create the different flow directions in the Arikaree/Brule aquifer while maintaining the northwesterly flow in the deeper BC/CPF aquifer;<sup>949</sup> and (4) the lack of impact from the Pine Ridge escarpment

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<sup>941</sup> See *supra* section VI.B.1.b.ii.

<sup>942</sup> See Wireman Initial Test. at 2-3.

<sup>943</sup> See EA at 3-29 (fig. 3-8); Conceptual Flow Model Diagram.

<sup>944</sup> See Tech. Rep. Figs. at 49-63 (figs. 2.6-3a to -3n), 113-16 (figs. 2.9-6a to -6d).

<sup>945</sup> See EA at 3-27.

<sup>946</sup> See Tech. Rep. at 2-86 (citing Test #8 Rep.).

<sup>947</sup> See *id.*; Tech. Rep. Figs. at 109-12 (figs. 2.9-5a to -5d).

<sup>948</sup> See Tr. at 616 (Wireman).

<sup>949</sup> See Tr. at 619-20 (Shriver).

is backed by the existence of nearly flat, intact upper and lower Whitney ash layers, which are marker beds within the Chadron Formation that were not displaced across the escarpment as shown on the geophysical logs making up the geologic cross-sections.<sup>950</sup>

The field evidence of differing groundwater flow directions in the Arikaree/Brule and BC/CPF is consistent with CBR's conceptual model showing southeast flow in the overlying Arikaree/Brule aquifer through the MEA, but northerly flow in these aquifers north of the Pine Ridge escarpment, while flow in the BC/CPF is north-northwest from the Niobrara River through the MEA and the existing CBR ISR facility to north of Crawford. These observations clearly indicate a flow divide exists between the existing facility and the MEA in the shallow aquifers due to significant recharge to the shallow formations exposed along the Pine Ridge escarpment.<sup>951</sup>

As a consequence, we find that the CBR TR description of downgradient flow in the BC/CPF is adequate to meet the applicable NUREG-1569 criteria, and is sufficiently supported by the site characterization data acquired at the MEA to establish an acceptable site-wide HCM.

*c. Board Findings on Perimeter Groundwater Monitoring Wells*

A detailed discussion of the Board's findings addressing the perimeter groundwater monitoring wells has been presented above,<sup>952</sup> and is not repeated here except as the following summary of the findings that relate to the HCM: (1) before the start of operations in each MU, perimeter monitoring wells will be installed in the BC/CPF and in the Arikaree/Brule aquifer to detect potential lateral and vertical migration of production fluids;<sup>953</sup> (2) two additional monitoring wells will be placed further downgradient of the perimeter wells to measure water levels needed to track drawdown in the mineralized zone;<sup>954</sup> and (3) while the upgradient and downgradient monitoring wells will only be installed as the ISR extraction process extends into a new MU, no OST evidence was proffered on the need to install the wells as part of the licensing process or how the use of the monitoring wells is diminished by waiting to install them until the pre-operational period.

The Board finds that delaying the installation of monitoring wells until just

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<sup>950</sup> See Tr. at 629-30 (Shriver).

<sup>951</sup> See CBR Rebuttal Test. at 14 (Lewis, Nelson, Pavlick) (citing Conceptual Flow Model Diagram; EA at 3-29 (fig. 3-8)).

<sup>952</sup> See *supra* section VI.B.1.c.ii.

<sup>953</sup> See CBR Rebuttal Test. at 14-15 (Lewis, Nelson, Pavlick).

<sup>954</sup> See EA at 4-22; CBR License Amend. 3, at 2 (cross-reference table for Amendment 3), 17 (License Condition 11.1.5).

prior to the start of each MU will have no real effect on their ability to (a) detect changes in the potentiometric surface downgradient of the MUs; (b) indicate unwanted changes in aquifer discharge; or (c) quantify potential contamination of downgradient groundwater. With the installation and sampling of the perimeter monitoring wells dictated by several license conditions imposed by the Staff, the Board finds that these perimeter monitoring wells will be sufficient to identify potential vertical and lateral migration of production fluids, and to assess inward hydraulic gradients during the operation and restoration of the facility. As a result, we find that CBR's description of perimeter groundwater monitoring wells in the BC/CPF in its TR is adequate to meet the applicable NUREG-1569 criteria so as to establish an acceptable site-wide HCM.

*d. Board Findings on Surface Water Hydrology*

A detailed discussion of the Board's findings addressing CBR's description of surface water hydrology has been presented previously,<sup>955</sup> and is not repeated here except as the following summary of the findings that relate to the HCM: (1) while OST claimed there was no data or information on surface water hydrology at the MEA in the Marsland license application,<sup>956</sup> the CBR TR, and the Staff EA and SER provide extensive information relating to surface water hydrology at the MEA, with the narrative provided by the Applicant and the Staff characterizing surface-water bodies and drainages within the MEA licensed area and affected surroundings, and providing maps identifying the location, size, shape, hydrologic characteristics, and uses of surface-water bodies near the MEA area,<sup>957</sup> which resulted in the conclusion that the only significant water body near the MEA is the Niobrara River;<sup>958</sup> (2) CBR thoroughly reviewed surface water studies on the Niobrara River performed by NDNR and NDEQ and summarized the hydrology of this river, as well as CBR's baseline sampling and proposed monitoring program during MEA ISR activities;<sup>959</sup> (3) in contrast to OST's allegations, the two major ephemeral drainages that traverse the MEA license area north to south were discussed, seven sampling points in the channel bottom were selected on these drainages to measure radiological concentrations in the sediment, and sediments from these collection points were sampled twice for baseline values;<sup>960</sup> (4) water was not present in the ephemeral drainages, thus

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<sup>955</sup> See *supra* section VI.B.1.d.ii.

<sup>956</sup> See Wireman Initial Test. at 3.

<sup>957</sup> See Tech. Rep. at 2-77 to -78, 2-119 to -123, 2-128, 5-57 to -58; EA at 3-18 to -23; SER at 59-60.

<sup>958</sup> See Tech. Rep. at 2-77.

<sup>959</sup> See *id.* at 2-120 to -122.

<sup>960</sup> See *id.* at 2-128.

preventing water sample collection, but if water flow becomes available prior to MEA startup, baseline water samples will be collected;<sup>961</sup> (5) a detailed discussion of Niobrara River and existing monitoring programs on this surface water body was provided in CBR's TR;<sup>962</sup> (6) two water quality sampling locations were located on the Niobrara River to detect potential impacts from either of the two major ephemeral drainages as they drain the MEA and connect to the Niobrara River between the two drainage points;<sup>963</sup> (7) quarterly water quality samples of the Niobrara River will be taken at the two designated locations, as will samples from the main drainage channel at the seven designated locations of the ephemeral drainages whenever sufficient flow is available for sampling.<sup>964</sup>

As a result of these and other findings on surface water hydrology, the Board concludes that CBR's description of surface water hydrology in its TR is adequate to meet the applicable NUREG-1569 criteria so as to establish an acceptable site-wide HCM.

*e. Board Findings on Baseline Restoration Wells*

Detailed discussion of the Board's findings dealing with the baseline restoration wells have been presented previously,<sup>965</sup> and so are not repeated here except as the following summary of the findings that relate to the HCM: (1) as OST asserted, wells for baseline monitoring have not been selected and no data are provided by CBR or the Staff regarding background concentrations for applicable constituents;<sup>966</sup> (2) the baseline monitoring wells will be installed before initiating operations of a new MU,<sup>967</sup> and there has been no convincing evidence or testimony presented justifying why these wells should be installed at an earlier date; (3) before each new MU begins operation, a wellfield package will be provided for Staff review that must illustrate all well completions and show the locations of the perimeter monitoring wells so that contaminant migration is detected before being transported into any new MU area;<sup>968</sup> (4) alleviating the concern that the active MU may impact the groundwater quality of the downgradient area proposed for the next MU, perimeter monitoring wells surrounding the active MUs will detect any changes in groundwater quality, and provide the

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<sup>961</sup> See *id.*; Tr. at 645-47 (Pavlick, Back, Lancaster); see also CBR License Amend. 3, at 20 (License Condition 11.2.3).

<sup>962</sup> See Tech. Rep. at 2-77 to -78, at 2-119 to -123.

<sup>963</sup> See *id.* at 2-122 to -123 (citing Tech. Rep. Figs. at 94 (fig. 2.7-4)).

<sup>964</sup> See *id.* at 5-57 to -58.

<sup>965</sup> See *supra* section VI.B.1.e.ii.

<sup>966</sup> See Wireman Initial Test. at 3.

<sup>967</sup> See Tr. at 656-58 (Nelson, Striz), 660 (Striz).

<sup>968</sup> See Tr. at 656-58 (Nelson, Striz), 660 (Striz).



warning to implement corrective measures prior to any impact on baseline water quality for the downgradient proposed MU;<sup>969</sup> (5) CBR's wellfield package includes water quality for all constituents with a statistical analysis to uncover any outliers that would help indicate impacted baseline water quality;<sup>970</sup> (6) if outliers are detected, NRC has the ability to adjust the documented values to better reflect baseline levels that will be used after the MU is depleted to assess the effectiveness of restoring the aquifer;<sup>971</sup> (7) movement of production fluids between the MUs is not plausible due to the required inward hydraulic gradients that prevent such migrations of fluids and the perimeter monitoring that provides early detection and correction for potential wayward constituents;<sup>972</sup> and (8) it is not likely that chemical transportation of ISR mobilized constituents could overcome the strong inward groundwater hydraulic gradients.<sup>973</sup>

As a result, we find that CBR's description of baseline restoration wells in the BC/CPF in its TR is adequate to meet the applicable NUREG-1569 criteria so as to establish an acceptable site-wide HCM.

### **C. Summary of Board Findings on HCM**

As we have noted in addressing above the items of concern raised by OST regarding the Applicant's HCM, CBR in its TR<sup>974</sup> and the Staff in its EA<sup>975</sup> have described in detail the surface water and groundwater HCM for the MEA. For surface water, these include descriptions of watersheds and drainages; seasonal surface water quality; and the detailed hydrology of surface water features of the two ephemeral streams transecting the MEA licensed area, the Niobrara River about a half mile south of the most southern MEA MU, and the local Box Butte Reservoir located approximately 3 miles to the east of the southeast corner of the MEA license boundary.<sup>976</sup> Groundwater hydrogeology includes the identification of aquifers; descriptions of the upper and lower confining units; hydrologic conditions in the production zone of the BC/CPF and overlying Arikaree/Brule aquifer; groundwater occurrence and flow direction; aquifer and aquitard properties; a regional aquifer pumping test that was used to determine hydraulic properties of the production zone aquifer; and a summary of the lines of evi-

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<sup>969</sup> See Tr. at 656-58 (Nelson, Striz), 660 (Striz).

<sup>970</sup> See Tr. at 665-66 (Striz).

<sup>971</sup> See Tr. at 660, 665-66 (Striz).

<sup>972</sup> See Tr. at 666-67 (Striz).

<sup>973</sup> See Tr. at 666-67 (Striz).

<sup>974</sup> See Tech. Rep. at 2-77 to -91, 2-115 to -123, 2-127 to -128.

<sup>975</sup> See EA at 3-5 to -18, 3-18 to -36.

<sup>976</sup> See Tech. Rep. at 2-77 to -78, 2-119 to -123, 2-128, 5-55 to -58.

dence demonstrating adequate confinement of the BC/CPF Sandstone aquifer.<sup>977</sup> These descriptions are augmented with discussions of water-level measurements and groundwater geochemistry of the production zone and overlying aquifers,<sup>978</sup> the hydrologic conceptual model for the MEA,<sup>979</sup> and baseline sediment sampling.<sup>980</sup>

The Board finds that CBR submitted a wealth of hydrologic data and analyses supporting its HCM,<sup>981</sup> while the Intervenor's witnesses merely made repeated calls for more investigations and analyses based on allegations that had little or no support justifying these additional efforts. OST not having provided any specific, supported rationale as to how the existing CBR program for licensing the MEA fails to meet NUREG-1569 acceptance criteria and why the additional work sought will achieve such a goal, the Board rejects OST's demands.

Crow Butte asserts relative to its HCM that it has provided information meeting all of the NUREG-1569 section 2.7 acceptance criteria, as confirmed by the Staff's review. The Board finds that no evidence has been proffered by the Intervenor demonstrating that CBR has not met these criteria. At the same time, based on our review of the evidentiary record, the Board has no difficulty determining that the CBR TR contains sufficient data and information to create an adequate site-wide conceptual model of site hydrology that meets the requirements of NUREG-1569 or that the Staff was justified in using that HCM as the basis for resolving both the safety and environmental aspects of the CBR license amendment application.

The Board thus finds relative to OST Concern 3 that in its TR and supporting documents CBR has developed an HCM for the MEA that demonstrates, with scientific confidence, that MEA hydrology and hydrogeology, including horizontal and vertical hydraulic conductivity, assures containment of extraction fluids and anticipated operational and restoration performance, and that the Staff appropriately used this model in deriving its EA and SER for the MEA site.

#### **IX. CONCERN 4 — UNSUBSTANTIATED ASSUMPTIONS REGARDING BC/CPF AQUIFER ISOLATION**

Concern 4, dealing with the unsubstantiated assumptions regarding BC/CPF

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<sup>977</sup> See *id.* at 2-78 to -84.

<sup>978</sup> See *id.* at 2-115 to -119.

<sup>979</sup> See *id.* at 2-84 to -87; see also Staff Initial Test. at 23-24 (Back, Lancaster).

<sup>980</sup> See Tech. Rep. at 2-127 to -128.

<sup>981</sup> See Staff Initial Test. at 23-24 (Back, Lancaster) (outlining sections of Staff review documents that describe HCM).

aquifer isolation, relates to specific analysis assumptions as well as more general assumptions associated with the analytical bases that the Applicant and the Staff used to assess the containment and interconnectivity properties of the BC/CPF aquifer — bases that are necessary to both assure the safe operation and restoration of the MEA facility and assess the environmental impacts of ISR activity in the MEA.

**A. Parties' Positions on Unsubstantiated Assumptions Regarding BC/CPF Aquifer Isolation**

Regarding this concern, OST witnesses Wireman and Dr. Kreamer claimed that CBR used several analysis assumptions in evaluating the May 2011 aquifer pumping test of the BC/CPF aquifer that were not consistent with the data and other evidence gathered relative to this formation. Consequently, in their view, the main foundations of CBR's analytical calculations are not representative of the hydrogeologic conditions at the MEA. In addition to their concern about these analytical assumptions, they also claimed that CBR and the Staff misinterpreted observations, resulting in the erroneous conclusion that the aquifers underlying the MEA are isolated and will remain so during facility operation and restoration.<sup>982</sup>

***1. Parties' Positions on Analysis Assumptions***

According to Mr. Wireman and Dr. Kreamer, CBR made faulty assumptions in its analysis of pumping test data relating to homogeneity, isotropy, transmissivity, storativity, infinite lateral extent, and thickness.<sup>983</sup> Mr. Wireman claimed that the CBR and Staff mischaracterizations of the BC/CPF aquifer hinged on the assumption that groundwater flow could be characterized as Darcian porous media flow with no significant structural disturbance (e.g., fractures/faults) causing preferential flow paths.<sup>984</sup> Mr. Wireman also alleged that the aquifer pumping test analysis assumed no spatial variability in the aforementioned parameters in deriving the hydraulic properties of the BC/CPF aquifer from the pumping test data. Further, he maintained that these assumptions led to a mischaracterization of the hydrogeology of the area by failing to recognize the increased heterogeneity from structural deformation. Mr. Wireman thus asserted that CBR failed to consider properly the impact of variable heterogeneity, anisotropy, thickness,

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<sup>982</sup> See Kreamer Initial Test. at 6-7; Wireman Initial Test. at 4; Kreamer Rebuttal Test. at 1-2, 3, 4; Wireman Rebuttal Test. at 3.

<sup>983</sup> See Kreamer Initial Test. at 6-7; Wireman Initial Test. at 4.

<sup>984</sup> See Wireman Rebuttal Test. at 3 (citing CBR Initial Test. at 7, 14, 35-41; Staff Initial Test. at 42-44).

and lateral extent on groundwater flow and well yields, and to identify significant preferential flow paths within the BC/CPF aquifer and overlying strata.<sup>985</sup>

The allegedly incorrect and invalid assumptions highlighted by Dr. Kreamer include fundamental assumptions inherent in the Theis and Cooper-Jacob analytical solutions for analyzing aquifer pumping test results, starting with the assumption that the aquifer is confined and of apparent infinite extent, followed by the assumptions of homogeneity, isotropy, infinite lateral extent, and uniform effective thickness.<sup>986</sup> As Concern 4 involves primarily a coalescing of selected testimony from Concerns 1 and 2, the parties' positions regarding the identified unsubstantiated assumptions leading to the CBR/Staff conclusion about BC/CPF aquifer containment were already discussed in detail in previous sections of this decision. Narrated references to these sections are presented below, organized by each individual assumption.

*a. Sole Use of the Theis and Cooper-Jacob Methodologies*

The parties' positions regarding CBR's singular use of the Theis and the Cooper-Jacob methodologies to interpret the May 2011 aquifer pumping test were discussed previously,<sup>987</sup> and will not be repeated here. But summarizing the discussion relating to the assumptions associated with those analyses in the context of Concern 4, Dr. Kreamer criticized CBR for using the Theis method for analyzing the aquifer pumping test data as well as claimed that CBR referred to using the Cooper-Jacob technique, but then failed to present the results of this supplemental analysis.<sup>988</sup> In response, Staff witnesses Back, Lancaster, and Dr. Striz confirmed that CBR's pumping test report clearly states that the Applicant used both the Theis drawdown and recovery method and the Cooper-Jacob distance-drawdown method to analyze the aquifer pumping test data, and presented the graphical results from both analyses for the entire duration of the aquifer pumping test in the MEA aquifer pumping test report.<sup>989</sup>

Dr. Kreamer also testified that CBR did not address the omission of, nor did the Staff require, other pumping test analysis methodologies that consider aquifer leakage (e.g., De Glee, Hantush-Jacob, Walton).<sup>990</sup> And in support of his criticism of CBR's use of only one type of analysis solution, Dr. Kreamer declared that both the Theis and Cooper-Jacob mathematical forms of analysis are considered the simplest forms of aquifer pumping test analyses and require

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<sup>985</sup> See Wireman Initial Test. at 4; Wireman Rebuttal Test. at 3.

<sup>986</sup> See Kreamer Initial Test. at 6.

<sup>987</sup> See *supra* section V.A.1.a.

<sup>988</sup> See Kreamer Initial Test. at 6.

<sup>989</sup> See Staff Rebuttal Test. at 21 (citing Test #8 Rep. at 11, figs. app. at PDF 50 (fig. 18)).

<sup>990</sup> See Kreamer Rebuttal Test. at 2-3.

the same fundamental assumptions (e.g., aquifer homogeneity, isotropy, uniform thickness, lateral extent) to be considered appropriate at the aquifer for accurate results.<sup>991</sup>

CBR witnesses Lewis, Nelson, and Pavlick responded in rebuttal testimony that “Crow Butte used appropriate analytical techniques for such aquifers, but nevertheless was prepared to use more complex analytical techniques had it been necessary. It was not.”<sup>992</sup> These witnesses indicated that the need to perform hypothetical aquifer leakage analyses had no conceptual support because of the great thickness and low permeability of the UCU and the depth of the BC/CPF sandstone, which precludes the OST-asserted need for additional aquifer test analyses.<sup>993</sup>

Staff witnesses provided support for the Applicant’s position, noting that the May 2011 pumping test was conducted according to a plan approved by the NDEQ and employed accepted industry testing and analysis procedures.<sup>994</sup> Staff witnesses also explained that the Theis and Cooper-Jacob methods are widely used and accepted techniques that have been adopted into ASTM standards and that there was no evidence in the aquifer pumping test data to suggest that the assumptions underlying those methodologies were inappropriate for the BC/CPF aquifer at the MEA.<sup>995</sup> They noted as well that these methods have been successfully applied to heterogeneous, anisotropic aquifers.<sup>996</sup> Furthermore, Dr. Kreamer acknowledged that the more complex analysis methods he suggested (i.e., De Glee, Hantush-Jacob, Walton methods) have the same assumptions of aquifer homogeneity, isotropy, uniform thickness, and lateral extent as the Theis and Cooper-Jacob methods.<sup>997</sup>

*b. Lack of Preferential Flow Paths Associated with Fracturing/Faulting*

The parties’ positions regarding the lack of preferential flow paths associated with fracturing/faulting were discussed previously in detail,<sup>998</sup> and are not repeated here. But with regard to Concern 4, in summary Mr. Wireman claimed

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<sup>991</sup> See Kreamer Initial Test. at 6.

<sup>992</sup> CBR Rebuttal Test. at 10.

<sup>993</sup> See *id.* at 10-11 (citing Test #8 Rep. at 12-13).

<sup>994</sup> See Staff Initial Test. at 26 (Back, Lancaster) (citing ER at 3-45; Tech. Rep. at 2-82).

<sup>995</sup> See Staff Rebuttal Test. at 25-26 (Back, Lancaster, Striz) (citing ASTM Theis Analysis Standards).

<sup>996</sup> See *id.* at 25 (Back, Lancaster, Striz).

<sup>997</sup> See Tr. at 507-08.

<sup>998</sup> See *supra* sections V.B.1 and VI.B.2.

that there may be significant preferential flow paths within the BC/CPF aquifer and overlying strata that are the result of structural and lithologic conditions.<sup>999</sup>

CBR witness Lewis testified that none of the specific geophysical log signatures that would indicate significant structural displacements were found in the 1600 logs made at the site, which confirmed that these extensive field investigations did not encounter any sign of significant faulting across the MEA.<sup>1000</sup> Furthermore, it is CBR's position that, based on extensive field data, there is no evidence of any significant faulting within the MEA that will affect confinement or transmit production fluids.<sup>1001</sup>

OST witness Dr. LaGarry stated that his work over the past 25 years had shown that there are several, likely hundreds, more fractures.<sup>1002</sup> While CBR witnesses Lewis, Nelson, Pavlick, and Shriver admitted that faults and other fractures may exist at a regional level, it is Crow Butte's position that if any minor fractures were to appear, they would close up quickly as a result of overburden stress from the weight of overlying strata.<sup>1003</sup> And they further declared that CBR knows of no evidence of any fracturing within the MEA that will have any effect on the proposed activity, asserting that any undetected fractures will have no hydrologic impact based on the wealth of other evidence confirming containment of the BC/CPF.<sup>1004</sup>

But even if the faults do exist beneath the MEA, their presence would not lead to significant adverse environmental impacts, according to the Staff's EA, because (1) ambient groundwater flow in the BC/CPF sandstone aquifer is to the northwest and away from the reported Niobrara River fault; (2) once uranium recovery begins, groundwater flow would be inward toward the MUs (as required by License Condition 10.1.6)<sup>1005</sup> and away from both the Pine Ridge and Niobrara River faults; (3) based on groundwater velocity estimates provided in the EA, it would take at least 500 years for groundwater to migrate from the MEA to the reported Pine Ridge fault, during which time any constituents of the production fluids would attenuate through sorption and dilution; (4) the ambient hydraulic gradients are strongly downward from the overlying aquifers of the Arikaree/Brule into the BC/CPF aquifer such that production fluids would not be able to migrate upward through any preferential pathways; (5) the downward gradient would become even more pronounced during restoration operations;

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<sup>999</sup> See Wireman Rebuttal Test. at 3.

<sup>1000</sup> See Tr. at 805-06; *see also* Tech. Rep. at 3-7.

<sup>1001</sup> See CBR Rebuttal Test. at 23.

<sup>1002</sup> See LaGarry Initial Test. at PDF 5.

<sup>1003</sup> See CBR Rebuttal Test. at 23 (Lewis, Nelson, Pavlick, Shriver).

<sup>1004</sup> See *id.*; *see also supra* section V.C.2 (discussing other containment-confirming evidence).

<sup>1005</sup> See CBR License Amend. 3, at 11 (License Condition 10.1.6).

and (6) CBR will conduct additional aquifer pumping tests in each MU to identify hydraulic boundaries, including those caused by faulting.<sup>1006</sup>

*c. Aquifer Confinement and Apparent Infinite Extent*

Regarding aquifer confinement, Staff witnesses Back and Lancaster testified that by definition, the BC/CPF sandstone aquifer is a confined aquifer because the potentiometric surface of the BC/CPF rises above the top elevation of the aquifer.<sup>1007</sup> These Staff witnesses, along with Dr. Striz, also noted that the majority of the data collected during the aquifer pumping test fall on the classic Theis type-curve, further indicating that the BC/CPF aquifer is confined.<sup>1008</sup> Ultimately, no party disputed that the BC/CPF is not a confined aquifer under the potentiometric surface definition.<sup>1009</sup>

The parties' positions about the assumption of apparent infinite extent were discussed previously in detail,<sup>1010</sup> and are not repeated here. But summarizing the discussion concerning the infinite extent assumption in the context of Concern 4, Staff witnesses Back, Lancaster, and Dr. Striz posited that the site-specific and regional cross-sections, based on boreholes and geophysical logging, demonstrate that the BC/CPF sandstone aquifer is present over the entire MEA site and beyond.<sup>1011</sup> This conclusion is also supported by the lack of boundary conditions observed during the aquifer pumping test, especially in the most distant observation wells.<sup>1012</sup>

*d. Homogeneity and Isotropy*

The parties' positions concerning the assumption of BC/CPF homogeneity and isotropy were discussed previously in detail as well,<sup>1013</sup> and are not repeated here. But summarizing the discussion relating to the homogeneity and isotropy assumptions in the context of Concern 4, Dr. Kreamer argued that the BC/CPF is heterogeneous and anisotropic over the area influenced by pumping.<sup>1014</sup> CBR witnesses Lewis, Nelson, and Pavlick pointed out that while actual hydrogeo-

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<sup>1006</sup> See EA at 3-14 (citing ER at 3-47; SER at 139).

<sup>1007</sup> See Staff Initial Test. at 30.

<sup>1008</sup> See Staff Rebuttal Test. at 27 (citing Test #8 Rep. app. C at PDF 80-95 (graphs C1 to C16)).

<sup>1009</sup> See Staff Initial Test. at 30; Test #8 Rep. at 11; Tr. at 50-51 (Kreamer).

<sup>1010</sup> See *supra* section VII.F.1.

<sup>1011</sup> See Staff Rebuttal Test. at 28 (citing Tech. Rep. Figs. at 49-62 (figs. 2.6-3a to -3n), 87-90 (figs. 2.6-21 to -24)).

<sup>1012</sup> See Test #8 Rep. at 13.

<sup>1013</sup> See *supra* section VII.D.1.

<sup>1014</sup> See Kreamer Initial Test. at 6.

logical conditions always vary from ideal conditions in natural systems so that, realistically, the BC/CPF within the MEA is not homogeneous and isotropic on a local scale, the assumptions of homogeneity and isotropy nonetheless are reasonably satisfied over the scale of the BC/CPF pumping test.<sup>1015</sup>

As a result, these CBR witnesses asserted, and Staff witnesses Back, Lancaster, and Dr. Striz agreed, that the BC/CPF Formation underlying the MEA can be treated as homogeneous and isotropic for analytical purposes.<sup>1016</sup> Furthermore, these Staff witnesses indicated that homogeneity and isotropy exist on the scale of the ROI of the pumping test as a result of fairly uniform hydraulic conductivity, indicating a lack of significant stratification of the BC/CPF aquifer underlying the MEA. It was their position as well that the homogeneity/isotropy premise is supported by the subsurface characterization (e.g., core inspection, geophysical logging) demonstrating that there are no major impermeable or permeable features that would indicate significant heterogeneity or anisotropy to the extent that it would impact CBR's analysis of the aquifer test analysis results.<sup>1017</sup>

At the hearing, Dr. Kreamer again advanced the need to further characterize the homogeneity of the BC/CPF with additional pumping tests to address the containment properties of these strata,<sup>1018</sup> having claimed that the allegedly wide range of transmissivities (i.e., 230 ft<sup>2</sup>/d to 1780 ft<sup>2</sup>/d) and storage coefficients ( $1.7 \times 10^{-3}$  to  $8.32 \times 10^{-5}$ ) are not consistent with homogeneous conditions.<sup>1019</sup> Mr. Wireman was in agreement, concluding that aquifer testing, monitoring, and flow modeling of these aquifers must consider the heterogeneity, noting that the aquifer test data indicate that hydraulic conductivity and transmissivity of the BC/CPF near the pumping well was an order of magnitude lower than at the outlying monitoring wells.<sup>1020</sup>

Relative to these concerns, Staff witness Dr. Striz testified that well Monitor-3, which was only 100 ft from the pumping well, was impacted by well effects, and she also indicated that when she corrected for this effect by re-analyzing the information to match with the later time data, the resulting transmissivity (700 ft<sup>2</sup>/d) and storage coefficient ( $1 \times 10^{-5}$ ) values were more in line with the other wells and indicative of a confined aquifer.<sup>1021</sup> Nonetheless, Dr. Kreamer continued to claim the existence of a preferential pathway indicating leakage in the containment of the production zone, backed by references to the drawdown

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<sup>1015</sup> See CBR Rebuttal Test. at 11-12 (citing Test #8 Rep. at 11).

<sup>1016</sup> See *id.*; Staff Rebuttal Test. at 27.

<sup>1017</sup> See Staff Rebuttal Test. at 27 (citing Test #8 Rep. at 5, figs. app. at PDF 48 (fig. 16)).

<sup>1018</sup> See Tr. at 344-45.

<sup>1019</sup> See Kreamer Initial Test. at 6.

<sup>1020</sup> See Wireman Initial Test. at 4.

<sup>1021</sup> See Tr. 502-05, 530.



data for the pumping well (i.e., CWP-1A) and the observation wells that are close to the pumping well (i.e., CPW-1 and Monitor-3). Because these, in his estimation, showed a late-time flattening of the drawdown curve that made them unsuitable for Theis type-curve fitting, Dr. Kreamer maintained that this isolated flattening of the curve may be indicative of leakage in the containment of the production zone.<sup>1022</sup>

Staff witnesses Back, Lancaster, and Dr. Striz disagreed with this analytical approach, testifying that the lack of significant heterogeneity is also reflected on the potentiometric surface of the BC/CPF aquifer, which is smooth and has an essentially flat and relatively constant hydraulic gradient. In addition, they asserted, the aquifer drawdown from the May 2011 aquifer pumping test indicates that there is no evidence of significant directional conductivity from lateral anisotropy. According to these Staff witnesses, the smooth appearance of these mapping contours indicates that there are no significant changes in transmissivity that impact the groundwater flow in the BC/CPF sandstone aquifer.<sup>1023</sup>

Also, these same Staff witnesses referenced the Driscoll text, stating that the assumption of homogeneity does not limit the use of the Theis equations because average hydraulic conductivity values, as determined from pumping tests, have proven to be reliable for predicting well performance even though uniform hydraulic conductivity is rarely found in a real aquifer. They also noted that Driscoll concluded that in confined aquifers where the well is fully penetrating and open to the formation, which they asserted is the case with the BC/CPF, the assumption of no stratification is not an important limitation.<sup>1024</sup>

Dr. Kreamer, who acknowledged familiarity with Driscoll, maintained that Driscoll referenced the use of fully penetrating screened monitoring wells for monitoring pumping,<sup>1025</sup> and asserted that assuming homogeneity and isotropy “wrongly implies the local geology is simple.”<sup>1026</sup> Staff witnesses Back, Lancaster, and Dr. Striz, on the other hand, indicated that, based on CBR’s sub-surface investigation, there is ample evidence that the local stratigraphy around the MEA is relatively uniform and uncomplicated. In particular, they indicated that the site-specific and regional cross-sections provided by CBR show that

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<sup>1022</sup> See Tr. at 937-42; see also Kreamer Initial Test. at 6; Kreamer Rebuttal Test. at 1-2.

<sup>1023</sup> See Staff Rebuttal Test. at 27 (citing Test. #8 Rep. figs. app. at PDF 48 (fig. 16); Tech. Rep. Figs. at 113-16 (figs. 2.9-6a to -6d)).

<sup>1024</sup> See Tr. at 465 (Back); Staff Rebuttal Test. at 26 (Back, Lancaster, Striz) (citing Driscoll Text at 214).

<sup>1025</sup> See Tr. at 462, 463-64.

<sup>1026</sup> Kreamer Initial Test. at 5.

the stratigraphic units, and particularly the BC/CPF sandstone, are essentially flat.<sup>1027</sup>

*e. Uniform Effective Aquifer Thickness*

The parties' positions about the assumption of uniform effective aquifer thickness were discussed previously in detail,<sup>1028</sup> and are not repeated here. But summarizing the discussion in the context of Concern 4, Dr. Kreamer claimed that the BC/CPF aquifer is not of uniform effective thickness over the area influenced by the May 2011 pumping aquifer test and thus this formation is not homogeneous.<sup>1029</sup>

But CBR witnesses Lewis, Nelson, and Pavlick stated that the local variations in aquifer thickness are conceptually consistent with observed drawdown responses in the highly confined aquifer.<sup>1030</sup> Supporting CBR, Staff witnesses posited that there is ample evidence that the local stratigraphy around the MEA is relatively uniform and uncomplicated, pointing out that the site-specific and regional cross-sections provided by CBR show that the stratigraphic units, and particularly the BC/CPF sandstone, are relatively uniform in thickness over the site.<sup>1031</sup>

With respect to the Staff's assessment of the BC/CPF sandstone thickness, Dr. Kreamer asserted that the EA contains "conjecture" about the reason for a "lack of continual thickness."<sup>1032</sup> As a counterpoint to this statement, Staff witnesses Back, Lancaster, and Dr. Striz noted that, based on site-specific cross-sections and geophysical log data, the BC/CPF aquifer transitions to less permeable silts and clays (zero sandstone thickness) approximately 9 miles to the east and 12

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<sup>1027</sup> See Staff Rebuttal Test. at 29 (citing Tech. Rep. Figs. at 49-62 (figs. 2.6-3a to -3n), 87-90 (figs. 2.6-21 to -24)).

<sup>1028</sup> See *supra* sections VII.A.7.a and VII.F.1.

<sup>1029</sup> See Kreamer Initial Test. at 6 (citing EA at 3-28; Test #8 Rep. at 11), 7.

<sup>1030</sup> See CBR Rebuttal Test. at 10-11 (citing Test #8 Rep. at 12-13).

<sup>1031</sup> See Staff Rebuttal Test. at 29 (Back, Lancaster, Striz) (citing Tech. Rep. Figs. at 49-62 (figs. 2.6-3a to -3n), 87-90 (figs. 2.6-21 to -24)).

<sup>1032</sup> Kreamer Initial Test. at 6 (citing EA at 3-28). According to the Staff, Dr. Kreamer's statement reflects a misunderstanding of what was written in the EA. Further, the Staff asserted, the only reference to aquifer thickness at the EA page Dr. Kreamer cites states that the BC/CPF sandstone was deposited in a fluvial stream environment within a regional channel, which represents two separate concepts and, more importantly, says nothing about the variation in thickness of the BC/CPF sandstone at (or near) the MEA, whereas the EA at page 3-10 describes the thickness of the BC/CPF sandstone. See Staff Rebuttal Test. at 28 (Back, Lancaster, Striz). In this decision, we assume Dr. Kreamer was referring to the EA at page 3-10 relative to his concern about the thickness of the BC/CPF aquifer.

miles to the west of the MEA,<sup>1033</sup> while the EA indicates the aquifer has a thickness ranging from approximately 20 ft to 90 ft (and averaging about 55 ft) with the thickest sections occurring in the western portions of the MEA.<sup>1034</sup> These Staff witnesses maintained that this level of variation is expected in sedimentary systems and, per the Driscoll text, is not a serious limitation given that the variation in aquifer thickness within the cone of depression in most situations is relatively small, especially in sedimentary rocks, so as not to preclude obtaining reliable results from the May 2011 aquifer pumping test for the MEA.<sup>1035</sup>

*f. Range of Transmissivity and Storage Coefficient Values*

The parties' position about the alleged wide range of values for transmissivity and storage coefficients as a demonstration of heterogeneity/anisotropy was discussed previously in detail.<sup>1036</sup> As stated therein, Dr. Kreamer claimed that transmissivities, ranging from 230 ft<sup>2</sup>/d to 1780 ft<sup>2</sup>/d with values of storage coefficients ranging from  $1.7 \times 10^{-3}$  to  $8.3 \times 10^{-5}$  are not consistent with homogeneous conditions.<sup>1037</sup>

According to CBR witnesses Lewis, Nelson, and Pavlick, the cited variability in aquifer transmissivity and storativity is not unusual, is relatively small, and is well within the expected range of variability of a sandstone aquifer. In their view, the observed variation in subsurface conditions at the MEA does not preclude analysis of the data using analytical models with ideal boundary conditions.<sup>1038</sup> And Staff witness Dr. Striz, looking more closely at the circumstances that generated the values of concern to Dr. Kreamer, testified that well Monitor-3, which was close to the pumping well CPW-1A, was impacted by well effects. When the pertinent information was re-analyzed to match with the later time data, she declared the resulting values of transmissivity (700 ft<sup>2</sup>/d) and storage coefficient ( $1 \times 10^{-5}$ ) changed the range for the storage coefficient from  $1.7 \times 10^{-3}$  to  $8.3 \times 10^{-5}$  to  $1 \times 10^{-5}$  to  $8.3 \times 10^{-5}$ , which is more in line with the other wells and indicative of a confined aquifer.<sup>1039</sup>

*g. Anisotropy*

The parties' positions as to the alleged anisotropy of the BC/CPF were dis-

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<sup>1033</sup> See Staff Rebuttal Test. at 28 (citing EA at 3-28).

<sup>1034</sup> See EA at 3-10.

<sup>1035</sup> See Staff Rebuttal Test. at 27-28 (citing Driscoll Text at 214).

<sup>1036</sup> See *supra* section VII.D.1.

<sup>1037</sup> See Kreamer Initial Test. at 6.

<sup>1038</sup> See CBR Rebuttal Test. at 11-12.

<sup>1039</sup> See Tr. at 502-05, 530.

cussed previously in detail,<sup>1040</sup> and again are not repeated here. But summarizing the discussion regarding anisotropy in the context of Concern 4, Dr. Kreamer claimed that neither CBR nor the Staff performed an analysis for anisotropy and that the nature of directional hydraulic conductivity differences remains undefined and not quantified, particularly in the vertical direction.<sup>1041</sup> In lieu of any anisotropy model analysis, he maintained that the CBR and Staff claims that no anisotropy exists within the May 2011 aquifer pumping test's ROI are inadequate, because they are based on a hand-drawn visual rendering using very few data points rather than a standard data-based evaluation.<sup>1042</sup>

CBR witnesses Lewis, Nelson, and Pavlick clarified that drawdown data from all monitoring wells were used to create the cone of depression at the end of the May 2011 pumping test,<sup>1043</sup> while CBR witness Lewis explained that the drawdown contour lines are non-biased as they were created with a commercially available computer contouring program, SURFER.<sup>1044</sup> According to these CBR witnesses, a more detailed analysis of horizontal anisotropy was not necessary given the lack of a conceptual basis in the geometry of the drawdown cone.<sup>1045</sup>

Additionally, Staff witnesses Back, Lancaster, and Dr. Striz indicated that if there was significant anisotropy within the production zone, the aquifer test would show elliptical drawdown curves, a shape not apparent in the plot from the MEA aquifer pumping test results.<sup>1046</sup> And for his part, Dr. Kreamer agreed that if the data are accepted as sound, the graph does illustrate consistent isotropy in the horizontal plane.<sup>1047</sup> Moreover, Staff witnesses Back, Lancaster, and Dr. Striz also claimed that if there is any vertical anisotropy in the production zone aquifer, it would be beneficial for ISR operations by creating a preferred horizontal flow within the sandstone aquifer.<sup>1048</sup>

Finally, these Staff witnesses claimed that Dr. Kreamer provided no support for his assertion that further analysis is necessary because anisotropy (and heterogeneity for that matter) are unrelated to the vertical containment of a production zone aquifer and are only important in meeting one of the objectives of the MEA aquifer pumping test, i.e., to show interconnectivity as it may affect

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<sup>1040</sup> See *supra* section VII.E.1.

<sup>1041</sup> See Kreamer Initial Test. at 7.

<sup>1042</sup> See *id.* (citing Test #8 Rep. at 14, figs. app. at PDF 48 (fig. 16); EA at 3-30, A-22).

<sup>1043</sup> See CBR Rebuttal Test. at 12.

<sup>1044</sup> See Tr. at 537-39.

<sup>1045</sup> See CBR Initial Test. at 12.

<sup>1046</sup> See Staff Rebuttal Test. at 29.

<sup>1047</sup> See Tr. at 539-40.

<sup>1048</sup> See Staff Rebuttal Test. at 29.

the ability of the operator to balance the wellfields and maintain an inward gradient.<sup>1049</sup>

## **2. Parties' Positions on Challenges to Evidence of Hydrogeologic Containment of BC/CPF**

The parties' positions regarding OST's challenges to the evidence proffered by CBR and the Staff dealing with the alleged hydrogeologic containment of the BC/CPF were discussed previously in detail,<sup>1050</sup> and will not be repeated here. But to summarize the discussion concerning BC/CPF hydrogeologic containment in the context of Concern 4, both CBR and the Staff referred to what they considered extensive evidentiary support demonstrating the containment properties of the BC/CPF aquifer that, in their view, make this formation fit for safe and environmentally-sound ISR uranium extraction. Their evidence relating to containment was summarized by the Staff and presented as eight independent observations that demonstrated isolation of the overlying Arikaree/Brule aquifer from the production zone within the BC/CPF aquifer.<sup>1051</sup>

The Staff-referenced evidence included the following items: (1) the presence of a thick (360 ft to 450 ft), laterally continuous UCU consisting of low-permeability mudstone and claystone and an uncontested, thick (more than 750 ft), regionally extensive LCU of Pierre Shale; (2) the results of the May 2011 aquifer pumping test demonstrating no discernable drawdown in the overlying Brule Formation observation wells; (3) the large differences in observed hydraulic head (330 ft to 500 ft) between the Arikaree/Brule aquifer and the BC/CPF aquifer that could only occur with a large hydraulic resistance to vertical flow due to the significant thickness of the UCU within the MEA; (4) the strong vertical downward gradients between the Arikaree/Brule aquifer and the BC/CPF aquifer; (5) the significant historical differences in geochemical groundwater characteristics between the BC/CPF and the Arikaree/Brule aquifer; (6) the large groundwater age differences between the BC/CPF, the Brule Formation, and the Arikaree aquifer (oldest to youngest) based on age dating of isotopes; (7) the detection of pressure effects at long distances over short time periods from pumping at a relatively low flow rate (27 gpm), which could only occur from confinement of the aquifer; and (8) the calculated storativity values

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<sup>1049</sup> See *id.*

<sup>1050</sup> See *supra* sections V.C.1 and V.C.2.

<sup>1051</sup> See *supra* section V.C.2; see also Staff Initial Test. at 28-31 (Back, Lancaster) (outlining six items); Staff Rebuttal Test. at 15 (Back, Lancaster, Striz) (indicating two items).

(ranging from  $1.7 \times 10^{-3}$  to  $8.3 \times 10^{-5}$ ) indicative of a confined aquifer, the values for which range between  $5 \times 10^{-3}$  and  $5 \times 10^{-5}$ .<sup>1052</sup>

In his rebuttal testimony, Dr. Kreamer challenged three of the Staff-identified items above, i.e., items 1, 2, and 5, stating, respectively, that (a) the quantity and quality of the UCU may be breached by potential fracturing of the intervening strata; (b) the well array in the Arikaree/Brule aquifer was not sufficient to discern drawdown; and (c) geochemical transport is too complex to use as a demonstration of aquifer containment.<sup>1053</sup> Furthermore, when given the opportunity at the hearing to comment on aquifer containment at the MEA,<sup>1054</sup> Dr. Kreamer raised the issue of the flattening of the drawdown curve from the Theis type-curve for wells CPW-1/1A and Monitor-3, implying that these results are associated with late-time recharge zones indicating a lack of containment.<sup>1055</sup> In addition, during the hearing Dr. Kreamer presented his hypothesis countering the following Staff-identified items: (a) the strong downward gradients between the Arikaree/Brule aquifer and the BC/CPF (item 4); (b) the difference in the ages of the groundwater (item 6); (c) the large ROI for a well pumped at relatively low rate (item 7); and (d) the range of storativity values indicative of containment (item 8).<sup>1056</sup> Moreover, when asked whether, in addressing these items, he was identifying unusual situations that would all need to occur to establish a lack of containment, Dr. Kreamer cautioned that it would take only leakage from one preferential flow path to cause devastating results and again called for a robust fracture analysis.<sup>1057</sup>

## **B. Board Findings on Unsubstantiated Assumptions of BC/CPF Aquifer Isolation**

### ***1. Board Findings on Analysis Assumptions***

As Concern 4 is primarily a coalescing of selected testimony regarding Concerns 1 and 2, most of the Board findings regarding the purported unsubstantiated analysis assumptions improperly underpinning the conclusion of BC/CPF aquifer isolation were already discussed in detail in previous sections of this

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<sup>1052</sup> See Staff Initial Test. at 28-31 (Back, Lancaster); Staff Rebuttal Test. at 15 (Back, Lancaster, Striz).

<sup>1053</sup> See Kreamer Rebuttal Test. at 1-2 (Kreamer item 2 responding to Staff item 2), 3 (Kreamer items 7 and 8 responding to Staff item 5), 5 (Kreamer item 10 responding to Staff item 1).

<sup>1054</sup> See Tr. at 965-99.

<sup>1055</sup> See Tr. at 968-85 (Kreamer, Shriver); see also Kreamer Initial Test. at 6.

<sup>1056</sup> See Tr. at 993-96.

<sup>1057</sup> See Tr. at 996-98.

decision. Below, references to those sections are provided, along with a brief summary of the most relevant findings.

*a. Analytical Solution Analogues to the Use of the Theis and Cooper-Jacob Methodologies*

Board findings regarding CBR's purported misuse of the Theis and the Cooper-Jacob methodologies in interpreting the May 2011 aquifer pumping test were previously discussed in detail,<sup>1058</sup> but are summarized here as relevant to Concern 4. As an initial matter, we found that CBR graphically analyzed data using Theis drawdown and recovery methods and the Cooper-Jacob distance-drawdown method.<sup>1059</sup> The Board also noted that OST agreed that the use of the Theis method was a starting point for pumping test analyses, and would help to determine if more sophisticated analyses are needed.<sup>1060</sup> We found as well that CBR was prepared to use more complex analytical techniques if needed,<sup>1061</sup> but we agreed with CBR and the Staff that there was no need to do so based on record evidence demonstrating the apparent consistency of the resulting hydraulic parameters with established values that OST agrees can often vary by an order of magnitude or more.<sup>1062</sup> Nor did the Intervenor directly dispute CBR's derivation of the recovery data, which shows the same consistency in the hydraulic conductivity values generated as those that were derived from the draw-down data.<sup>1063</sup>

The Board further found that CBR conducted the pumping test according to its NDEQ-approved plan, using accepted industry testing and analysis procedures that are incorporated into ASTM standards.<sup>1064</sup> In contrast, OST did not provide any independent estimate for the rate of leakage based on a separate interpretation of the Marsland pumping test data using its suggested alternative, allegedly superior methods that consider a leaky aquifer (i.e., De Glee, Hantush-Jacob, and Walton methods) to support its demand that these techniques be implemented by Crow Butte,<sup>1065</sup> despite acknowledging that these more complex analysis methods may have the same assumptions of aquifer homogeneity,

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<sup>1058</sup> See *supra* section V.A.2.a.

<sup>1059</sup> See CBR Initial Test. at 29 (Lewis, Nelson, Pavlick).

<sup>1060</sup> See Tr. at 682 (Wireman).

<sup>1061</sup> See CBR Rebuttal Test. at 10 (Lewis, Nelson, Pavlick).

<sup>1062</sup> See *supra* note 216 and accompanying text.

<sup>1063</sup> See Test #8 Rep. tbls. app. at 10 of 10 (tbl. 8).

<sup>1064</sup> See Staff Initial Test. at 26 (Back, Lancaster) (citing ER at 3-45; Tech. Rep. at 2-82); see also ASTM Theis Analysis Standards.

<sup>1065</sup> See CBR Rebuttal Test. at 10-11 (Lewis, Nelson, Pavlick).

isotropy, uniform thickness, and lateral extent, and thus the same potential limitations, as the Theis and Cooper-Jacob methods.<sup>1066</sup>

Dr. Kreamer also maintained there is a lack of containment in the BC/CPF as demonstrated by the departure of data points from the expected Theis type-curve during the May 2011 pumping test.<sup>1067</sup> The Board found, however, that CBR and the Staff presented other hypotheses for these deviations that are consistent with the many other site characteristics and observations while Dr. Kreamer offered no corroborating evidence of co-existing factors supporting his position there is localized leakage of sufficient magnitude to negatively impact the containment properties and internal interconnections of the BC/CPF to control fluid migration within the aquifer.<sup>1068</sup>

*b. Lack of Preferential Flow Paths Associated with Fracturing/Faulting*

The Board's findings regarding the lack of preferential flow paths associated with fracturing/faulting were discussed previously in detail,<sup>1069</sup> and are summarized here as is relevant to Concern 4. We found it likely that there is some degree of structural fracturing of the geologic strata underlying the MEA, but that transmissivity, not the mere presence of fractures, is the critical issue. In this regard, we concluded that there is no evidence of extensive, transmissive, heterogeneous pathways that would provide a preferential flow for contaminants to uncontrollably migrate into the adjacent aquifers or into the neighboring Niobrara and White Rivers.<sup>1070</sup>

*c. Aquifer Confinement and Apparent Infinite Extent*

The Board found that there was no disagreement that the BC/CPF aquifer meets the definition of a confined aquifer, because its potentiometric surface rises above the top elevation of the aquifer.<sup>1071</sup> Moreover, the Board's related findings regarding the apparent infinite extent assumption were discussed previously.<sup>1072</sup> Therein we found that, with respect to the issue of lateral extent, as it is relevant to Concern 4, the BC/CPF aquifer is present over the entire MEA site and goes well beyond these limits based on the lack of definitive boundary

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<sup>1066</sup> See Tr. at 507-09 (Kreamer).

<sup>1067</sup> See Kreamer Rebuttal Test. at 2.

<sup>1068</sup> See *supra* section V.A.2.b.

<sup>1069</sup> See *supra* sections V.B.2 and VI.B.2.

<sup>1070</sup> See *supra* section V.B.3.

<sup>1071</sup> See Staff Initial Test. at 30 (Back, Lancaster); Text #8 Rep. at 11; Tr. at 450-51 (Kreamer).

<sup>1072</sup> See *supra* section VII.F.2.



conditions observed during the aquifer pumping test, backed by site-specific regional cross-sections derived from borehole data and geophysical logging.<sup>1073</sup>

*d. Homogeneity and Isotropy*

The Board's findings relating to the homogeneity and isotropy assumptions were discussed previously in detail,<sup>1074</sup> and are not repeated here other than to note that, in Dr. Kreamer's estimation, the assumption that the BC/CPF is homogeneous and isotropic is inconsistent with data and evidence in the record, as is the asserted premise of uniform effective thickness over the area influenced by pumping. The Board agreed with CBR and the Staff that actual hydrogeological conditions always vary from ideal conditions in natural systems,<sup>1075</sup> but if the Theis and other aquifer analysis methods were only utilized when the assumptions are strictly adhered to, the methods would never be employed because no hydrogeologic system could meet them.<sup>1076</sup> The Board also concurred with the parties that all geologic strata exhibit heterogeneity and anisotropy at some scale,<sup>1077</sup> noting that application of the Theis and Cooper-Jacob techniques to these systems is routinely done in practice with an understanding of the assumptions inherent to their use.<sup>1078</sup> And we found further that, at the relevant scale for licensing, the Applicant assumed homogeneous, isotropic responses, and then looked to the actual test results to show whether there were significant deviations from the assumed homogeneity and isotropy that, in turn, would establish the need for the use of more complex analysis methods. Moreover, we agreed with CBR's conclusion, based on the preponderance of the evidence in the record before us, that no such additional testing or analysis was necessary here.<sup>1079</sup>

Finally, the Board found that the evidence points to the fact that there are no known faults or significant fracturing underlying the MEA that might cause heterogeneity and anisotropy of the underlying geologic strata. As a result, there is no need for CBR to augment its TR or for the Staff to alter its EA to address heterogeneity/anisotropy impacts due to fracturing.

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<sup>1073</sup> See Staff Rebuttal Test. at 28 (Back, Lancaster, Striz) (citing Test #8 Rep. at 13; Tech. Rep. Figs. at 49-62 (figs. 2.6-3a to -3n), 87-90 (figs. 2.6-21 to -24)).

<sup>1074</sup> See *supra* section VII.D.2.

<sup>1075</sup> See CBR Rebuttal Test. at 11-12 (Lewis, Nelson, Pavlick).

<sup>1076</sup> See Staff Rebuttal Test. at 25 (Back, Lancaster, Striz).

<sup>1077</sup> See CBR Rebuttal Test. at 11 (Lewis, Nelson, Pavlick); Staff Rebuttal Test. at 25 (Back, Lancaster, Striz); Tr. at 491-94 (Kreamer).

<sup>1078</sup> See CBR Rebuttal Test. at 11 (Lewis, Nelson, Pavlick); Staff Rebuttal Test. at 25 (Back, Lancaster, Striz).

<sup>1079</sup> See CBR Rebuttal Test. at 11 (Lewis, Nelson, Pavlick).

*e. Uniform Effective Aquifer Thickness*

The Board's findings concerning uniform aquifer thickness were discussed previously in detail,<sup>1080</sup> and are not repeated here except as they are relevant to Concern 4.

Dr. Kreamer testified that the upper boundary of the BC/CPF changes elevation repeatedly and fairly abruptly, causing impermissible changes in aquifer thickness.<sup>1081</sup> But we found that he proffered these points without providing references to specific locations on the geologic cross-sections where he believed the variation in BC/CPF thickness to exist, thus failing to point to examples of these allegedly numerous discontinuities other than by general reference to geologic cross-sections.

We also found that the record provided ample evidence that the local stratigraphy around the MEA is relatively uniform and uncomplicated and, specifically, that the site and regional cross-sections provided by CBR show that the BC/CPF is relatively uniform in thickness over the site.<sup>1082</sup> Furthermore, the Staff's EA describes the thickness of the BC/CPF sandstone as ranging from 20 ft to 90 ft over the MEA based on site-specific cross-sectional data and geophysical logging,<sup>1083</sup> which the Staff asserted is a level of variation expected in sedimentary systems.<sup>1084</sup> We agreed with the Staff as well that, based on Driscoll,<sup>1085</sup> this range of thicknesses will not affect the analysis results significantly, thus yielding reasonably reliable hydraulic parameters from the use of the Theis and Cooper-Jacob methodologies for the solution of the aquifer pumping test data.<sup>1086</sup> And while the visual representations of the geologic cross-sections may, in some locations, appear to illustrate an apparent abrupt change in the upper surface of the BC/CPF, the Board found that this is likely an artifact of the exaggerated scales of these graphs.<sup>1087</sup>

*f. Range of Transmissivity and Storage Coefficient Values*

The Board's findings regarding the allegedly wide range of values for trans-

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<sup>1080</sup> See *supra* sections VII.A.7.b and VII.F.2.

<sup>1081</sup> See Kreamer Initial Test. at 6 (citing Tech. Rep. Figs. at 67-69 (figs. 2.6-3s to -3u); Test #8 Rep. at PDF 35-40 (figs. 3-8)).

<sup>1082</sup> See Staff Rebuttal Test. at 29 (Back, Lancaster, Striz) (citing Staff Initial Test. at 10-11, 12-13, 24-25; Tech. Rep. Figs. at 49-62 (figs. 2.6-3a to -3n), 87-90 (figs. 2.6-21 to -24)).

<sup>1083</sup> See EA at 3-10.

<sup>1084</sup> See Staff Rebuttal Test. at 28 (Back, Lancaster, Striz).

<sup>1085</sup> See Driscoll Text at 214, 218.

<sup>1086</sup> See NRC Rebuttal Test. at 26-27 (Back, Lancaster, Striz).

<sup>1087</sup> See Tr. at 468 (Shriver).

missivity and storage coefficients were discussed previously in detail.<sup>1088</sup> While Dr. Kreamer claimed that the allegedly wide range of transmissivities (i.e., 230 ft<sup>2</sup>/d to 1780 ft<sup>2</sup>/d) and storage coefficients ( $1.7 \times 10^{-3}$  to  $8.32 \times 10^{-5}$ ) are not consistent with homogeneous conditions,<sup>1089</sup> we disagreed based on the apparent consistency of the hydraulic parameters resulting from the pumping test analyses,<sup>1090</sup> values that OST agreed can often vary by an order of magnitude or more.<sup>1091</sup> We also noted that the derived storativity values are within the range expected for a confined aquifer.<sup>1092</sup> Also, it seems clear to us that well Monitor-3, which was only 100 ft from the pumping well, was impacted by well effects, and concur with the Staff's re-analysis of the information to match with the later time data, which resulted in values of transmissivity and storage coefficients that are more in line with the other wells and indicative of a confined aquifer.<sup>1093</sup>

*g. Anisotropy*

The Board's findings as to anisotropy were discussed previously in detail,<sup>1094</sup> and therefore are not repeated here other than to reiterate that it is OST's opinion that directional differences in hydraulic conductivity for the BC/CPF remain undefined and not quantified.<sup>1095</sup> Dr. Kreamer claimed that CBR's position of no anisotropy is based on a crude plot of limited pumping test data.<sup>1096</sup> We disagreed, finding that Figure 16 in the pumping test report<sup>1097</sup> was generated using the monitoring well network data and software-generated contours to create the non-biased horizontal flow patterns derived from the pumping test results and displayed in this figure.<sup>1098</sup> And we pointed out that the drawdown contours are far from the elliptical shape that would indicate significant directional hydraulic conductivity from lateral anisotropy.<sup>1099</sup> With OST not disputing what the con-

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<sup>1088</sup> See *supra* section VII.D.2.

<sup>1089</sup> See Kreamer Initial Test. at 6.

<sup>1090</sup> See Test #8 Rep. tbls. app. at 10 of 10 (tbl. 8).

<sup>1091</sup> See Tr. at 485-88 (Kreamer).

<sup>1092</sup> See Staff Rebuttal Test. at 15 (Back, Lancaster, Striz) (citing Todd Text at 45-46 (stating that storativity values for a confined aquifer range between  $5 \times 10^{-5}$  and  $5 \times 10^{-3}$ )).

<sup>1093</sup> See Tr. at 502-05, 530 (Striz).

<sup>1094</sup> See *supra* section VII.E.2.

<sup>1095</sup> See Kreamer Initial Test. at 7.

<sup>1096</sup> See *id.* (citing EA at 70, 255; Test #8 Rep. figs. app. at PDF 48 (fig. 16)).

<sup>1097</sup> See Test #8 Rep. figs. app. at PDF 48 (fig. 16).

<sup>1098</sup> See CBR Rebuttal Test. at 12 (Lewis, Nelson, Pavlick).

<sup>1099</sup> See Staff Rebuttal Test. at 27 (Back, Lancaster Striz) (citing Test #8 Rep. figs. app. at PDF 48 (fig. 16)).

tour lines represent if they are based on accurate data,<sup>1100</sup> we found that the plot illustrates near circular contour lines indicative of isotropic flow in a horizontal plane of the BC/CPF. As a result, we concluded that CBR was justified in its determination that more detailed analyses of horizontal anisotropy are not necessary given the lack of conceptual basis in the geometry of the drawdown cone. The Board also found that Dr. Kreamer failed to provide any concrete evidence or even reasonable indications of observations that supported his opinion that anisotropy is not defined or quantified, or that this lack of definition has any significant safety impact on the proposed Marsland ISR facility.

The Board concluded that the alleged necessity of having horizontal isotropic conditions in the BC/CPF has not been justified by the Intervenor because it is unrelated to the vertical containment of a production zone aquifer that is controlled by the hydraulic characteristics of the UCU and LCU.<sup>1101</sup> And as far as vertical anisotropy is concerned, OST did not challenge the Staff's persuasive argument that vertical anisotropy in the BC/CPF sandstone aquifer will likely be beneficial for ISR operations because it creates the preferred horizontal flow that increases the interconnectivity of the BC/CPF, thus helping the operator to balance the wellfields and maintain an inward gradient.<sup>1102</sup>

## **2. Board Findings on Challenges to Evidence of Hydrogeologic Containment of BC/CPF**

A detailed discussion of the Board's findings addressing the challenges to the Staff's list of evidence of the hydrogeologic containment of the BC/CPF aquifer has been presented above,<sup>1103</sup> and is not repeated here except to present a summary of the findings as is relevant to Concern 4. The Board found that CBR and the Staff presented extensive data and analysis supporting multiple lines of evidence establishing that the production zone is hydrologically isolated from the overlying aquifers. Overall, we found that the information in the CBR ER and TR, as well as the Staff's EA and SER, demonstrated the isolation of the BC/CPF aquifer within the MEA. We thus concluded that most of the independent observations of containment provided by CBR and the Staff strongly demonstrate that the BC/CPF has the hydraulic properties to contain processing fluids and to control lateral migration within the aquifer.

According to the Staff, Dr. Kreamer appeared to be suggesting that if the Theis analyses show deviations consistent with a recharge boundary, it follows

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<sup>1100</sup> See Tr. at 539-40 (Kreamer).

<sup>1101</sup> See Staff Rebuttal Test. at 29 (Back, Lancaster, Striz).

<sup>1102</sup> See *id.*; Tr. at 544-46 (Kreamer).

<sup>1103</sup> See *supra* section V.C.3.

that a significant volume of water may be flowing from the overlying aquifer into the BC/CPF sandstone aquifer, which would indicate a lack of containment.<sup>1104</sup> We found that Dr. Kreamer's explanation is not likely because the Intervenor provided no convincing evidence for this volume of flow and, as the Staff summarized in its initial written testimony,<sup>1105</sup> other multiple, independent lines of evidence showed a high degree of containment so as to preclude a preferential vertical flow (as championed by the Intervenor) that would jeopardize the containment properties of the BC/CPF aquifer.

Given the opportunity to address each of the items that the Staff presented as evidence of containment of production fluids within the BC/CPF, Dr. Kreamer provided persuasive arguments that the purported complexity of potential geochemical interactions during groundwater flow through geologic strata was not a basis supporting the BC/CPF containment.<sup>1106</sup> The Board agreed with the Intervenor that the resulting difference between the water quality of the upper Arikaree/Brule aquifer and that of the BC/CPF aquifer is unlikely to be solely a result of isolation of the upper aquifers from the Chadron Formation. As a result, we place very little weight on the observation of differing water quality as definitive proof of aquifer containment, a position that is acknowledged to some degree by CBR witness Lewis.<sup>1107</sup>

Relative to Dr. Kreamer's comments on each of the remaining seven signs of containment,<sup>1108</sup> however, the Board finds that the preponderance of the evidence supports the validity of the Staff's seven other observations, noting that the presence of any one of these items provides a significant demonstration of the containment properties of the BC/CPF aquifer. While OST's hypotheses in rebuttal are not infeasible, the Board nonetheless found there is insufficient contrary evidence to show a likelihood that containment will be breached by ISR operations sufficiently to jeopardize the integrity of the thick UCU. This is particularly so given all seven of the Staff-identified items would have to prove insufficient to establish containment, a situation that is highly unlikely to occur.

Ultimately, the central focus of Dr. Kreamer's arguments regarding a lack of hydrogeologic containment was his premise that there is fracturing of the geologic strata that had the potential to create a preferential pathway for groundwater flow such that a robust fracture analysis is required to quantify this possible structural disturbance.<sup>1109</sup> Yet, all the parties agreed to a greater or lesser degree that in assessing a facility such as the MEA, it is not the mere presence of a

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<sup>1104</sup> See Staff Rebuttal Test. at 19 (Back, Lancaster, Striz) (citing Kreamer Initial Test. at 2, 6).

<sup>1105</sup> See *id.* (citing Staff Initial Test. at 28-31) (Back, Lancaster)).

<sup>1106</sup> See Tr. at 951-56 (Lewis, Kreamer).

<sup>1107</sup> See Tr. at 956 (Lewis).

<sup>1108</sup> See Tr. at 965-67, 990-96 (Kreamer).

<sup>1109</sup> See Tr. at 998.

fracture that is important but its transmissivity. And in this regard, OST has failed to provide convincing evidence of the existence of such a preferential path that has groundwater flow capacity sufficient to negate the CBR and Staff persuasive showings regarding the seven items supporting a containment finding.

To be sure, in his initial testimony, Dr. Kreamer alleged that the large range of storativity and transmissivity values from the May 2011 pumping test were not consistent with homogeneous conditions at the MEA. But based on the evidentiary record, the Board found that these values fall within the range expected for a confined aquifer. Furthermore, at the hearing Staff witness Dr. Striz clarified that the largest value for storativity should be reduced by nearly two orders of magnitude, yielding a narrower range that is more in line with other monitoring wells and even more indicative of a confined aquifer. Thus, regarding transmissivity and the analogous parameter of hydraulic conductivity, we find the results fall within the containment parameters that even Dr. Kreamer agreed can often vary by an order of magnitude or more.<sup>1110</sup>

### **C. Summary of Unsubstantiated Assumptions of BC/CPF Aquifer Isolation**

For Concern 4, the Board reached findings on what OST asserted are unsubstantiated assumptions of BC/CPF aquifer isolation used for both the Theis and Cooper-Jacob aquifer analyses, as well as to assess the BC/CPF aquifer containment and interconnectivity properties that are considered necessary to assure the safe operation and restoration of the facility and to assess the environmental impacts from ISR activity in the MEA. A summary of our findings follows.

#### ***1. Summary of Unsubstantiated Assumptions with Aquifer Pumping Test Analyses***

The assumptions underlying the analytical analyses concern several topics, including the use of the Theis and Cooper-Jacob methodologies, the lack of preferential flow paths associated with fracturing/faulting, aquifer confinement and apparent infinite extent, homogeneity and isotropy, uniform effective aquifer thickness, range of transmissivity and storativity, and anisotropy assessments.

Regarding the assumptions associated with the use of the Theis and Cooper-Jacob methodologies in interpreting the May 2011 aquifer pumping test, the Board found that CBR graphically analyzed both the drawdown and recovery data using the Theis drawdown and recovery method and the Cooper-Jacob

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<sup>1110</sup> See Tr. at 485-88.

distance-drawdown method.<sup>1111</sup> Additionally, while prepared to use more complex analytical techniques if needed, the Applicant concluded, and we agreed, that there was no need to do so based on the apparent consistency of the resulting hydraulic parameters for values that,<sup>1112</sup> as OST acknowledged, can often vary by an order of magnitude or more.<sup>1113</sup> The Board also found that CBR conducted the pumping test according to its plan approved by NDEQ, using accepted industry testing and analysis procedures that are incorporated into ASTM standards.<sup>1114</sup> We found further that Dr. Kreamer conceded that the more complex analysis methods he suggested may have the same assumptions of aquifer homogeneity, isotropy, uniform thickness, and lateral extent as do the Theis and Cooper-Jacob methods.<sup>1115</sup>

As to the assumptions associated with the lack of preferential flow paths associated with fracturing/faulting, the Board found that there is likely some degree of structural fracturing of the geologic strata underlying the MEA, but that transmissivity, rather than the mere presence of fractures, is the critical issue. In this regard, we found that there is no evidence of extensive transmissive, heterogeneous pathways that would provide a preferential flow for contaminants to uncontrollably migrate into the adjacent aquifers or into the neighboring Niobrara River and the more distant White River.

Concerning the assumptions associated with aquifer confinement and apparent infinite extent, the Board found the parties in agreement that the BC/CPF aquifer meets the definition of a confined aquifer because its potentiometric surface rises above the top elevation of the aquifer.<sup>1116</sup> And with respect to lateral extent of the aquifer, we concluded that the BC/CPF aquifer is not only present over the entire MEA site, but goes well beyond these limits based on site-specific regional cross-sections derived from borehole data and geophysical logging and the lack of definitive boundary conditions observed during the May 2011 aquifer pumping test.<sup>1117</sup>

We also found that at some scale, all geologic strata are heterogeneous and anisotropic.<sup>1118</sup> Furthermore, we acknowledged that when analyzing pumping

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<sup>1111</sup> See CBR Initial Test. at 29 (Lewis, Nelson, Pavlick).

<sup>1112</sup> See CBR Rebuttal Test. at 10 (Lewis, Nelson, Pavlick).

<sup>1113</sup> See Tr. at 485-88 (Kreamer).

<sup>1114</sup> See Staff Initial Test. at 26 (Back, Lancaster) (citing ER at 3-45; Tech. Rep. at 2-82); Staff Rebuttal Test. at 25 (Back, Lancaster, Striz) (citing ASTM Theis Analysis Standards).

<sup>1115</sup> See Tr. at 507-09.

<sup>1116</sup> See Staff Initial Test. at 30 (Back, Lancaster); Test #8 Rep. at 11; Tr. at 450-51 (Kreamer).

<sup>1117</sup> See Staff Rebuttal Test. at 28 (Back, Lancaster, Striz) (citing Test #8 Rep. at 13; Tech. Rep. Figs. at 49-62 (figs. 2.6-3a to -3n), 87-90 (figs. 2.6-21 to -24)).

<sup>1118</sup> See CBR Rebuttal Test. at 11 (Lewis, Nelson, Pavlick); Staff Rebuttal Test. at 25 (Back, Lancaster, Striz); Tr. at 491-94 (Kreamer).

test data, application of the “simplistic” Theis equations to these strata is routinely done in practice with an understanding of the assumptions inherent to their use.<sup>1119</sup> And at the relevant scale for licensing, we noted that the Applicant assumed homogeneous, isotropic responses and then concluded from the consistent test results supporting the applicability of those assumptions to the MEA that additional analysis complexity was unnecessary.<sup>1120</sup> The Board also found there was no need for CBR to augment its TR or for the Staff to alter its EA to address this issue given that the evidence in the record supports a finding that there are no known faults or significant fracturing underlying the MEA that might cause heterogeneity and anisotropy of the underlying geologic strata.

For the assumptions associated with uniform effective aquifer thickness, the Board found that the Staff referenced ample evidence that the local stratigraphy around the MEA is relatively uniform and uncomplicated and, specifically, that the site-specific and regional cross-sections provided by CBR show that the BC/CPF is relatively uniform in thickness over the site.<sup>1121</sup> Moreover, while the visual representations of the CBR geologic cross-sections may, in spots, illustrate an apparent abrupt change in the upper surface of the BC/CPF, the Board found that it is likely an artifact of the exaggerated scales of these graphs.<sup>1122</sup>

Regarding the assumptions associated with the range of transmissivity and storativity, the Board found consistency among the hydraulic parameters resulting from the May 2011 pumping test analyses for values that, as OST acknowledged, can often vary by an order of magnitude or more.<sup>1123</sup> And we found as well that the derived storativity values are within the range expected for a confined aquifer.<sup>1124</sup>

Finally, concerning the assumptions associated with anisotropy, the Board found that potentiometric drawdown was created using the monitoring well network and software-generated contours to create non-biased horizontal flow patterns,<sup>1125</sup> and that the analysis results indicated isotropic flow in a horizontal plane of the BC/CPF.<sup>1126</sup> As a result, we found that CBR was justified in stating that more detailed analyses of horizontal anisotropy are not necessary given the

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<sup>1119</sup> See Staff Rebuttal Test. at 25 (Back, Lancaster, Striz); CBR Rebuttal Test. at 11 (Lewis, Nelson, Pavlick).

<sup>1120</sup> See CBR Rebuttal Test. at 11 (Lewis, Nelson, Pavlick).

<sup>1121</sup> See Staff Rebuttal Test. at 29 (Back, Lancaster, Striz) (citing Staff Initial Test. at 10-11, 12-13, 24-25; Tech. Rep. Figs. at 49-62 (figs. 2.6-3a to -3n), 87-90 (figs. 2.6-21 to -24)).

<sup>1122</sup> See Tr. at 468 (Shriver).

<sup>1123</sup> See Test #8 Rep. tbls. app. at 10 of 10 (tbl. 8); Tr. at 485-88 (Kreamer).

<sup>1124</sup> See Staff Rebuttal Test. at 15 (Back, Lancaster, Striz) (citing Todd Text at 45-46).

<sup>1125</sup> See CBR Rebuttal Test. at 12 (Lewis, Nelson, Pavlick).

<sup>1126</sup> See Staff Rebuttal Test. at 29 (Back, Lancaster, Striz).



lack of conceptual basis in the geometry of the drawdown cone.<sup>1127</sup> As far as vertical anisotropy is concerned, OST did not dispute the Staff's assertion that vertical anisotropy creates the preferred horizontal flow in the BC/CPF sandstone aquifer and therefore will likely be beneficial for ISR operations.<sup>1128</sup>

## **2. Summary of Unsubstantiated Assumptions with BC/CPF Aquifer Containment**

Regarding the assumptions associated with the containment of the BC/CPF aquifer, the Board found that CBR and the Staff presented extensive data and analyses to support the conclusions in the CBR TR, as well as in the Staff EA and SER, that the ore-bearing zones are hydrologically isolated. We also found that a Staff-identified list of independent observations of containment, in general, strongly established that the BC/CPF has the hydraulic properties to contain processing fluids and to control lateral migration within the aquifer.<sup>1129</sup>

The Board concluded as well that for one of the Staff-identified items purportedly evidencing containment, i.e., the complexity of potential geochemical interactions during groundwater flow through geologic strata, OST provided persuasive arguments as to why that element failed to demonstrate BC/CPF aquifer containment.<sup>1130</sup> On the basis of the evidentiary record, and contrary to the Staff's assertions, we concluded that the resulting difference between the water quality of the upper Arikaree/Brule aquifer and that of the BC/CPF aquifer was unlikely to be solely a result of isolation of the upper aquifers from the Chadron Formation. As a result, we place very little weight on the observation of differing water quality as proof of aquifer containment, a position with which CBR did not disagree.<sup>1131</sup> That being said, we found the seven other Staff-identified items supporting BC/CPF containment to be valid, emphasizing that any one provides a significant demonstration of the BC/CPF aquifer's containment properties.

We also observed that, while not infeasible, OST's hypotheses challenging the BC/CPF aquifer's containment properties nonetheless have a low probability of occurrence and would all need to come to pass for containment to be breached sufficiently to jeopardize the integrity of the thick UCU, a highly unlikely situation. Accordingly, OST's attempts to refute the Staff's seven other lines of evidence supporting BC/CPF containment deserve little weight.<sup>1132</sup>

We find little substance in particular in the proposition upon which Dr.

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<sup>1127</sup> See CBR Rebuttal Test. at 12 (Lewis, Nelson, Pavlick).

<sup>1128</sup> See Staff Rebuttal Test. at 29 (Back, Lancaster, Striz), Tr. at 544-46 (Kreamer).

<sup>1129</sup> See *supra* section V.C.1.

<sup>1130</sup> See Tr. at 951-56 (Lewis, Kreamer).

<sup>1131</sup> See Tr. at 956 (Lewis).

<sup>1132</sup> See Tr. at 965-67, 990-96 (Kreamer).

Kreamer placed the main weight of his arguments, i.e., the premise that there is fracturing of the geologic strata that creates a preferential pathway for groundwater flow, a structural disturbance that he asserted requires quantification via a robust fracture analysis.<sup>1133</sup> Although all the parties agreed that it is not the mere presence of a fracture, but the fracture's transmissivity, that is important, OST failed to provide substantial evidence indicating that such a preferential path exists with sufficient flow to affect the other indications of aquifer containment. In contrast, we found that the hydraulic parameter values of storativity and transmissivity evidenced by the May 2011 pumping test fell within those values expected for a confined aquifer, with a consistency in magnitude for parameters that, as OST acknowledged, can often vary by an order of magnitude or more.<sup>1134</sup>

## X. CONCLUSIONS OF LAW

Relative to OST Contention 2, which involves both AEA safety issues and, with regard to Concerns 1, 3, and 4, NEPA issues, we conclude, as a matter of law, that the preponderance of evidence before the Board establishes that the CBR application, including its TR, and the Staff EA provide sufficient information regarding (1) the geological setting of the MEA so as to meet the AEA safety requirements in 10 C.F.R. Part 40, including Appendix A, Criterion 5(B)(2), the NEPA-implementing requirements in 10 C.F.R. Part 51, and the review criteria of NUREG-1569, section 2.6; and (2) the potential effects of the MEA project on the adjacent surface and groundwater resources so as to meet the NEPA-implementing requirements of 10 C.F.R. Part 51, and the review criteria of NUREG-1569, section 2.7.

Additionally, relative to Contention 2, the Board concludes that (1) the MEA application, including the CBR TR, provides a description of hydraulic conductivity, hydraulic gradient, effective porosity, transmissivity, and storativity as is necessary to demonstrate CBR's ability to conduct ISR operations and groundwater restoration in accordance with NRC regulations in 10 C.F.R. Part 40 and the review criteria of NUREG-1569, section 2.7; (2) the CBR TR and the Staff EA both adequately describe the hydrologic conceptual model for the MEA in that (a) the conceptual model as set forth in the CBR TR is supported by extensive site characterization data and demonstrates with scientific confidence that there will be adequate confinement of ISR production fluids at the MEA, and (b) the Staff EA satisfied the NEPA "hard look" requirement in its consideration of CBR's hydrologic conceptual model, site characterization data, and evidence

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<sup>1133</sup> See Tr. at 998 (Kreamer).

<sup>1134</sup> See Tr. at 485-88 (Kreamer).

of confinement when assessing potential impacts to adjacent surface water and groundwater resources at the MEA; and (3) the CBR TR and the Staff EA do not contain unsubstantiated assumptions related to isolation of aquifers at the MEA.

Accordingly, as to the matters at issue in OST Contention 2, we conclude as a matter of law that the MEA application, including CBR's TR, demonstrates that (1) CBR will comply with the requirements of the AEA and the applicable NRC safety regulations in 10 C.F.R. Part 40; and (2) the Staff's environmental review, including its EA and FONSI, comply with the requirements of NEPA and the agency's environmental regulations in 10 C.F.R. Part 51.

We thus resolve OST Contention 2 in favor of the Staff and CBR.

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Accordingly, it is this twenty-eighth day of February 2019, ORDERED that:

A. Intervenor OST's Contention 2, including associated Concerns 1–4, are resolved on the merits in favor of CBR and the Staff, and the proceeding before this Board is *terminated*.

B. In accordance with 10 C.F.R. § 2.1210, this initial decision will constitute a final decision of the Commission 120 days from the date of issuance (or the first agency business day following that date if it is a Saturday, Sunday, or federal holiday, *see* 10 C.F.R. § 2.306(a)), i.e., on *Friday, June 28, 2019*, unless a petition for review is filed in accordance with 10 C.F.R. § 2.1212, or the Commission directs otherwise. Any party wishing to file a petition for review on the grounds specified in 10 C.F.R. § 2.341(b)(4) must do so within twenty-five (25) days after service of this initial decision. Unless authorized by law, the filing of a petition for review is mandatory for a party to have exhausted its administrative remedies before seeking judicial review. Within 25 days after service of a petition for review, parties to the proceeding may file an answer supporting or op-

posing Commission review. Any petition for review and any answer shall conform to the requirements of 10 C.F.R. § 2.341(b)(2)–(3).

THE ATOMIC SAFETY AND  
LICENSING BOARD

G. Paul Bollwerk, III, Chairman  
ADMINISTRATIVE JUDGE

Richard E. Wardwell  
ADMINISTRATIVE JUDGE

Thomas J. Hirons  
ADMINISTRATIVE JUDGE

Rockville, Maryland  
February 28, 2019

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

**COMMISSIONERS:**

**Kristine L. Svinicki**, Chairman  
**Jeff Baran**  
**Stephen G. Burns**  
**Annie Caputo**  
**David A. Wright**

In the Matter of

**Docket No. 11005323**  
**(License No. XW008/05)**

**DIVERSIFIED SCIENTIFIC  
SERVICES, INC.**  
**(Export of Low-Level Waste)**

**March 11, 2019**

**NUCLEAR NON-PROLIFERATION ACT: HEARING REQUEST**

To obtain a hearing in a nuclear export proceeding, petitioners must successfully explain why a hearing would be in the public interest and how a hearing would assist the Commission in making the required statutory determinations.

**NUCLEAR NON-PROLIFERATION ACT: HEARING REQUEST**

To obtain a hearing in a nuclear export proceeding, petitioners must show that a hearing would bring new information to light.

**MEMORANDUM AND ORDER**

**I. INTRODUCTION**

Nuclear Information and Resource Service, Tennessee Environmental Council, and Don't Waste Michigan (collectively, Petitioners) request leave to inter-

vene on an export license application filed by Diversified Scientific Services, Inc.<sup>1</sup> Diversified Scientific Services seeks to amend its existing export license that authorizes the export of low-level radioactive waste to Canada. Petitioners seek a public hearing on Diversified Scientific Services' application. For the reasons discussed below, we deny Petitioners' request for a hearing, and we refer Petitioners' request to the Office of International Programs to consider as non-adjudicatory comments when addressing the pending licensing request.

## II. BACKGROUND

Since 2002, Diversified Scientific Services has possessed an NRC export license (XW008) that allows it to export low-level radioactive material to its customers in Canada.<sup>2</sup> In 2017, Diversified Scientific Services filed an application to amend the license.<sup>3</sup> Specifically, Diversified Scientific Services sought the following amendments to XW008: (1) update the licensee's contact information; (2) extend the export license for five additional years; (3) change the final shipment date; (4) change the name of one point of origin entity; (5) include two ports of exit; (6) remove a reference to waste classification; and (7) remove certain shipping references. Shortly thereafter, the NRC provided notice in the *Federal Register* of that application.<sup>4</sup> On August 10, 2017, the Petitioners filed a request for hearing and leave to intervene on the application.<sup>5</sup>

While that hearing request was pending, Diversified Scientific Services filed a revised application in February 2018 with the NRC to amend XW008.<sup>6</sup> The revised application superseded the 2017 application, and it sought the following amendments to XW008: (1) change the licensee's contact information; (2) extend the export license for five additional years; (3) change the final shipment date; (4) change the name of one point of origin entity; (5) revise the quantity, description, and radioactivity levels of the materials authorized for export; and (6) include two ports of exit. Later that year, the NRC provided notice

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<sup>1</sup> See Amended Petition for Leave to Intervene and Request for Hearing of Petitioners Nuclear Information and Resource Service, Tennessee Environmental Council and Don't Waste Michigan (June 14, 2018) (ADAMS accession no. ML18166A000) (Petition).

<sup>2</sup> Diversified Scientific Services possesses this material pursuant to an Agreement State radioactive material license issued by Tennessee. Radioactive Material License Number R-73014-H24 (ML18318A277).

<sup>3</sup> Application for NRC Export, License No. XW008/05 (Mar. 24, 2017) (ML17089A176).

<sup>4</sup> Diversified Scientific Services, Inc., 82 Fed. Reg. 32,014 (July 11, 2017).

<sup>5</sup> Request for Hearing and Leave to Intervene in DSSI Export Specific License Amendment/Renewal (Aug. 10, 2017) (ML17222A835) (2017 Petition).

<sup>6</sup> Application for NRC Export, License No. XW008/05 (Feb. 9, 2018) (ML18085A690).

of Diversified Scientific Services' revised application in the *Federal Register*.<sup>7</sup> Petitioners then filed the amended hearing request now before us.<sup>8</sup>

### III. PETITIONERS' HEARING REQUEST

#### A. Requirements for Obtaining a Hearing on an Export License

In an export licensing proceeding, we will grant a hearing when we find that such a hearing will be in the public interest and will assist us in making the statutory determinations required by the Atomic Energy Act.<sup>9</sup> A hearing request in an export case, therefore, must "explain why a hearing or an intervention would be in the public interest and how a hearing or intervention would assist the Commission in making the [required statutory] determinations."<sup>10</sup> We consider these factors in deciding whether to grant or deny a hearing request.<sup>11</sup>

Our regulations further provide that a hearing request must "specify, when a person asserts that his interest may be affected, both the facts pertaining to his interest and how it may be affected."<sup>12</sup> When determining whether a petitioner identifies an interest that may be affected, we consider the following:

- (1) The nature of the alleged interest;
- (2) How that interest relates to issuance or denial; and
- (3) The possible effect of any order on that interest, including whether the relief requested is within the Commission's authority, and, if so, whether granting relief would redress the alleged injury.<sup>13</sup>

Persons without an affected interest are not as likely as persons with an affected interest to contribute to our decisionmaking; they are also less likely to be able to show that a hearing would be in the public interest and would assist us in making the requisite statutory and regulatory determinations.<sup>14</sup>

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<sup>7</sup> Diversified Scientific Services, Inc., 83 Fed. Reg. 22,534 (May 15, 2018).

<sup>8</sup> Petition.

<sup>9</sup> *U.S. Department of Energy* (Export of 93.20% Enriched Uranium), CLI-16-15, 84 NRC 53, 56 (2016) (quoting 42 U.S.C. § 2155a).

<sup>10</sup> 10 C.F.R. § 110.82(b)(3).

<sup>11</sup> *Id.* § 110.84(a).

<sup>12</sup> *Id.* § 110.82(b)(4).

<sup>13</sup> *Id.* § 110.84(b).

<sup>14</sup> *Cf. U.S. Department of Energy* (Plutonium Export License), CLI-04-17, 59 NRC 357, 367 (2004).

We first consider Petitioners' assertion of an interest, and we then address whether Petitioners have shown that a hearing would be in the public interest and would assist us in making the required determinations.

## **B. Analysis of Petitioners' Hearing Request**

In the declarations accompanying their 2017 Petition, Petitioners assert various harms that their individual members may suffer if this export license is granted, including the following: radioactive waste entering the watercourses near their homes, exposure to radiation during traffic jams as a result of being in close proximity to a cargo truck carrying licensed material, exposure to radiation as a result of sabotage or terrorist activity, the release of radioactive metals and other materials into landfills, and risks to the food chain resulting from the release of radioactive material.<sup>15</sup> Petitioners imply that the nature of their interests is in avoiding each of these harms.

Although Petitioners arguably have articulated the nature of their interests, those interests do not bear a sufficient nexus to the proposed export of low-level waste to Canada to satisfy the other elements we consider when assessing whether an asserted interest may be affected by a proceeding. To show an interest that may be affected by *this* proceeding, Petitioners must assert that the proposed *export* itself could cause them harm.<sup>16</sup> Petitioners' asserted harms relate to activities that are separately authorized by domestic possession and transportation regulations — none of the asserted harms derive directly and specifically from exports that might be made if the application before us is granted. An export license authorizes only the physical transfer of nuclear equipment or material at an international border. Denying this application, therefore, would not address the Petitioners' asserted harms because a denial would not alter Diversified Scientific Services' license to domestically possess the radioactive material or its authority to transport low-level radioactive waste. Because of the lack of a nexus between the export application and the asserted harms, we conclude that Petitioners have not demonstrated that they possess an interest that may be affected by this proceeding.

Additionally, Petitioners have not demonstrated that granting an adjudicatory hearing would be in the public interest and would assist us in making the required statutory and regulatory determinations. To satisfy these factors,

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<sup>15</sup> See [Petitioners'] Appendix of Membership Declarations in Support of Petition for Leave to Intervene Against Diversified Scientific Services, Inc. Specific Export License Amendments/Renewal and Request for Adjudicatory Hearing (Aug. 10, 2017) (ML17222A833).

<sup>16</sup> See *U.S. Department of Energy*, CLI-04-17, 59 NRC at 365 (explaining that in export cases, the alleged harm must "result from the grant or denial of the export license").



a petitioner must show how a hearing would bring new information to light.<sup>17</sup> The crux of the amended petition is that Diversified Scientific Services has not properly identified the characteristics of the waste that it proposes to export to Canada, and it has not confirmed that the Canadian recipient of the waste is authorized to receive the waste.<sup>18</sup> These arguments are stated clearly in the petition itself, however, and Petitioners do not explain how a hearing is necessary to generate the information necessary to address any asserted omissions in the application.

The 2017 Petition, which the amended petition incorporates, also raises concerns with respect to transportation and reprocessing.<sup>19</sup> Here too, Petitioners do not explain how a hearing will generate additional information to assist the agency in making its determination. Petitioners argue that a hearing would assist the agency and be in the public interest, but instead of addressing the relevant standard for export licensing — which generally reflects international nonproliferation concerns — they focus their arguments on domestic issues.<sup>20</sup> Moreover, Petitioners have not shown that they possess “special knowledge” or that they would be in a position to present information at a hearing that we do not otherwise possess.<sup>21</sup>

Even though Petitioners have not satisfied the NRC’s hearing requirements in Part 110, the NRC can still consider the points raised in the petition. Part 110 explicitly encourages written comments from the public regarding export license applications and provides that the NRC will consider and, if appropriate, respond to any comments received.<sup>22</sup> In our view, the amended petition is properly considered as a public comment on Diversified Scientific Services’ application. We therefore refer the amended petition to the Office of International Programs as a public comment pursuant to 10 C.F.R. § 110.81(a).

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<sup>17</sup> *U.S. Department of Energy*, CLI-16-15, 84 NRC at 58 n.25 (quoting *U.S. Department of Energy*, CLI-04-17, 59 NRC at 369 (“Petitioners have already submitted detailed information as to the basis for their position. We do not believe a hearing will result in significant new information that is not already available to and considered by the Commission in making the requisite statutory determinations.”); *Transnuclear, Inc.* (Export of 93.3% Enriched Uranium), CLI-00-16, 52 NRC 68, 72 (2000) (explaining that nothing in the petitioner’s filings indicates it will be able to “present significant information not already available to and considered by the Commission”)).

<sup>18</sup> Petition at 2.

<sup>19</sup> 2017 Petition at 6-9; Petition at 2.

<sup>20</sup> Compare 10 C.F.R. § 110.42(c)-(d) (providing that for export licensing of byproduct material, the agency will consider whether the export is “inimical to the common defense and security”), with 2017 Petition at 9-11 (addressing whether a hearing would assist the agency).

<sup>21</sup> Cf. *Transnuclear, Inc.* (Export of 93.15% Enriched Uranium), CLI-94-1, 39 NRC 1, 6 (1994).

<sup>22</sup> 10 C.F.R. § 110.81.

## VI. CONCLUSION

We deny Petitioners' request for a hearing. For the reasons discussed above, we find that the request does not meet the established standard for holding a hearing because a hearing would not be in the public interest and would not assist us in making the required statutory and regulatory determinations. The NRC Staff should consider the amended petition as a public comment on Diversified Scientific Services' application, consistent with 10 C.F.R. § 110.81(a).

IT IS SO ORDERED.

For the Commission

Annette L. Vietti-Cook  
Secretary of the Commission

Dated at Rockville, Maryland,  
this 11th day of March 2019.

### **Additional Views of Commissioner Baran**

While I agree that it is not necessary to hold a hearing on this matter, I write separately because I disagree with the majority's conclusion that Petitioners have not demonstrated that they possess an interest that may be affected by this proceeding.

In the declarations accompanying their 2017 Petition, Petitioners include statements from one member who resides within 1.5 miles of the Peace Bridge and another member who resides within 2.5 miles of the Blue Water Bridge.<sup>1</sup> Both bridges are listed by Diversified Scientific Services in the revised application as the exit ports to be used for the export of low-level radioactive waste from the United States to Canada.<sup>2</sup> As the majority decision acknowledges, Petitioners assert several harms that their individual members could suffer if this export license is granted.<sup>3</sup> And although Diversified Scientific Services is separately authorized to possess and transport the low-level radioactive material within the United States, there is no reason to believe that the material would be present at these international crossings (and a short distance from the homes of Petitioners' members) if it were not being exported to Canada. Because the low-level radioactive material at issue would not cross the Peace Bridge or Blue Water Bridge in the absence of the requested export license, the stated concerns of the nearby residents have a sufficient nexus to the proposed export for the Commission to find that Petitioners have an affected interest in this proceeding.

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<sup>1</sup> See [Petitioners'] Appendix of Membership Declarations in Support of Petition for Leave to Intervene Against Diversified Scientific Services, Inc. Specific Export License Amendments/Renewal and Request for Adjudicatory Hearing, at ScheenKloth Decl. 1 and Zimmer-Lloyd Decl. 1 (Aug. 10, 2017) (ML17222A833).

<sup>2</sup> Application for NRC Export, License No. XW008/05, Attach. 1, at 3 (Feb. 9, 2018) (ML18085-A690).

<sup>3</sup> See [Petitioners'] Appendix of Membership Declarations in Support of Petition for Leave to Intervene Against Diversified Scientific Services, Inc. Specific Export License Amendments/Renewal and Request for Adjudicatory Hearing (Aug. 10, 2017) (ML17222A833).

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

**COMMISSIONERS:**

**Kristine L. Svinicki**, Chairman  
**Jeff Baran**  
**Stephen G. Burns**  
**Annie Caputo**  
**David A. Wright**

In the Matter of

Docket No. 72-1050-ISFSI

**INTERIM STORAGE  
PARTNERS LLC  
(WCS Consolidated Interim Storage  
Facility)**

**March 11, 2019**

**CHIEF ADMINISTRATIVE JUDGE**

The Chief Administrative Judge of the Atomic Safety and Licensing Board Panel has “broad authority” to manage the Panel’s docket efficiently, including such matters as splitting an adjudication between two boards. *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-98-7, 47 NRC 307, 311 (1998); *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-916, 29 NRC 434, 438 (1989). This authority extends to substituting board members — even replacing an entire board — if necessary for workload reasons.

**LICENSING BOARD — RECUSAL**

When considering whether to recuse themselves from a particular matter, Licensing Board members should look to standards that apply to federal judges. *Houston Lighting and Power Co.* (South Texas Project, Units 1 and 2), CLI-82-9, 15 NRC 1363, 1365-67 (1982).

### **LICENSING BOARD — RECUSAL**

A board member should recuse or disqualify him- or herself whenever the judge's impartiality in the proceeding "might reasonably be questioned," as well as in specific circumstances in which conflict of interest is shown.

### **LICENSING BOARD — RECUSAL**

Even where there is no actual conflict of interest, a judge should disqualify himself or herself where a reasonable person would question the judge's impartiality.

### **LICENSING BOARD — RECUSAL**

While a judge should not have preconceived beliefs about the facts, it is not grounds for disqualification for a judge to have formed an opinion about the applicable law. *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-777, 20 NRC 21, 34-35 (1984); *Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-101, 6 AEC 60, 64, 65, 66 (1973).

## **MEMORANDUM AND ORDER**

This proceeding involves the application of Interim Storage Partners LLC for a license to construct and operate a consolidated interim storage facility (CISF) in Andrews County, Texas. Numerous petitioners sought to intervene and requested a hearing in this proceeding, and the Board has not yet ruled on any of the petitions. On November 26, 2018, a group of petitioners (referred to as the "Moving Petitioners") requested that each of the Board's three members disqualify himself from hearing this matter.<sup>1</sup> The Staff opposed the motion, and other participants in the hearing did not respond to it.<sup>2</sup>

The Board denied the motion and referred its ruling to the Commission, as our regulations require with respect to motions to disqualify.<sup>3</sup> We agree with

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<sup>1</sup> See Motion of Sierra Club, Don't Waste Michigan, Citizens' Environmental Coalition, Citizens for Alternatives to Chemical Contamination, Nuclear Energy Information Service, Public Citizen, Inc., San Luis Obispo Mothers for Peace, Sustainable Energy and Economic Development (SEED) Coalition, and Leona Morgan, Individually for Disqualification of Atomic Safety and Licensing Board (Nov. 26, 2018) (Motion).

<sup>2</sup> NRC Staff Response to Motion for Disqualification of Atomic Safety and Licensing Board (Dec. 6, 2018) (Staff Response).

<sup>3</sup> LBP-18-6, 88 NRC 177 (2018); see 10 C.F.R. § 2.313(b)(2).

the Board that the Moving Petitioners did not provide a valid justification for disqualifying the Board or any of its members, and we affirm its ruling.

## I. DISCUSSION

NRC regulations provide that, if the Commission itself does not designate the presiding officer, then the Chief Administrative Judge of the Atomic Safety and Licensing Board Panel will do so.<sup>4</sup> The Chief Judge has “broad authority” to manage the Panel’s docket efficiently, including such matters as splitting an adjudication between two boards.<sup>5</sup>

Although the regulation pertaining to disqualification of a judge does not describe what circumstances justify disqualification, we have held that Licensing Board members should look to standards that apply to federal judges.<sup>6</sup> Those standards hold that a judge must disqualify himself or herself whenever the judge’s impartiality in the proceeding “might reasonably be questioned,” as well as in specific circumstances in which conflict of interest is shown.<sup>7</sup> While the Moving Petitioners did not claim in their motion that any of the Board judges have an actual conflict of interest, they argued that the circumstances would “suggest[] the appearance of bias” to an objective observer.<sup>8</sup>

Specifically, the Moving Petitioners argued that the three members of the Board should disqualify themselves because the same three judges are serving as the Board members in a similar license proceeding, involving the application of Holtec International for a CISF in New Mexico; that proceeding is also now in its preliminary stages.<sup>9</sup> The Moving Petitioners point to caselaw that holds that even where there is no actual conflict of interest, a judge should disqualify himself or herself where a reasonable person would question the judge’s impartiality.<sup>10</sup> They argue that having the same three judges preside over the

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<sup>4</sup> 10 C.F.R. § 2.313(a).

<sup>5</sup> See *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-98-7, 47 NRC 307, 311 (1998) (citing *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-916, 29 NRC 434, 438 (1989)).

<sup>6</sup> *Houston Lighting and Power Co.* (South Texas Project, Units 1 and 2), CLI-82-9, 15 NRC 1363, 1365-67 (1982).

<sup>7</sup> 28 U.S.C. § 455(a)-(b).

<sup>8</sup> Motion at 1.

<sup>9</sup> *Id.*

<sup>10</sup> *Id.* at 4-5 (citing, among others, *Cheney v. U.S. Dist. Court for the Dist. of Columbia*, 541 U.S. 913 (2004) (Scalia, J., in chambers); *Hydro Resources, Inc.* (2929 Coors Road, Suite 101, Albuquerque, NM 87120), CLI-98-9, 47 NRC 326, 331 (1998)). In *Hydro*, we rejected the argument that a reasonable person might believe the Presiding Officer would be biased in favor of a party

(Continued)

two licensing proceedings “poses the appearance of bias.”<sup>11</sup> They cite no other facts supporting their argument. They do not explain how there could be an appearance of bias at this point in the proceeding, when the Board has made no substantive rulings in either proceeding.

The Moving Petitioners argue that an appearance of bias could arise in the future; that is, that a reasonable observer would infer bias if, after ruling on an issue in one proceeding, the Board then makes a similar ruling in the other proceeding.<sup>12</sup> At this point, there is no indication that the Board or any of its members have established views about any issue pertaining to this proceeding. Moreover, in order to provide a basis for disqualification, the prejudgment, or appearance of prejudgment, must relate to a factual dispute rather than a legal one.<sup>13</sup> While a judge should not have preconceived beliefs about the facts, it is not grounds for disqualification for a judge to have formed an opinion about the applicable law.<sup>14</sup> If two proceedings occasionally present overlapping legal issues, then consistency between the legal rulings of the two cases is to be expected, regardless of the composition of the boards. And where the facts and legal issues between the two proceedings are distinguishable, we have confidence in the boards’ abilities to distinguish between them.

The Moving Petitioners’ argument concerning bias is not persuasive. Nothing in the motion suggests that any of the Board judges either have a conflict or have prejudged any issue involved in this case. The motion does not provide any reason why a reasonable observer might question the Board’s impartiality.

The bulk of the Moving Petitioners’ motion is devoted to arguments implying that the judges would be overworked by the complexity and confused by the similarity of the issues in the two licensing proceedings.<sup>15</sup> These claims do not relate to prejudice. As for the prospect that the judges may be overworked, the Chief Administrative Judge appoints members of each board and has the discretion to manage the boards if the complexity of the issues involved makes it expedient to do so.<sup>16</sup> That would include substituting Board members, or

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represented by a law firm with which the Presiding Officer had recently discussed, but had not been offered, employment. CLI-98-9, 7 NRC at 331.

<sup>11</sup> Motion at 4.

<sup>12</sup> *See id.* at 6 (arguing that two different boards should be appointed “to dispel any appearance or suggestion that the complex and controversial decisions in one case are being made, but in short-shrift or summary fashion, by the same judges in the other CISF licensing case”).

<sup>13</sup> *See Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-777, 20 NRC 21, 34 (1984).

<sup>14</sup> *Id.* at 35 (citing *S. Pac. Commc’ns Co. v. AT&T*, 740 F.2d 980, 990-91 (D.C. Cir. 1984)); *see also Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-101, 6 AEC 60, 64, 65, 66 (1973).

<sup>15</sup> Motion at 3-4.

<sup>16</sup> *See Private Fuel Storage*, CLI-98-7, 47 NRC at 311; *Seabrook*, ALAB-916, 29 NRC at 438.

replacing an entire Board, if necessary for workload reasons.<sup>17</sup> We decline to take over this duty of the Chief Administrative Judge. In addition, we are not persuaded by the suggestion that the Board members may become confused by the factual similarities between the two proceedings. We traditionally give a high level of deference to the boards as the fact finder in our adjudicatory proceedings.<sup>18</sup> The Moving Petitioners have not provided a sufficient basis for the Commission to do otherwise in the instant proceeding.

## II. CONCLUSION

We therefore find that the Moving Petitioners' grounds for disqualification are insufficient and affirm the Board's ruling.

IT IS SO ORDERED.

For the Commission

Annette L. Vietti-Cook  
Secretary of the Commission

Dated at Rockville, Maryland,  
this 11th day of March 2019.

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<sup>17</sup> See *Private Fuel Storage*, CLI-98-7, 47 NRC at 311.

<sup>18</sup> See, e.g., *Pa'ina Hawaii, LLC*, CLI-10-18, 72 NRC 56, 73 (2010); *AmerGen Energy Co., LLC* (Oyster Creek Nuclear Generating Station), CLI-09-7, 69 NRC 235, 259 (2009).



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

**COMMISSIONERS:**

**Kristine L. Svinicki**, Chairman  
**Jeff Baran**  
**Stephen G. Burns**  
**Annie Caputo**  
**David A. Wright**

**In the Matter of**

**Docket No. 50-271-LT-2**

**ENTERGY NUCLEAR VERMONT  
YANKEE, LLC, and ENTERGY  
NUCLEAR OPERATIONS, INC.  
(Vermont Yankee Nuclear Power  
Station)**

**March 11, 2019**

**TERMINATION OF PROCEEDING**

As a general matter, when a petitioner withdraws its petition in a contested proceeding and there are no petitions remaining, we terminate the proceeding.

**MEMORANDUM AND ORDER**

In this license transfer proceeding involving the Vermont Yankee Nuclear Power Station, the State of Vermont and the New England Coalition (NEC) requested a hearing and petitioned to intervene.<sup>1</sup> Both petitioners informed us in March 2018 that they anticipated withdrawing from this adjudicatory proceed-

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<sup>1</sup> State of Vermont's Petition for Leave to Intervene and Hearing Request (June 13, 2017); New England Coalition's Request for a Hearing and Petition for Leave to Intervene (June 27, 2017).

ing.<sup>2</sup> The petitioners had entered a Settlement Agreement with the Applicants.<sup>3</sup> The Settlement Agreement provided a deadline and terms for withdrawal, which were related to a pending decision of the Vermont Public Utility Commission on the proposed license transfer of the Vermont Yankee Nuclear Power Station.<sup>4</sup> Shortly after the petitioners entered into the Settlement Agreement, we held in abeyance both the State's and NEC's petitions to intervene and hearing requests.<sup>5</sup> The Vermont Public Utility Commission issued its order approving the license transfer in December 2018.<sup>6</sup> The period for any party to withdraw from the Settlement Agreement has passed, and no party has withdrawn.<sup>7</sup> The State and NEC have now submitted notices withdrawing their petitions to intervene and hearing requests on the proposed license transfer.<sup>8</sup>

As a general matter, when a petitioner withdraws its petition in a contested proceeding and there are no petitions remaining, we terminate the proceeding.<sup>9</sup> Because the only two petitioners here have withdrawn their petitions and re-

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<sup>2</sup> State of Vermont's Notice of Anticipated Withdrawal of the State's Petition for Leave to Intervene and Hearing Request (Mar. 7, 2018), at 1; Amended Motion to Hold in Abeyance Action on New England Coalition's Petition for Leave to Intervene and Hearing Request in Consideration of Anticipated Withdrawal (Mar. 12, 2018), at 2.

<sup>3</sup> The Applicants are Entergy Nuclear Operations, Inc. (the licensed operator for decommissioning), Entergy Nuclear Vermont Yankee, LLC (the licensed owner), and NorthStar Nuclear Decommissioning Company, LLC (the proposed license transferee). As proposed in the application, authority to possess, maintain, and decommission the facility, including the Independent Spent Fuel Storage Installation, transferred to NorthStar Nuclear Decommissioning Company, LLC, after the transaction was completed. Biweekly Notice; Applications and Amendments to Facility Operating Licenses and Combined Licenses Involving No Significant Hazards Considerations, 84 Fed. Reg. 489, 499-500 (Jan. 30, 2019) (Notice of Amendment Issuance); In the Matter of Entergy Nuclear Vermont Yankee, LLC; Entergy Nuclear Operations, Inc.; NorthStar Vermont Yankee LLC; NorthStar Nuclear Decommissioning Company, LLC; Vermont Yankee Nuclear Power Station; Direct and Indirect Transfer of License; Order, 83 Fed. Reg. 53,116, 53,117 (Oct. 19, 2018) (Order Approving Transfer).

<sup>4</sup> See CLI-18-3, 87 NRC 87, 88 (2018). The Settlement Agreement was subsequently amended to take into account developments related to the schedule for the Vermont Public Utility Commission's decision. See Second Joint Status Report (Nov. 15, 2018), at 1-2.

<sup>5</sup> CLI-18-3, 87 NRC at 88.

<sup>6</sup> Third Joint Status Report (Dec. 14, 2018). The Staff approved the license transfer in October 2018, and the transaction closed in January 2019. See Order Approving Transfer, 83 Fed. Reg. at 53,117; Notice of Amendment Issuance, 84 Fed. Reg. at 499-500.

<sup>7</sup> State of Vermont's Notice of Withdrawal of the State's Petition for Leave to Intervene and Hearing Request (Dec. 21, 2018), at 2.

<sup>8</sup> *Id.* at 1; New England Coalition's Withdrawal of Its Request for a Hearing and Petition for Leave to Intervene (Dec. 14, 2018), at 1.

<sup>9</sup> See *Public Service Co. of Colorado* (Fort St. Vrain Independent Spent Fuel Storage Installation), Commission Order (Oct. 29, 1990), attached to *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-91-13, 34 NRC 185, 188 n.1, 190-91 (1991) (terminating)  
(Continued)

quests for hearing, we dismiss the petitions and requests for hearing without prejudice and terminate the proceeding.

IT IS SO ORDERED.

For the Commission

Annette L. Vietti-Cook  
Secretary of the Commission

Dated at Rockville, Maryland,  
this 11th day of March 2019.

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the proceeding after the sole petitioner withdrew its petition pursuant to an agreement that it had entered with the applicant and the Staff); *Houston Lighting & Power Co.* (South Texas Project, Units 1 and 2), ALAB-799, 21 NRC 360, 382 (1985).



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

**ATOMIC SAFETY AND LICENSING BOARD**

**Before Administrative Judges:**

**E. Roy Hawkens**, Chairman  
**Dr. Michael F. Kennedy**  
**Dr. Sue H. Abreu**

**In the Matter of**

**Docket Nos. 50-250-SLR  
50-251-SLR  
(ASLBP No. 18-957-01-SLR-BD01)**

**FLORIDA POWER & LIGHT  
COMPANY  
(Turkey Point Nuclear Generating  
Units 3 and 4)**

**March 7, 2019**

This proceeding concerns three hearing requests that challenge an application from Florida Power & Light Company (FPL) for a subsequent license renewal (i.e., a second twenty-year license renewal) for two nuclear power reactors, Turkey Point Units 3 and 4, located near Homestead, Florida. The hearing requests were filed by (1) Southern Alliance for Clean Energy (SACE); (2) Friends of the Earth, Inc., Natural Resources Defense Council, Inc., and Miami Waterkeeper, Inc. (collectively, Joint Petitioners); and (3) Albert Gomez. Additionally, Monroe County, Florida requests to participate in this proceeding as an interested governmental participant. The Licensing Board grants SACE's and Joint Petitioners' hearing requests, denies Mr. Gomez's hearing request, and grants Monroe County's request to participate as an interested governmental participant. The Board also refers to the Commission its ruling that 10 C.F.R. § 51.53(c)(3) applies to the preparation of environmental reports (ERs) in subsequent license renewal proceedings.

#### **RULES OF PRACTICE: INTERVENTION**

An entity seeking to intervene in a licensing proceeding must establish standing and proffer at least one admissible contention. *See* 10 C.F.R. § 2.309(a).

#### **RULES OF PRACTICE: CHALLENGE TO COMMISSION REGULATIONS**

Pursuant to 10 C.F.R. § 2.335, a contention that challenges a Commission rule or regulation will be rejected unless the petitioner makes an appropriate *prima facie* showing supporting a rule waiver before the licensing board, which then must certify the waiver request to the Commission.

#### **RULES OF PRACTICE: STANDING**

In determining whether a petitioner has established standing, the Commission applies contemporaneous judicial concepts of standing, which require a petitioner to “(1) allege an injury in fact that is (2) fairly traceable to the challenged action and (3) is likely to be redressed by a favorable decision.” *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-15-25, 82 NRC 389, 394 (2015).

#### **RULES OF PRACTICE: STANDING (PROXIMITY PRESUMPTION)**

For certain licensing proceedings (e.g., reactor construction permit proceedings and new operating reactor license proceedings), the Commission has authorized the use of a “proximity presumption,” which presumes that a petitioner has standing if he or she resides, or otherwise has frequent contacts, within approximately 50 miles of the facility in question. *See PPL Bell Bend, LLC* (Bell Bend Nuclear Power Plant), CLI-10-7, 71 NRC 133, 138-39 (2010); *Calvert Cliffs 3 Nuclear Project, LLC, and UniStar Nuclear Operating Services, LLC* (Calvert Cliffs Nuclear Power Plant, Unit 3), CLI-09-20, 70 NRC 911, 915-16 (2009). This presumption “rests on [the] finding . . . that persons living within the roughly 50-mile radius of [a] facility face a realistic threat of harm if a release from the facility of radioactive material were to occur.” *Calvert Cliffs*, CLI-09-20, 70 NRC at 917 (internal quotation marks omitted).

#### **RULES OF PRACTICE: STANDING (PROXIMITY PRESUMPTION)**

Licensing boards routinely have applied the 50-mile proximity presumption in reactor license renewal proceedings, reasoning that a renewal “allows operation of a reactor over an additional period of time during which the reactor

could be subject to the same equipment failures and personnel errors as during operations over the original period of the license.” *Exelon Generation Co., LLC* (Limerick Generating Station, Units 1 and 2), LBP-12-8, 75 NRC 539, 547, *rev’d in part on other grounds*, CLI-12-19, 76 NRC 377 (2012). The Commission implicitly endorsed this approach when it cited with approval a licensing board’s application of the proximity presumption in a reactor license renewal proceeding. *See Calvert Cliffs*, CLI-09-20, 70 NRC at 915 n.15 (citing *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), LBP-01-6, 53 NRC 138, 150, *aff’d on other grounds*, CLI-01-17, 54 NRC 3 (2001)).

#### **RULES OF PRACTICE: STANDING (PROXIMITY PRESUMPTION)**

The 50-mile proximity presumption should apply in all reactor license renewal proceedings, including subsequent license renewal proceedings. As the Commission has explained, the 50-mile proximity presumption “is simply a shortcut for determining standing in certain cases.” *Calvert Cliffs*, CLI-09-20, 70 NRC at 917. Applying this shortcut to reactor license renewal proceedings not only satisfies contemporaneous judicial concepts of standing, it provides clarity for litigants and licensing boards, thereby promoting efficiency in the adjudicatory process. *See Entergy Operations, Inc.* (River Bend Station, Unit 1), LBP-18-1, 87 NRC 1, 7 n.4 (2018).

#### **RULES OF PRACTICE: STANDING (REPRESENTATIONAL)**

An organization that seeks to establish representational standing must show that (1) at least one of its members would otherwise have standing to sue in his or her own right; (2) the member has authorized the organization to represent his or her interests; (3) the interests that the organization seeks to protect are germane to its purpose; and (4) neither the claim asserted nor the relief requested requires the member to participate in the adjudicatory proceeding. *See Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-99-10, 49 NRC 318, 323 (1999).

#### **RULES OF PRACTICE: CONTENTIONS (ADMISSIBILITY)**

The six-factor contention admissibility standard in 10 C.F.R. § 2.309(f)(1) is “strict by design,” *AmerGen Energy Co., LLC* (Oyster Creek Nuclear Generating Station), CLI-06-24, 64 NRC 111, 118 (2006) (quoting *Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Units 2 and 3), CLI-01-24, 54 NRC 349, 358 (2001)), and failure to comply with any admissibility

requirement “renders a contention inadmissible.” *Entergy Nuclear Operations, Inc.* (Indian Point, Unit 2), CLI-16-5, 83 NRC 131, 136 (2016).

#### **RULES OF PRACTICE: PARTICIPATION BY AN INTERESTED STATE OR LOCAL GOVERNMENT**

A licensing board “will afford an interested . . . local governmental body (county, municipality or other subdivision) . . . that has not been admitted as a party under [10 C.F.R.] § 2.309, a reasonable opportunity to participate in a hearing.” 10 C.F.R. § 2.315(c). Section 2.315(c) does not require a demonstration of standing from an entity that seeks to participate as an interested governmental participant. Rather, it requires the entity to (1) identify those contentions on which it intends to participate; and (2) designate a single representative for the hearing. *See id.*

#### **NEPA: ENVIRONMENTAL IMPACT STATEMENT (REQUIREMENTS)**

NEPA requires federal agencies to prepare an environmental impact statement for proposed major federal actions “significantly affecting the quality of the human environment,” including a detailed discussion of “the environmental impact of the proposed action,” “any adverse environmental effects which cannot be avoided should the proposal be implemented,” and “alternatives to the proposed action.” 42 U.S.C. § 4332(C)(i)-(iii).

#### **NEPA: ENVIRONMENTAL IMPACT STATEMENT (HARD LOOK)**

NEPA’s environmental impact statement requirement serves two purposes. “First, it places upon an agency the obligation to consider every significant aspect of the environmental impact of a proposed action.” *Baltimore Gas & Elec. Co. v. Nat. Res. Def. Council, Inc.*, 462 U.S. 87, 97 (1983) (quotation marks omitted). “Second, it ensures that the agency will inform the public that it has indeed considered environmental concerns in its decisionmaking process.” *Id.* Although NEPA requires the agency to take a “hard look” at environmental consequences of major federal actions, *id.*, it “seeks to guarantee process, not specific outcomes.” *Massachusetts v. NRC*, 708 F.3d 63, 67 (1st Cir. 2013).

#### **NEPA: FEDERAL ACTION**

Pursuant to NRC regulations, the renewal of a license to operate a nuclear power plant constitutes a “major Federal action” triggering the NRC’s obligation



under NEPA to prepare an environmental impact statement. *See* 10 C.F.R. § 51.20(a), (b)(2).

**NEPA: ENVIRONMENTAL IMPACT STATEMENT  
(PREPARATION)**

In the context of a nuclear power plant license renewal proceeding, there are several steps in the NRC Staff's preparation of an environmental impact statement (EIS). *See Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-01-17, 54 NRC 3, 12 (2001). First, the Staff prepares a draft supplemental EIS (SEIS), which is a site-specific supplement to the generic EIS (GEIS) addressing Category 2 issues, and then the Staff seeks public comments on that draft. *See id.* The final SEIS adopts all applicable Category 1 environmental impact findings from the GEIS, and it also "takes account of public comments, including plant-specific claims and new information on generic findings. Part 51 requires the final SEIS to weigh all of the expected environmental impacts of license renewal, both those for which there are generic findings and those described in plant-specific analyses." *Id.* (internal citation omitted).

**NEPA: ENVIRONMENTAL IMPACT STATEMENT  
(PREPARATION)**

"When the GEIS and SEIS are combined, they cover all issues that NEPA requires be addressed in an EIS for a nuclear power plant license renewal proceeding." *Massachusetts v. NRC*, 522 F.3d 115, 120 (1st Cir. 2008).

**NEPA: ENVIRONMENTAL IMPACT STATEMENT  
(PREPARATION)**

Although preparing an EIS that complies with NEPA is ultimately the NRC's responsibility, the process of creating it begins with the license renewal applicant. *See Massachusetts v. NRC*, 522 F.3d 115, 120 (1st Cir. 2008). Pursuant to 10 C.F.R. §§ 51.45 and 51.53(c)(1), license renewal applicants must submit an environmental report (ER), the purpose of which is "to aid the Commission in complying with section 102(2) of NEPA." 10 C.F.R. § 51.14. The NRC Staff, in turn, reviews the ER and "draw[s] upon [it] to produce a draft [SEIS]." *Massachusetts*, 522 F.3d at 120.

**NEPA: DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (PREPARATION)**

When the NRC Staff prepares a draft SEIS for a nuclear power plant license renewal application (initial or subsequent), unambiguous regulations require it to apply the GEIS to Category 1 issues. *See* 10 C.F.R. §§ 51.95(c)(4), 51.71(d), pt. 51, subpt. A, app. B.

**NEPA: CONSIDERATION OF ALTERNATIVES**

Although NEPA does not require selection of the most environmentally superior alternative, NRC regulations require the environmental report and the environmental impact statement to consider “alternatives available for reducing or avoiding adverse environmental impacts.” 10 C.F.R. §§ 51.45(c) and 51.71(d); *see Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), LBP-07-3, 65 NRC 237, 259-61, 280 (2007) (admitting a contention regarding dry cooling as a NEPA alternative in light of the sensitive biological resources affected).

**ADJUDICATION: ENVIRONMENTAL IMPACT STATEMENT (CATEGORY 1 ISSUES)**

Because Category 1 issues have been addressed and codified in Part 51, “they cannot be litigated in individual adjudications, such as license renewal proceedings for individual plants.” *Massachusetts v. NRC*, 522 F.3d at 120; *see also* 10 C.F.R. § 2.335. Instead, the NRC has provided the following avenues for reviewing, changing, or challenging GEIS findings regarding Category 1 issues: (1) the Commission reviews GEIS findings on a ten-year basis to ensure their continuing validity; (2) the NRC Staff can request that the Commission suspend a generic rule or that a particular adjudication be delayed until the GEIS and accompanying rule are amended; (3) the NRC Staff can request that a generic rule be suspended with respect to a particular plant; (4) a party to an adjudicatory proceeding can invoke 10 C.F.R. § 2.335 and request that an NRC rule be waived with respect to that proceeding; and (5) any member of the public can petition the agency for a rulemaking proceeding for the purpose of changing the GEIS findings. *See Massachusetts*, 522 F.3d at 120-21; *Turkey Point*, CLI-01-17, 54 NRC 12, 23 n.14.

**ADJUDICATION: ENVIRONMENTAL REPORT (CATEGORY 1 ISSUES)**

“The new and significant information requirement in 10 C.F.R.

§ 51.53(c)(3)(iv) [does] not override, for the purposes of litigating the issues in an adjudicatory proceeding, the exclusion of Category 1 issues in 10 C.F.R. § 51.53(c)(3)(i) from site-specific review. . . . [A] waiver [is] required to litigate any new and significant information relating to a Category 1 issue.” *Limerick*, CLI-12-19, 76 NRC at 384.

**ADJUDICATION: ENVIRONMENTAL IMPACT STATEMENT  
(CATEGORY 2 ISSUES)**

Category 2 issues, unlike Category 1 issues, can be litigated in NRC adjudicatory proceedings. This “divergent treatment of generic and site-specific issues is reasonable and consistent with the purpose of promoting efficiency in handling license renewal decisions.” *Massachusetts v. NRC*, 522 F.3d at 120.

**REGULATIONS: INTERPRETATION**

The starting point in interpreting regulations is the regulatory language. *See Northeast Nuclear Energy Co.* (Millstone Nuclear Power Station, Unit 3), CLI-01-10, 53 NRC 353, 361 (2001) (“[Regulatory] interpretation begins with the language and structure of the provision itself.”).

**REGULATIONS: INTERPRETATION**

When the regulatory language does not answer the question presented, a licensing board may conduct a holistic analysis that considers (1) the regulatory structure; (2) the agency’s interpretative rules; and (3) administrative efficiency, logic, and practicality to discern the Commission’s intent. *See Fed. Express Corp. v. Holowecki*, 552 U.S. 389, 398-404 (2008).

**REGULATIONS: INTERPRETATION**

In *Shook v. D.C. Fin. Responsibility and Mgmt. Assistance Auth.*, 132 F.3d 775, 782 (D.C. Cir. 1998), the court of appeals recognized that “[s]ometimes Congress drafts statutory provisions that appear preclusive of other unmentioned possibilities . . . without meaning to exclude the unmentioned ones.” Agencies are likewise susceptible of such drafting imprecision, and in such circumstances, a tribunal is obliged to give effect to agency intent in a manner that comports with the regulatory text, purpose, and structure.

**REGULATIONS: INTERPRETATION**

“It is an elementary canon of construction that we ‘cannot interpret federal statutes to negate their own stated purposes.’” *Exxon Nuclear Co., Inc.* (Nuclear Fuel Recovery and Recycling Center), ALAB-447, 6 NRC 873, 878 (1977)) (quoting *N.Y. State Dep’t of Social Servs. v. Dublino*, 413 U.S. 405, 419-20 (1973)).

**REGULATIONS: INTERPRETATION**

An agency’s interpretative statements “reflect a body of experience and informed judgment to which courts and litigants may properly resort for guidance. As such, they are entitled to a measure of respect . . . .” *Holowecki*, 552 U.S. at 399 (internal citations omitted); *see also Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 and 3), CLI-15-6, 81 NRC 340, 356 (2015) (“Guidance documents that are developed to assist in compliance with applicable regulations are . . . entitled to special weight.”) (internal citation omitted).

**REGULATIONS: INTERPRETATION**

In assessing the deference to accord to an agency’s interpretative statement, a tribunal should “consider whether the agency has applied its position with consistency.” *Holowecki*, 552 U.S. at 399-400.

**REGULATIONS: INTERPRETATION**

“It is true that interpretations of a statute which would produce absurd results are to be avoided if alternative interpretations consistent with the legislative purpose are available.” *Griffin v. Oceanic Contractors, Inc.*, 458 U.S. 564, 575 (1982).

**REGULATIONS: INTERPRETATION (10 C.F.R. § 51.53(c)(3))**

Based on a holistic review of 10 C.F.R. § 51.53(c)(3) that considers (1) regulatory language and structure; (2) regulatory purpose and history; (3) interpretative rules; and (4) efficiency, logic, and practicality, we conclude that the Commission did not intend to restrict section 51.53(c)(3) to initial license renewals. Accordingly, when an applicant for a subsequent license renewal prepares the ER, the applicant need not consider generic Category 1 issues on a site-specific basis but, instead, may rely on the Category 1 findings in the GEIS and 10 C.F.R. pt. 51, subpt. A, app. B, table B-1.

## **REGULATIONS: INTERPRETATION**

The *expressio unius est exclusio alterius* canon is not an inflexible rule of law commanding that the mere mention of one thing means the exclusion of another; rather, it is “used as a starting point in [regulatory] construction” to ascertain “whether or not the draftsmen’s mention of one thing . . . does really necessarily, or at least reasonably, imply the preclusion of alternatives.” *Shook*, 132 F.3d at 782. The force of the canon in a particular case, like “[t]he force of any negative implication, . . . depends on context.” *NLRB v. Sw. Gen., Inc.*, 580 U.S. \_\_\_, \_\_\_, 137 S. Ct. 929, 940 (2017) (internal quotations omitted).

## **ADMINISTRATIVE PRACTICE: WAIVER**

In the litigation context, it is axiomatic that when a regulation (or statute) lacks clarity, it is incumbent on a party or its representative to (1) identify the uncertainty; and (2) pursue a litigation strategy that protects the party’s interests. Where a party refrains from advancing an argument, that argument is deemed to be waived. *See, e.g., Hormel v. Helvering*, 312 U.S. 552, 556 (1941); *District of Columbia v. Air Florida, Inc.*, 750 F.2d 1077, 1084-85 (D.C. Cir. 1984).

## **ADMINISTRATIVE PRACTICE: ASSUMPTION OF COMPLIANCE**

A licensing board accords “substantial weight” to the determination of state environmental regulatory agencies that a licensee will comply with its legal obligations. *See Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-77-8, 5 NRC 503, 527 (1977) (holding that a finding of environmental acceptability made by a competent state authority pursuant to a thorough hearing “is properly entitled to substantial weight in the conduct of our own NEPA analysis.”) (internal quotation marks omitted); *cf. Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-03-2, 57 NRC 19, 29 (2003) (absent evidence to the contrary, Commission will assume that licensee will comply with license obligations); *Florida Power & Light Co.* (Turkey Point Nuclear Generating Units 3 and 4), CLI-16-18, 84 NRC 167, 174-75 n.38 (2016).

**MEMORANDUM AND ORDER**  
**(Granting the Hearing Requests of SACE and Joint Petitioners,**  
**Denying the Hearing Request of Albert Gomez,**  
**Granting Monroe County's Request to Participate as an**  
**Interested Governmental Participant, and**  
**Referring a Ruling to the Commission)**

Pending before this Licensing Board are three hearing requests that challenge an application from Florida Power & Light Company (FPL) for a subsequent license renewal (i.e., a second twenty-year license renewal) for two nuclear power reactors, Turkey Point Units 3 and 4, located near Homestead, Florida. The hearing requests were filed by (1) Southern Alliance for Clean Energy (SACE); (2) Friends of the Earth, Inc., Natural Resources Defense Council, Inc., and Miami Waterkeeper, Inc. (collectively, Joint Petitioners); and (3) Albert Gomez. Additionally, Monroe County, Florida filed a request to participate in this proceeding as an interested governmental participant.

For the reasons discussed below, we conclude that (1) SACE has established standing and proffered two admissible contentions; (2) Joint Petitioners have established standing and proffered two admissible contentions; and (3) Mr. Gomez has failed to proffer an admissible contention. We therefore grant SACE's and Joint Petitioners' hearing requests, and we deny Mr. Gomez's hearing request. We also grant Monroe County's request to participate as an interested governmental participant.

Additionally, pursuant to 10 C.F.R. § 2.323(f)(1), we refer to the Commission our ruling, *infra* Part III.A, that 10 C.F.R. § 51.53(c)(3) applies to the preparation of environmental reports (ERs) in subsequent license renewal proceedings. *See infra* note 46.<sup>1</sup>

**I. PROCEDURAL BACKGROUND**

On January 30, 2018, FPL submitted an application for a subsequent license renewal (SLR) for two nuclear power reactors, Turkey Point Units 3 and 4, located near Homestead, Florida. *See* Letter from Mano K. Nazar, President

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<sup>1</sup> Appended to this Memorandum and Order is an opinion by Judge Abreu dissenting in part (with the majority's interpretation and application of section 51.53(c)(3)) and concurring in part (with those portions of the majority's decision that do not involve the interpretation or application of section 51.53(c)(3)).

and Chief Nuclear Officer, FPL, to Document Control Desk, NRC (Jan. 30, 2018).<sup>2</sup> FPL submitted an ER with its application, as required.<sup>3</sup>

On May 2, 2018, the NRC issued a notice of opportunity to request a hearing and petition for leave to intervene, which provided members of the public sixty days from the date of publication to file a hearing request. *See* [FPL]; Turkey Point Nuclear Generating, Unit Nos. 3 and 4, 83 Fed. Reg. 19,304 (May 2, 2018). On June 29, 2018, in response to several requests to extend the filing deadline, the Commission granted a thirty-day extension, to and including August 1, 2018. *See* Commission Order (June 29, 2018) at 2 (unpublished).

On August 1, 2018, SACE filed a hearing request that proffered two multi-faceted environmental contentions,<sup>4</sup> and Joint Petitioners filed a hearing request that proffered five multi-faceted environmental contentions.<sup>5</sup> On August 2, 2018, Mr. Gomez, acting *pro se*, submitted a hearing request that proffered ten contentions consisting of safety and environmental challenges to FPL's application.<sup>6</sup>

FPL filed answers opposing all three hearing requests.<sup>7</sup> The NRC Staff filed an answer that (1) did not oppose granting SACE's hearing request and admitting, in part, both of SACE's environmental contentions;<sup>8</sup> and (2) did not oppose Joint Petitioners' hearing request and admitting, in part, two of Joint

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<sup>2</sup> *See* [FPL], Turkey Point Nuclear Plant Units 3 and 4 [SLR] Application (rev. 1 Apr. 2018) [hereinafter SLRA]. The original licenses issued to FPL for Units 3 and 4 authorized forty years of operation, and the first renewal was for an additional twenty years of operation. The current licenses for the units will expire, respectively, on July 19, 2032 and April 10, 2033. *Id.* at 1-1.

<sup>3</sup> *See* [FPL] SLRA, App. E, Applicant's Environmental Report, Subsequent Operating License Renewal Stage, Turkey Point Nuclear Plant Units 3 and 4 (Jan. 2018) [hereinafter ER]. The purpose and content of an ER are discussed *infra* Part III.A.2.

<sup>4</sup> *See* [SACE's] Request for Hearing and Petition to Intervene (Aug. 1, 2018) [hereinafter SACE Pet.].

<sup>5</sup> *See* Request for Hearing and Petition to Intervene Submitted by [Joint Petitioners] (Aug. 1, 2018) [hereinafter Joint Pet'rs Pet.].

<sup>6</sup> *See* Proposed Petition to Intervene and for Hearing Under 10 C.F.R. § 2.206, for Docket ID # NRC-2018-0074 (Aug. 2, 2018) [hereinafter Gomez Pet.].

<sup>7</sup> *See* Applicant's Answer Opposing [SACE's] Request for Hearing and Petition to Intervene (Aug. 27, 2018) [hereinafter FPL Answer to SACE Pet.]; Applicant's Answer Opposing Request for Hearing and Petition to Intervene Submitted by [Joint Petitioners] (Aug. 27, 2018) [hereinafter FPL Answer to Joint Pet'rs Pet.]; Applicant's Opposition to Albert Gomez's Petition to Intervene (Sept. 4, 2018) [hereinafter FPL Answer to Gomez Pet.].

<sup>8</sup> *See* NRC Staff's Corrected Response to Petitions to Intervene and Requests for Hearing Filed by (1) [Joint Petitioners], and (2) [SACE] (Aug. 27, 2018) at 57-69 [hereinafter NRC Staff Answer to Joint Pet'rs Pet. and SACE Pet.].

Petitioners' five environmental contentions.<sup>9</sup> In a separately filed answer, the NRC Staff opposed Mr. Gomez's hearing request.<sup>10</sup>

On September 10, 2018, SACE and Joint Petitioners filed replies to FPL's and the NRC Staff's answers.<sup>11</sup> Mr. Gomez did not file a reply.

On September 20, 2018, FPL filed motions to strike certain portions of SACE's and Joint Petitioners' replies, or in the alternative, for leave to file an attached surreply.<sup>12</sup> Although SACE and Joint Petitioners opposed FPL's motions to strike, they did not oppose FPL's motion to file the surreply, and they requested permission to file an attached joint response to it.<sup>13</sup> On October 23, 2018, we (1) denied FPL's motions to strike, but granted its request to file the surreply; (2) granted the request of SACE and Joint Petitioners to file a joint response to FPL's surreply; and (3) authorized the NRC Staff to respond to these pleadings.<sup>14</sup> The NRC Staff filed a response on November 2, 2018.<sup>15</sup>

Meanwhile, on September 20, 2018, Monroe County, Florida filed a request to participate as an interested local governmental body pursuant to 10 C.F.R. § 2.315(c), seeking to participate on the two environmental contentions proffered

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<sup>9</sup> See *id.* at 28-57.

<sup>10</sup> See NRC Staff's Response to Petition to Intervene and Request for Hearing Filed by Albert Gomez (Sept. 4, 2018) [hereinafter NRC Staff Answer to Gomez Pet.].

<sup>11</sup> See [SACE's] Reply to Oppositions by [FPL] and NRC Staff to SACE's Hearing Request (Sept. 10, 2018) [hereinafter SACE Reply]; Reply in Support of Request for Hearing and Petition to Intervene Submitted by [Joint Petitioners] (Sept. 10, 2018).

<sup>12</sup> See Applicant's Motion to Strike a Portion of the September 10, 2018 Reply Filed by [SACE] or, in the Alternative, for Leave to File a Surreply (Sept. 20, 2018); Applicant's Motion to Strike Portions of the September 10, 2018 Reply Filed by [Joint Petitioners] or, in the Alternative, for Leave to File a Surreply (Sept. 20, 2018); Applicant's Surreply to New Arguments Raised in Reply Pleadings (Sept. 20, 2018) [hereinafter FPL Surreply].

<sup>13</sup> See [SACE]'s Response to [FPL]'s Motion to Strike a Portion of SACE's September 10, 2018, Reply or, in the Alternative for Motion for Leave to File a Surreply (Oct. 1, 2018); [Joint Petitioners'] Answer in Opposition to Applicant's Motion to Strike Portions of the September 10, 2018 Reply Filed by Joint Petitioners or, in the Alternative, for Leave to File a Surreply (Oct. 1, 2018); Motion for Leave to Respond to Applicant's Surreply (Oct. 1, 2018); Petitioners' Response to Applicant's Surreply (Oct. 1, 2018) (corrected Oct. 4, 2018) [hereinafter Pet'rs Response to FPL Surreply].

<sup>14</sup> See Licensing Board Memorandum and Order (Denying FPL's Motion to Strike Portions of Replies, Granting FPL's Request to File a Surreply, Granting SACE and Joint Petitioners' Motion to File Response to Surreply, and Authorizing NRC Staff to File Response) (unpublished) (Oct. 23, 2018).

<sup>15</sup> See NRC Staff's Response to the Applicant's Surreply and the Petitioners' Response, Regarding the Applicability of 10 C.F.R. § 51.53(c)(3) to [SLR] Applications (Nov. 2, 2018) [hereinafter NRC Staff Response to FPL Surreply].



by SACE.<sup>16</sup> The NRC Staff did not oppose Monroe County's participation, provided that the Board admitted the two contentions specified by the County.<sup>17</sup>

On December 4, 2018, this Board held an oral argument in Homestead, Florida to assess SACE's and Joint Petitioners' standing and the admissibility of their proffered contentions. *See* Official Transcript of Proceedings, [FPL] Turkey Point Units 3 & 4 at 11-259 (Dec. 4, 2018) [hereinafter Tr.].<sup>18</sup> Pursuant to the Board's direction at oral argument, *see* Tr. at 257, the NRC Staff filed a supplemental brief on December 18, 2018 regarding its position on a contention proffered by SACE and Joint Petitioners,<sup>19</sup> and on January 7, 2019, the other participants filed timely responses. *See id.* at 258-59.<sup>20</sup>

## II. LEGAL STANDARDS FOR STANDING AND CONTENTION ADMISSIBILITY

To participate in this proceeding as an intervenor, a petitioner must establish standing and proffer at least one admissible contention. *See* 10 C.F.R. § 2.309(a). We summarize the applicable legal standards below.

### A. Legal Standards Governing Standing

#### 1. Individual Standing and the 50-Mile Proximity Presumption

In determining whether a petitioner has established standing, the Commission applies contemporaneous judicial concepts of standing that require a petitioner to "(1) allege an injury in fact that is (2) fairly traceable to the challenged ac-

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<sup>16</sup> *See* Monroe County, Florida's Request to Participate as Interested Governmental Participant (Sept. 20, 2018) [hereinafter Monroe County Request]. Section 2.315(c) permits a local governmental body that is not admitted as a party under section 2.309 an opportunity to participate in a hearing as an interested non-party.

<sup>17</sup> *See* NRC Staff's Response to Monroe County, Florida's Request to Participate as an Interested Governmental Entity at 7 (Oct. 1, 2018).

<sup>18</sup> Mr. Gomez's arguments on standing and contention admissibility were submitted on his written pleading. *See* Tr. at 15; Licensing Board Order (Providing Oral Argument Topics) at 2 n.3 (Nov. 14, 2018) (unpublished).

On December 21, 2018, this Board issued an order granting a joint motion requesting transcript corrections. *See* Licensing Board Order (Adopting Transcript Corrections) (Dec. 21, 2018) (unpublished).

<sup>19</sup> *See* NRC Staff's Clarification of Its Views Regarding the Admissibility of Joint Petitioners' Contention 1-E and SACE Contention 2 (Alternative Cooling Systems) (Dec. 18, 2018).

<sup>20</sup> *See* Petitioners' Response to NRC Staff Clarification (Jan. 7, 2019); Applicant's Response to the NRC Staff's Clarification Regarding the Admissibility of Proposed Cooling Tower Contentions (Jan. 7, 2019).

tion and (3) is likely to be redressed by a favorable decision.” *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-15-25, 82 NRC 389, 394 (2015).<sup>21</sup> However, in the context of certain reactor licensing proceedings (e.g., reactor construction permit proceedings and new reactor operating license proceedings), the Commission has expressly authorized the use of a “proximity presumption,” which presumes that a petitioner has standing if he or she resides, or otherwise has frequent contacts, within approximately 50 miles of the facility in question. *See PPL Bell Bend, LLC* (Bell Bend Nuclear Power Plant), CLI-10-7, 71 NRC 133, 138-39 (2010); *Calvert Cliffs 3 Nuclear Project, LLC, and UniStar Nuclear Operating Services, LLC* (Calvert Cliffs Nuclear Power Plant, Unit 3), CLI-09-20, 70 NRC 911, 915-16 (2009). This presumption “rests on [the] finding . . . that persons living within the roughly 50-mile radius of [a] facility face a realistic threat of harm if a release from the facility of radioactive material were to occur.” *Calvert Cliffs*, CLI-09-20, 70 NRC at 917 (internal quotation marks omitted).

Licensing boards routinely have applied the 50-mile proximity presumption in reactor license renewal proceedings, reasoning that a renewal “allows operation of a reactor over an additional period of time during which the reactor could be subject to the same equipment failures and personnel errors as during operations over the original period of the license.” *Exelon Generation Co., LLC* (Limerick Generating Station, Units 1 and 2), LBP-12-8, 75 NRC 539, 547, *rev’d in part on other grounds*, CLI-12-19, 76 NRC 377 (2012). The Commission implicitly endorsed this approach when it cited with approval a licensing board’s application of the proximity presumption in a reactor license renewal proceeding. *See Calvert Cliffs*, CLI-09-20, 70 NRC at 915 n.15 (citing *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), LBP-01-6, 53 NRC 138, 150, *aff’d on other grounds*, CLI-01-17, 54 NRC 3 (2001)).

We conclude that the 50-mile proximity presumption should apply in all reactor license renewal proceedings, including SLR proceedings. As the Commis-

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<sup>21</sup> Under section 189a of the Atomic Energy Act, the NRC is required to “grant a hearing upon the request of any person whose interest may be affected by the proceeding.” 42 U.S.C. § 2239(a)(1)(A). Pursuant to the agency’s regulation implementing general standing requirements, a petitioner’s hearing request must state

- (i) The name, address and telephone number of the requestor or petitioner;
- (ii) The nature of the requestor’s/petitioner’s right under the [relevant statute] to be made a party to the proceeding;
- (iii) The nature and extent of the requestor’s/petitioner’s property, financial or other interest in the proceeding; and
- (iv) The possible effect of any decision or order that may be issued in the proceeding on the requestor’s/petitioner’s interest.

10 C.F.R. § 2.309(d)(1).

sion explained in *Calvert Cliffs*, the 50-mile proximity presumption “is simply a shortcut for determining standing in certain cases.” *Calvert Cliffs*, CLI-09-20, 70 NRC at 917. Applying this shortcut to reactor license renewal proceedings not only satisfies contemporaneous judicial concepts of standing, it provides clarity for litigants and licensing boards, thereby promoting efficiency in the adjudicatory process. See, e.g., *Entergy Operations, Inc.* (River Bend Station, Unit 1), LBP-18-1, 87 NRC 1, 7 n.4 (2018).

## 2. *Representational Standing*

An organization that seeks to intervene on behalf of one or more of its members must demonstrate representational standing. To do so, the organization must show that (1) at least one of its members would otherwise have standing to sue in his or her own right; (2) the member has authorized the organization to represent his or her interest; (3) the interests that the organization seeks to protect are germane to its purpose; and (4) neither the claim asserted nor the relief requested requires the member to participate in the adjudicatory proceeding. See *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-99-10, 49 NRC 318, 323 (1999).

## B. **Legal Standards Governing Contention Admissibility**

A timely-filed contention is admissible if it satisfies the six-factor contention admissibility criteria in 10 C.F.R. § 2.309(f)(1), which requires a petitioner to

- (i) Provide a specific statement of the issue of law or fact to be raised or controverted . . . ;
- (ii) Provide a brief explanation of the basis for the contention;
- (iii) Demonstrate that the issue raised in the contention is within the scope of the proceeding;
- (iv) Demonstrate that the issue raised in the contention is material to the findings the NRC must make to support the action that is involved in the proceeding;
- (v) Provide a concise statement of the alleged facts or expert opinions which support the requestor’s/ petitioner’s position on the issue . . . , together with references to the specific sources and documents on which the requestor/petitioner intends to rely to support its position on the issue; [and]
- (vi) . . . [P]rovide sufficient information to show that a genuine dispute exists with the applicant/licensee on a material issue of law or fact. This information must include references to specific portions of the application . . . that the petitioner disputes and the supporting reasons for each dispute.

10 C.F.R. § 2.309(f)(1)(i)-(vi). Additionally, pursuant to 10 C.F.R. § 2.335, a contention that challenges a Commission rule or regulation will be rejected

unless the petitioner makes an appropriate *prima facie* showing supporting a rule waiver before the licensing board, which then must certify the waiver request to the Commission.

The Commission's contention-admissibility standard is "strict by design," *AmerGen Energy Co., LLC* (Oyster Creek Nuclear Generating Station), CLI-06-24, 64 NRC 111, 118 (2006) (quoting *Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Units 2 and 3), CLI-01-24, 54 NRC 349, 358 (2001)), and failure to comply with any admissibility requirement "renders a contention inadmissible." *Entergy Nuclear Operations, Inc.* (Indian Point, Unit 2), CLI-16-5, 83 NRC 131, 136 (2016).

### III. ANALYSIS

Because of its overarching significance to this and other SLR cases, we first examine a legal question relevant to the admissibility of contentions proffered by SACE and Joint Petitioners; namely, whether 10 C.F.R. § 51.53(c)(3) applies to an applicant's preparation of an ER in SLR proceedings. After resolving that issue in the affirmative, *infra* Part III.A, we then consider whether to grant the hearing requests of SACE, *infra* Part III.B, Joint Petitioners, *infra* Part III.C, and Mr. Gomez, *infra* Part III.D.

#### A. The Applicability of 10 C.F.R. § 51.53(c)(3) to the Preparation of an ER in SLR Proceedings

Petitioners<sup>22</sup> proffer environmental contentions challenging the adequacy of FPL's ER. Before we address the admissibility of these contentions, we consider a legal issue of first impression raised by petitioners, the resolution of which will affect our contention admissibility analysis. Petitioners argue that 10 C.F.R. § 51.53(c)(3) — which provides, *inter alia*, that applicants for *initial* license renewals need not consider Category 1 issues in their ER<sup>23</sup> — does not apply to applicants who (like FPL) seek a *subsequent* license renewal.

To assist the reader in understanding the issue presented, we first discuss the statutory and regulatory scheme governing the NRC Staff's preparation of

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<sup>22</sup> When we use the term "petitioners," we are referring collectively to SACE and Joint Petitioners.

<sup>23</sup> As explained *infra* Parts III.A.1 and III.A.2, Category 1 issues are those environmental issues with effects that (1) are generic to all existing nuclear power plants; (2) have been analyzed in the generic environmental impact statement (GEIS) and codified by notice and comment rulemaking in 10 C.F.R. Part 51; (3) are reviewed by the Commission on a 10-year cycle; and (4) need not be addressed by the NRC Staff on a site-specific basis in the draft supplemental environmental impact statement for license renewals.

an environmental impact statement (EIS) incident to its review of applications seeking the renewal of licenses to operate nuclear power plants.<sup>24</sup> We then analyze 10 C.F.R. § 51.53(c)(3) and its applicability to SLRs.

### ***1. Statutory and Regulatory Background Governing the NRC Staff's Preparation of an EIS***

In 10 C.F.R. Part 51, the NRC promulgated regulations implementing NEPA requirements. *See* 10 C.F.R. § 51.10. NEPA requires federal agencies to prepare an EIS for proposed major federal actions “significantly affecting the quality of the human environment,” including a detailed discussion of “the environmental impact of the proposed action,” “any adverse environmental effects which cannot be avoided should the proposal be implemented,” and “alternatives to the proposed action.” 42 U.S.C. § 4332(C)(i)-(iii).

NEPA’s EIS requirement serves two purposes. “First, it places upon an agency the obligation to consider every significant aspect of the environmental impact of a proposed action.” *Baltimore Gas & Elec. Co. v. Nat. Res. Def. Council, Inc.*, 462 U.S. 87, 97 (1983) (quotation marks omitted). “Second, it ensures that the agency will inform the public that it has indeed considered environmental concerns in its decisionmaking process.” *Id.* Although NEPA requires the agency to take a “hard look” at environmental consequences of major federal actions, *id.*, it “seeks to guarantee process, not specific outcomes.” *Massachusetts v. NRC*, 708 F.3d 63, 67 (1st Cir. 2013).

Pursuant to NRC regulations, the renewal of a license to operate a nuclear power plant constitutes a “major Federal action” triggering the NRC’s obligation under NEPA to prepare an EIS. *See* 10 C.F.R. § 51.20(a), (b)(2).

Preparing an EIS that considers all of the significant environmental issues relevant to the renewal of a nuclear power plant on a site-specific basis is a demanding and time-consuming task. *See Massachusetts v. NRC*, 522 F.3d 115, 119 (1st Cir. 2008). In 1991, in anticipation of a wave of applications for initial reactor license renewals, the NRC published a proposed rule<sup>25</sup> and a draft generic environmental impact statement (GEIS)<sup>26</sup> that were designed to

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<sup>24</sup>The NRC has codified two sets of regulations governing license renewal applications: (1) 10 C.F.R. Part 54, which focuses on safety-related issues such as equipment aging, *see* 10 C.F.R. § 54.4 (describing scope of renewal requirements in 10 C.F.R. Part 54); and (2) 10 C.F.R. Part 51, which focuses on the NRC’s obligations under the National Environmental Policy Act (NEPA), *see id.* § 51.10 (explaining the purpose of Part 51 regulations). For purposes of this discussion, we deal only with NEPA and the environmental regulations in Part 51.

<sup>25</sup>Proposed Rule, Environmental Review for Renewal of Operating Licenses, 56 Fed. Reg. 47,016 (Sept. 17, 1991) [hereinafter 1991 Proposed Rule].

<sup>26</sup>Draft [GEIS] for License Renewal of Nuclear Plants, NUREG-1437 (Aug. 1991).

inject efficiencies into the agency's environmental review portion of the license renewal process. Both documents embodied the results of a comprehensive study conducted by the NRC to determine those NEPA-related issues that could be addressed generically (that is, issues that applied to all plants) and those that needed to be determined on a plant-by-plant basis. The agency characterized the first group as Category 1 issues and the second as Category 2 issues. *See Massachusetts*, 522 F.3d at 119; *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-01-17, 54 NRC 3, 11 (2001).<sup>27</sup>

In 1996, the NRC issued a final GEIS that analyzed Category 1 issues as to all nuclear power plants,<sup>28</sup> and it codified these findings in 10 C.F.R. Part 51. *See* Final Rule, Environmental Review for Renewal of Nuclear Power Plant Operating Licenses, 61 Fed. Reg. 28,467 (June 5, 1996) [hereinafter 1996 Final Rule]; 10 C.F.R. pt. 51, subpt. A, app. B (listing "NEPA issues for license renewal of nuclear power plants" and assigning them to either Category 1 or Category 2); *Massachusetts*, 522 F.3d at 120.

As the Commission explained in the context of an initial license renewal application proceeding, there are several steps in the NRC Staff's preparation of an EIS. *See Turkey Point*, CLI-01-17, 54 NRC at 12. First, the Staff prepares a draft supplemental EIS (SEIS), which is a site-specific supplement to the GEIS addressing Category 2 issues, and then the Staff seeks public comments on that draft. *See id.* The final SEIS adopts all applicable Category 1 environmental impact findings from the GEIS, and it also "takes account of public comments, including plant-specific claims and new information on generic findings. Part 51 requires the final SEIS to weigh *all* of the expected environmental impacts of license renewal, both those for which there are generic findings and those described in plant-specific analyses." *Id.* (internal citation omitted).<sup>29</sup>

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<sup>27</sup> For a more comprehensive definition of what constitutes a generic Category 1 issue, *see* Final Rule, Revisions to Environmental Review for Renewal of Nuclear Power Plant Operating Licenses, 78 Fed. Reg. 37,282, 37,283-84 n.2 (June 20, 2013) [hereinafter 2013 Final Rule]. The Supreme Court has upheld the NRC's authority to make generic determinations to meet its NEPA obligations. *See Balt. Gas & Elec. Co.*, 462 U.S. at 101 (stating that the generic method is "clearly an appropriate method of conducting the hard look required by NEPA").

<sup>28</sup> *See* Office of Nuclear Regulatory Research, NUREG-1437, [GEIS] for License Renewal of Nuclear Plants at 1-3 to 1-6 (May 1996).

<sup>29</sup> Because Category 1 issues have been addressed and codified in Part 51, "they cannot be litigated in individual adjudications, such as license renewal proceedings for individual plants." *Massachusetts*, 522 F.3d at 120; *see also* 10 C.F.R. § 2.335. Instead, the NRC has provided the following avenues for reviewing, changing, or challenging GEIS findings regarding Category 1 issues: (1) the Commission reviews GEIS findings on a ten-year basis to ensure their continuing validity; (2) the NRC Staff can request that the Commission suspend a generic rule or that a particular adjudication be delayed until the GEIS and accompanying rule are amended; (3) the NRC Staff can request

(Continued)

In sum, the governing regulations establish that for *all* nuclear plant license renewal applications, the SEIS must include a plant-specific analysis of all Category 2 issues, but that it need not discuss Category 1 issues because those issues have already been addressed globally in the GEIS and codified in 10 C.F.R. Part 51. *See* 10 C.F.R. pt. 51, subpt. A, app. B; *id.* §§ 51.71(d), 51.95(c)(4). “When the GEIS and SEIS are combined, they cover all issues that NEPA requires be addressed in an EIS for a nuclear power plant license renewal proceeding.” *Massachusetts*, 522 F.3d at 120.<sup>30</sup>

## 2. *The Applicability of 10 C.F.R. § 51.53(c)(3) to SLR Proceedings*

Although preparing an EIS that complies with NEPA is ultimately the NRC’s responsibility, the process of creating an EIS begins with the license renewal applicant. *See Massachusetts*, 522 F.3d at 120. Pursuant to 10 C.F.R. §§ 51.45 and 51.53(c)(1), license renewal applicants must submit an ER, the purpose of which is “to aid the Commission in complying with section 102(2) of NEPA.” 10 C.F.R. § 51.14.<sup>31</sup> The NRC Staff, in turn, reviews the ER and “draw[s] upon [it] to produce a draft [SEIS].” *Massachusetts*, 522 F.3d at 120.

As previously mentioned, this case raises the question of Commission intent regarding the scope of section 51.53(c)(3); more specifically, this case requires us to determine whether section 51.53(c)(3) may be construed as applying to an SLR applicant. The regulation states in pertinent part:

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that a generic rule be suspended with respect to a particular plant; (4) a party to an adjudicatory proceeding can invoke 10 C.F.R. § 2.335 and request that an NRC rule (i.e., a GEIS finding for a Category 1 issue) be waived with respect to that proceeding; and (5) any member of the public can petition the agency for a rulemaking proceeding for the purpose of changing the GEIS findings. *See Massachusetts*, 522 F.3d at 120-21; *Turkey Point*, CLI-01-17, 54 NRC at 12, 23 n.14.

Category 2 issues, unlike Category 1 issues, can be litigated in NRC adjudicatory proceedings. As the United States Court of Appeals for the First Circuit stated, this “divergent treatment of generic and site-specific issues is reasonable and consistent with the purpose of promoting efficiency in handling license renewal decisions.” *Massachusetts*, 522 F.3d at 120.

<sup>30</sup> SACE makes a passing argument in its brief that the NRC Staff may not rely on the GEIS for addressing Category 1 issues in preparing a draft EIS for SLR applications. *See* Pet’rs Response to FPL Surreply at 16; *see also* Tr. at 24. We disagree. Such an argument flies in the face of the 1996 regulatory language and structure, *see* 10 C.F.R. §§ 51.71(d), 51.95(c)(4); *infra* note 35 and accompanying text, as well as the plain language of the 2013 GEIS, which is a progeny of the 1996 regulations and which states that “[f]or [Category 1 issues] . . . no additional plant-specific analysis is required in future . . . SEISs unless new and significant information is identified.” Office of Nuclear Reactor Regulation, Generic Environmental Impact Statement for License Renewal of Nuclear Plants, NUREG-1437, at 4-3 (Vol. 1, Rev. 1 June 2013) [hereinafter 2013 GEIS].

<sup>31</sup> *Accord* 10 C.F.R. § 51.41; *see also id.* § 51.45(c) (“The [ER] should contain sufficient data to aid the Commission in its development of an independent analysis [in the EIS].”).

(c) *Operating license renewal stage.* (1) Each applicant for renewal of a license to operate a nuclear power plant under part 54 of this chapter shall submit with its application a separate document entitled “Applicant’s Environmental Report — Operating License Renewal Stage.”

(2) . . . This report must describe in detail the affected environment around the plant, the modifications directly affecting the environment or any plant effluents, and any planned refurbishment activities. In addition, the applicant shall discuss in this report the environmental impacts of alternatives and any other matters described in § 51.45. . . .

(3) For those *applicants seeking an initial renewed license* and holding an operating license . . . as of June 30, 1995, the environmental report shall include the information required in paragraph (c)(2) of this section subject to the following conditions and considerations:

(i) The environmental report for the operating license renewal stage is not required to contain analyses of the environmental impacts of the license renewal issues identified as Category 1 issues in Appendix B to subpart A of this part.

(ii) The environmental report must contain analyses of the environmental impacts of the proposed action, including the impacts of refurbishment activities, if any, associated with license renewal and the impacts of operation during the renewal term, for those issues identified as Category 2 issues in Appendix B to subpart A of this part. . . .

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(iii) The report must contain a consideration of alternatives for reducing adverse impacts, as required by § 51.45(c), for all Category 2 license renewal issues in Appendix B to subpart A of this part. No such consideration is required for Category 1 issues in Appendix B to subpart A of this part.

(iv) The environmental report must contain any new and significant information regarding the environmental impacts of license renewal of which the applicant is aware.

10 C.F.R. § 51.53(c) (emphasis added).

Section 51.53(c)(3) thus identifies a particular category of license renewal applicants (i.e., those seeking “an initial renewed license”), and it states that their ERs shall include the information required in section 51.53(c)(2) subject to certain “conditions and considerations,” including the following: (1) the ER need not contain analyses of generic Category 1 issues but, instead, may reference and adopt the Commission’s generic findings in 10 C.F.R. Part 51 and the GEIS, *id.* § 51.53(c)(3)(i); (2) the ER must provide a site-specific review of the non-generic Category 2 issues, *id.* § 51.53(c)(3)(ii); and (3) the ER must address any new and significant information regarding environmental impacts, of which the applicant is aware, that might render the Commission’s generic Category 1 determinations incorrect in that proceeding. *Id.* § 51.53(c)(3)(iv); *see also Turkey Point*, CLI-01-17, 54 NRC at 3, 11.

In considering petitioners’ assertion that section 51.53(c)(3) does not apply



to SLRs, our starting point is the regulatory language. *See Northeast Nuclear Energy Co.* (Millstone Nuclear Power Station, Unit 3), CLI-01-10, 53 NRC 353, 361 (2001) (“[Regulatory] interpretation begins with the language and structure of the provision itself.”). Although section 51.53(c)(3) directs applicants seeking an initial renewed license to prepare ERs in accordance with certain regulatory prescriptions, it (1) is silent as to SLR applicants; and (2) imposes no restrictions on the Commission’s authority to allow SLR applicants to utilize these regulatory prescriptions when preparing ERs. Restated, the plain regulatory language does *not* answer the question presented, because it neither directs the Commission to apply section 51.53(c)(3) to SLR applicants, nor does it forbid the Commission from doing so. Given this regulatory silence, we must look beyond the plain language to discern the Commission’s intent.

In our effort to ascertain Commission intent, we are guided by the Supreme Court’s approach in *Fed. Express Corp. v. Holowecki*, 552 U.S. 389 (2008), where, in limning the scope of a regulatory provision in the face of regulatory silence, the Court conducted a holistic analysis that considered (1) the regulatory structure; (2) the agency’s interpretative rules; and (3) administrative efficiency, logic, and practicality. In our judgment, a holistic analysis of section 51.53(c)(3) counsels emphatically against the restrictive interpretation urged by petitioners, and reveals, instead, that the Commission intended section 51.53(c)(3) to apply to *all* license renewal applications, including SLRs. *Cf. Christensen v. Harris Cty.*, 529 U.S. 576, 583-88 (2000) (rejecting petitioners’ invitation to put a restrictive gloss on a silent statutory provision when that gloss is not supported by the statutory or regulatory scheme).<sup>32</sup>

At the outset, we observe that the regulatory history accompanying the 1991 proposed rule stated that the rule was intended to apply “to one renewal of the initial license for up to 20 years beyond the expiration of the initial license.” *See* 1991 Proposed Rule, 56 Fed. Reg. at 47,017. Significantly, however, the proposed rule itself did not include the above restrictive phrase, and when the final rule was issued in 1996, neither it nor its regulatory history included this phrase. *See* 1996 Final Rule, 61 Fed. Reg. at 28,467. The omission of this phrase supports a conclusion that the Commission did not intend to limit section 51.53(c)(3) to initial license renewals. *See* Tr. at 62. This conclusion is buttressed by the regulatory structure, including Appendix B to Subpart A of Part 51 — to which section 51.53(c)(3)(ii) refers and that codifies the GEIS’s

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<sup>32</sup>In *Shook v. D.C. Fin. Responsibility and Mgmt. Assistance Auth.*, 132 F.3d 775, 782 (D.C. Cir. 1998), the court of appeals recognized that “[s]ometimes Congress drafts statutory provisions that appear preclusive of other unmentioned possibilities . . . without meaning to exclude the unmentioned ones.” Agencies are likewise susceptible of such drafting imprecision, and in such circumstances, a tribunal is obliged to give effect to agency intent in a manner that comports with the regulatory text, purpose, and structure.

findings — that does *not* refer to “initial” renewals, but speaks more broadly about applying to “a renewed operating license for a nuclear power plant,” and as “represent[ing] the analysis of the environmental impacts associated with renewal of any operating license . . . .” 10 C.F.R. pt. 51, subpt. A, app. B.<sup>33</sup>

That the Commission did not intend to restrict section 51.53(c)(3) to initial license renewals is also consistent with an explicitly stated regulatory purpose, which is to promote efficiency in the environmental review process for license renewal applications.<sup>34</sup> Accepting petitioners’ argument would result in an environmental review process where SLR applicants would be required to analyze Category 1 issues on a plant-specific basis, despite the fact that these generic issues have already been analyzed in the GEIS and codified in Appendix B to Subpart A of Part 51. In other words, accepting petitioners’ cabined interpretation of section 51.53(c)(3) would compel SLR applicants to perform a time-consuming and unnecessary act, in derogation of the regulatory purpose. This we are unwilling to do. *See Exxon Nuclear Co., Inc.* (Nuclear Fuel Recovery and Recycling Center), ALAB-447, 6 NRC 873, 878 (1977) (“It is an elementary canon of construction that we ‘cannot interpret federal statutes to

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<sup>33</sup> As discussed *supra* Part III.A.1, a singular purpose of the rule was to promote efficiency in the license renewal process for the wave of initial license renewal applications that was expected to arrive shortly after the rule’s promulgation in 1996. FPL and the NRC Staff state that the NRC was, quite understandably, then focused on initial license renewals. *See* FPL Surreply at 5-6; Tr. at 37. In FPL’s view, the word “initial” in section 51.53(c)(3) is properly viewed as a non-restrictive reference to the category of renewals the agency was then contemplating. *See* FPL Surreply at 6; Tr. at 38. They argue that this non-restrictive reference — although still operative — does not perform indicate a Commission intent to limit section 51.53(c)(3) to initial license renewals. We agree.

Despite numerous regulatory revisions to section 51.53 since its initial issuance, we found nothing in the regulatory history indicating that the scope of section 51.53(c)(3) — in 1996 or thereafter — was intended to be restricted to initial license renewals, nor do petitioners identify any such history. *See* Final Rule, Environmental Review for Renewal of Nuclear Power Plant Operating Licenses, 61 Fed. Reg. 66,537 (Dec. 18, 1996) (making minor clarifying and conforming changes and adding language to Table B-1 that had been omitted); Final Rule, Licenses, Certifications, and Approvals for Nuclear Power Plants, 72 Fed. Reg. 49,352 (Aug. 28, 2007) (modifying section 51.53(c)(3) to clarify its applicability to combined license applications); 2013 Final Rule, 78 Fed. Reg. at 37,282 (“[R]edefin[ing] the number and scope of the environmental impact issues that must be addressed by the NRC and applicants during license renewal environmental reviews”); Final Rule, Continued Storage of Spent Nuclear Fuel, 79 Fed. Reg. 56,238, 56,253 (Sept. 19, 2014) (amending section 51.53 “to improve readability and to clarify how the generic determination will be used in future NEPA documents for power reactors and ISFSIs”); Final Rule, Miscellaneous Corrections, 79 Fed. Reg. 66,598, 66,599 (Nov. 10, 2014) (correcting typographical errors in section 51.53(d)).

<sup>34</sup> *See* 1996 Final Rule, 61 Fed. Reg. at 28,467 (explaining that the Commission’s intent behind 10 C.F.R. Part 51 is to “improve the efficiency of the process of environmental review for applicants seeking to renew an operating license”).

negate their own stated purposes.”) (quoting *N.Y. State Dep’t of Social Servs. v. Dublino*, 413 U.S. 405, 419-20 (1973)).

Accepting petitioners’ restricted interpretation of section 51.53(c)(3) is also incompatible with the purpose of an ER, which is designed to aid the NRC Staff in preparing a draft SEIS. *See supra* note 31. When the NRC Staff prepares a draft SEIS, unambiguous regulations require it to apply the GEIS to Category 1 issues.<sup>35</sup> Because an ER is “essentially the applicant’s proposal” for the NRC Staff’s supplemental SEIS,<sup>36</sup> it logically follows that an SLR applicant should, like an applicant for an initial renewal, prepare an ER in accordance with section 51.53(c)(3) and, accordingly, apply the GEIS to Category 1 issues rather than analyzing them on a plant-specific basis. Otherwise, its ER would contain an overwhelming amount of information that would be of no assistance to the NRC Staff in its preparation of the draft SEIS. Absent persuasive indicators to the contrary, we are unwilling to impute to the Commission an intent to have an SLR applicant prepare an ER that does not serve its regulatory purpose.

Accepting petitioners’ argument would not only undermine the regulatory purpose, it would ignore an express regulatory mandate in section 51.95(c)(4). In license renewal proceedings, the NRC Staff is *required* to integrate into the draft SEIS “information developed for those Category 2 issues applicable to the plant under § 51.53(c)(3)(ii).” 10 C.F.R. § 51.95(c)(4) (emphasis added). In other words, section 51.95(c)(4), which applies broadly to *all* license renewal proceedings, *see supra* note 35, commands the NRC to consider the “information developed” by an SLR applicant “under § 51.53(c)(3)(ii)” in its preparation of the draft SEIS. In our view, this regulatory command is persuasive evidence that, contrary to petitioners’ argument, the Commission did not intend to restrict section 51.53(c)(3) to initial license renewal applicants.

This conclusion is strengthened by the fact that Part 51 requires periodic reviews of the GEIS findings to ensure that the environmental analyses for Category 1 issues remain current. The regulation states in pertinent part: “On a 10-year cycle, the Commission intends to review the material in [Appendix B] and update it if necessary. A scoping notice must be published in the *Federal Register* indicating the results of the NRC’s review and inviting public com-

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<sup>35</sup> *See* 10 C.F.R. § 51.95(c)(4) (stating that the SEIS prepared by the NRC incident to the renewal of an operating license “shall integrate the conclusions in the [GEIS] for issues designated as Category 1 with information developed for those Category 2 issues applicable to the plant”); *id.* § 51.71(d) (stating that the draft SEIS “for license renewal prepared under § 51.95(c) will rely on conclusions as amplified by the supporting information in the GEIS for issues designated as Category 1 in appendix B to subpart A of this part”); *id.* pt. 51, subpt. A, app. B (identifying Category 1 issues applicable to “license renewal of nuclear power plants”).

<sup>36</sup> *See* Final Rule, Rules of Practice for Domestic Licensing Proceedings — Procedural Changes in the Hearing Process, 54 Fed. Reg. 33,168, 33,172 (Aug. 11, 1989).

ments and proposals for other areas that should be updated.” 10 C.F.R. pt. 51, subpt. A, app. B. This regulatory requirement for periodic reviews and updates of the GEIS would not be necessary unless the Commission contemplated that the NRC Staff, as well as *all* license renewal applicants, could rely on the generic findings in the GEIS instead of engaging in the wholly unnecessary process of considering Category 1 issues on a site-specific basis.

The most recent update of the GEIS occurred in June 2013. *See* 2013 GEIS.<sup>37</sup> The following extract from the final regulatory analysis for that update expressly considered SLR applications in its cost-benefit analysis, signifying that the Commission intended the 2013 GEIS and Appendix B to apply to SLRs:

Some plants will become eligible for a second 20-year license extension after [fiscal year (FY)] 2013. While the NRC understands that the possibility exists for license holders to submit a second license renewal application, no letters of intent have been received as of the issuance date of this document. The NRC estimates receiving 3 applications per year from FY 2015 through FY 2022. The NRC estimates that a total of 30 license renewal applications (including applications for a second license renewal) will be received in the 10-year cycle following the effective date of the rule.

*See* SECY-12-0063, Final Rule: Revisions to Environmental Review for Renewal of Nuclear Power Plant Operating Licenses, encl. 2 at 25 (Apr. 20, 2012).<sup>38</sup>

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<sup>37</sup>Notably, the NRC’s scoping report for the 2013 update to the GEIS stated that “[t]he NRC’s current plan is to apply the revised GEIS to *all* license renewal applications submitted after the date [of] the Record of Decision for the revised GEIS is printed in the Federal Register.” [EIS] Scoping Process Summary Report, Update of the [GEIS] for License Renewal of Nuclear Plants at 67 (May 2009) (emphasis added). This scoping summary report was referenced in the proposed rule to update Part 51. *See* Proposed Rule, Revisions to Environmental Review for Renewal of Nuclear Power Plant Operating Licenses, 74 Fed. Reg. 38,117, 38,119 (July 31, 2009) (describing the scoping process). For a full description of the reasons public comments were sought, see Notice of Intent to Prepare an [EIS] for the License Renewal of Nuclear Power Plants and to Conduct Scoping Process, 68 Fed. Reg. 33,209, 33,210 (June 3, 2003).

<sup>38</sup>We acknowledge that this SECY paper (which is a formal memorandum to the Commissioners from the Executive Director for Operations that seeks Commission approval for the specified Staff action) “lack[s] the force of law” and, accordingly, cannot serve to alter a regulation. *Christensen*, 529 U.S. at 587. Here, however, we seek to discern Commission intent regarding the scope of a silent regulation. In our judgment, this SECY paper, which was the basis for Commission action on the final rule, *see* SRM-SECY-12-0063, Final Rule: Revisions to Environmental Review for Renewal of Nuclear Power Plant Operating Licenses (Dec. 6, 2012), provides insight into the Commission’s view regarding the continuing applicability of the GEIS to license renewals and, hence, the applicability of section 51.53(c)(3) to SLR applications. In other words, as we have shown, when the regulations were issued in 1996, the regulatory purpose and structure reveal that the Commission did not intend section 51.53(c)(3) to be restrictive in its scope, and that intent has remained constant with the passage of time.

Nowhere in the regulatory history of the 2013 rulemaking (or, for that matter, in any of the post-1996 rulemakings, *see supra* note 33), was there any discussion of an intent to restrict the application of section 51.53(c)(3) to initial license renewals. Rather, it discussed license renewals in general, without differentiating between initial renewals and SLRs, giving rise to a persuasive inference that the Commission intended the updated GEIS — and therefore section 51.53(c)(3) — to apply to *all* applicants.

After completion of the 2013 rulemaking, the NRC Staff informed the Commission that, with regard to SLR applications, “[t]he staff does not recommend updating the environmental regulatory framework under 10 CFR Part 51 . . . , because environmental issues can be adequately addressed by the existing GEIS and through future GEIS revisions.” SECY-14-0016, Ongoing Staff Activities to Assess Regulatory Considerations for Power Reactor [SLR], at 5 (Jan. 31, 2014). The Commission accepted that recommendation, which is further evidence of the Commission’s intention to apply the 2013 GEIS and Appendix B — and, hence, section 51.53(c)(3) — to SLR applicants. *See* SRM-SECY-14-0016, Ongoing Staff Activities to Assess Regulatory Considerations for Power Reactor [SLR] (Aug. 29, 2014) (disapproving the NRC Staff’s recommendation to initiate a rulemaking pursuant to Part 54, but refraining — consistent with the NRC Staff’s recommendation — from updating the Part 51 regulatory framework for SLR applications).

The 2013 GEIS itself discusses license renewals in general and non-restrictive terms, from which it may be inferred that SLR applicants may rely on the GEIS and Appendix B and, accordingly, need not consider Category 1 issues on a site-specific basis in their ER.<sup>39</sup>

Petitioners nevertheless assert that the agency intended the 1996 GEIS and the 2013 GEIS to be limited to initial license renewals. *See* Pet’rs Response to FPL Surreply at 5-8. But petitioners fail to identify any provision in the

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<sup>39</sup> *See, e.g.*, 2013 GEIS at 1-4 (“The GEIS serves to facilitate NRC’s environmental review process by identifying and evaluating environmental impacts that are considered generic and common to all nuclear power plants. . . . Generic impacts will be reconsidered in SEISs only if there is new and significant information that would change the conclusions in the GEIS.”); *id.* at 1-7 to 1-8 (“The decisions to be . . . supported by the GEIS are whether or not to renew the operating licenses of individual commercial nuclear power plants for an additional 20 years. The GEIS was developed to support these decisions and to serve as a basis from which future NEPA analyses for the license renewal of individual nuclear power plants would tier.”); *id.* at 1-8 (“The GEIS provides the NRC decision-maker with important environmental information considered common to all nuclear power plants and allows greater focus to be placed on plant-specific (i.e., Category 2) issues.”); *id.* at 1-17 (“The applicant is not required to assess the environmental impacts of Category 1 issues listed in Table B-1 unless the applicant is aware of new and significant information that would change the conclusions in the GEIS.”); *id.* at 4-3 (“For [Category 1 issues], no additional plant-specific analysis is required in future supplemental EISs . . . unless new and significant information is identified.”).

1996 GEIS that compels us to accept their argument. And regarding the 2013 GEIS, petitioners' argument fails to account for the following language in the GEIS: (1) the "purpose and need for the proposed action (issuance of a renewed license) is to provide an option [to continue plant operations] beyond the term of the current . . . operating license," 2013 GEIS at 1-3; (2) the "decisions to be . . . supported by the GEIS are whether or not to renew the operating licenses of . . . power plants for an additional 20 years," *id.* at 1-7; and (3) "[t]here are no specific limitations in the Atomic Energy Act or the NRC's regulations restricting the number of times a license may be renewed." *Id.* at S-1. The 2013 GEIS clearly indicates that it assesses "environmental consequences of renewing the licenses . . . and operating the plants for an additional 20 years *beyond the current license term.*" *Id.* at S-4 (emphasis added). Additionally, the 2013 GEIS states that the proposed action includes the activities associated with the "license renewal term," *id.* at 4-2, and this term is used throughout the GEIS in assessing the impacts of these activities, as well as in various impact findings codified in Table B-1. The 2013 GEIS defines the "license renewal term" as "[t]hat period of time past the original *or current license term* for which the renewed license is in force." *Id.* at 7-27 (emphasis added).

In short, the 2013 GEIS — which is an express regulatory product of the 1996 regulations — explicitly purports to assess the environmental impacts associated with a 20-year renewal period, regardless of whether this period follows the original license or a current renewed license. And the 2013 revisions to the Part 51 rules codify in Table B-1 the findings from the 2013 GEIS on the impacts associated with the "license renewal term."<sup>40</sup>

In our judgment, the Part 51 regulatory structure — commencing with the proposed 1991 regulations, and continuing to present (including the 2013 GEIS) — is compelling evidence that the Commission intended for *all* license renewal applicants to comply with the requirements of 10 C.F.R. § 51.53(c)(3) when preparing an ER. More specifically, consistent with section 51.53(c)(3), an SLR applicant "is not required to assess the environmental impacts of Category 1 issues listed in Table B-1 unless the applicant is aware of new and significant information that would change the conclusions in the GEIS." 2013 GEIS at 1-17.

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<sup>40</sup>Despite the above regulatory language, petitioners argue that the 2013 GEIS should not apply to SLRs because it fails to adequately consider the environmental impacts associated with SLRs (i.e., with a plant life of 80 years) for, e.g., occupational radiation exposures, public radiation doses, and decommissioning. *See* Pet'rs Response to FPL Surreply at 7-8. In light of our conclusion above that the 2013 GEIS aims to assess the environmental impacts associated with SLRs, and because Part 51 commands the NRC Staff to use the GEIS in preparing the SEIS for a license renewal, *see supra* note 35, we summarily reject petitioners' argument, concluding that it is essentially an impermissible attempt to challenge Category 1 findings in an adjudicatory proceeding without having first sought a waiver. *See* 10 C.F.R. § 2.335(a).

NRC guidance documents support this conclusion.<sup>41</sup> For example, NRC Regulatory Guide 4.2 provides instructions for license renewal applicants for the “preparation of [ERs] that are submitted as part of an application for the renewal of a nuclear power plant operating license in accordance with [10 C.F.R. Part 54].” Preparation of Environmental Reports for Nuclear Power Plant License Renewal Applications, Regulatory Guide 4.2, at 1 (supp. 1, rev. 1 June 2013) [hereinafter Reg. Guide 4.2]. This Regulatory Guide does *not* distinguish between initial and subsequent license renewal applicants; rather, because it repeatedly refers broadly to “applicants” and “license renewal applicants,” it is reasonably construed as applying to both categories of applicants. *See, e.g.*, Reg. Guide 4.2 at 1, 5, 6, 7, 8, 10.<sup>42</sup>

Moreover, and most significantly, Reg. Guide 4.2 repeatedly states that issues “identified as Category 1 issues in the GEIS, are adequately addressed for *all* applicable nuclear plants. The NRC will *not* require additional analysis in plant-specific [ERs] unless new and significant information has been identified . . . . The applicant may adopt the findings in the GEIS for Category 1 issues if no new and significant information is discovered.” *Id.* at 25 (emphasis added); *see also id.* at 2, 7.

According “special weight” to Reg. Guide 4.2 as directed by the Commission, *Indian Point*, CLI-15-6, 81 NRC at 356, and recognizing that it “reflect[s] a body of experience and informed judgment” developed by the NRC Staff, *Holowecki*, 522 U.S. at 399, we find that it provides strong support for concluding that “[a]pplicants for renewal of power reactor operating licenses,” including SLR applicants, may “use the guidance in [Reg. Guide 4.2] to develop the [ER] required under 10 C.F.R. 51.53(c).” Reg. Guide 4.2 at 56. Accordingly, SLR applicants need “not [conduct] additional analysis in . . . [ERs for Category 1 issues] unless new and significant information is identified.” *Id.* at 25.<sup>43</sup>

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<sup>41</sup> The Supreme Court has stated that an agency’s interpretative statements “reflect a body of experience and informed judgment to which courts and litigants may properly resort for guidance. As such, they are entitled to a measure of respect . . . .” *Holowecki*, 522 U.S. at 399 (internal citations omitted); *see also Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 and 3), CLI-15-6, 81 NRC 340, 356 (2015) (“Guidance documents that are developed to assist in compliance with applicable regulations are . . . entitled to special weight.”) (internal citation omitted).

<sup>42</sup> *Accord* Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Operating License Renewal, NUREG-1555, at iii (supp. 1, rev. 1, June 2013) (providing instructions for NRC Staff in “conducting an environmental review for *the renewal* of a nuclear power plant operating license”) (emphasis added).

<sup>43</sup> The Supreme Court has instructed that in assessing the deference to be accorded to an interpretative rule, a tribunal should “consider whether the agency has applied its position with consistency.” *Holowecki*, 522 U.S. at 399-400. The current version of Reg. Guide 4.2 has been applied by the agency and relied upon by the nuclear industry for over five years. Plainly, FPL relied upon it when

(Continued)

A contrary conclusion — in addition to being discordant with the regulatory purpose, regulatory structure, and Reg. Guide 4.2 — would result in the following untenable interplay between the NRC’s environmental review procedures in 10 C.F.R. Part 51 and its adjudicatory procedures in 10 C.F.R. Part 2. First, assume that we accept petitioners’ argument that section 51.53(c)(3) does not apply to SLRs and, accordingly, that we admit a contention alleging that FPL’s ER is deficient because it fails to consider a Category 1 issue on a plant-specific basis. Further, assume that thereafter the NRC Staff issues a draft SEIS that, consistent with regulatory requirements, likewise does *not* consider that Category 1 issue on a plant-specific basis. Pursuant to the agency’s contention-migration tenet,<sup>44</sup> the admitted contention would become a challenge to the NRC Staff’s draft SEIS. Because the NRC Staff’s non-consideration of the Category 1 issue on a plant-specific basis fully comports with its environmental review responsibilities under NEPA and Part 51, *see Balt. Gas & Elec. Co.*, 462 U.S. at 101; *supra* note 35 and accompanying text, the contention would be subject to summary dismissal on the alternative grounds that it was (1) outside the scope of the proceeding, *see* 10 C.F.R. § 2.309(f)(1)(iii); or (2) an impermissible challenge to an agency regulation. *See id.* § 2.335(a). We do not believe that the Commission intended to craft a regulatory scheme that would require litigants and licensing boards to engage in a senseless adjudicatory process that, in practice, would result in the wasteful expenditure of private and governmental resources in derogation of the public interest. We therefore decline to credit petitioners’ interpretation of section 51.53(c)(3), which would compel this absurd result.<sup>45</sup>

In sum, based on a holistic review of 10 C.F.R. § 51.53(c)(3) that considers (1) regulatory language and structure; (2) regulatory purpose and history; (3) interpretative rules; and (4) efficiency, logic, and practicality, we are persuaded that the Commission did not intend to restrict section 51.53(c)(3) to initial license renewals. Accordingly, we conclude that FPL’s ER need not consider generic Category 1 issues on a site-specific basis but, instead, may rely on the Category

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preparing this ER, *see* ER at 1-7, and FPL’s reliance was consistent with the agency’s expectation embodied in NUREG-1555. *See supra* note 42.

<sup>44</sup> “[A] contention ‘migrates’ when a licensing board construes a contention challenging [an ER] as a challenge to a subsequently issued Staff NEPA document without the petitioner amending the contention.” *Crow Butte Resources, Inc.* (In Situ Leach Facility, Crawford, Nebraska), CLI-15-17, 82 NRC 33, 42 n.58 (2015).

<sup>45</sup> *Cf. Griffin v. Oceanic Contractors, Inc.*, 458 U.S. 564, 575 (1982) (“It is true that interpretations of a statute which would produce absurd results are to be avoided if alternative interpretations consistent with the legislative purpose are available.”).



1 findings in the GEIS and Table B-1, and we will assess petitioners' contentions in that light.<sup>46</sup>

### 3. *A Response to the Dissent*

The dissent would lead this Licensing Board to an irrational result based on its conviction that section 51.53(c)(3), by its plain and (allegedly) unambiguous language, excludes SLRs and necessarily applies *only* to initial license renewals. *See* Dissent at pp. 303-05, 315. With respect, the dissent is incorrect.<sup>47</sup>

To support its restrictive reading of section 51.53(c)(3), the dissent cites the canon of statutory interpretation *expressio unius est exclusio alterius*, *see* Dissent at pp. 304-05, which means “the mention of one thing implies the exclusion of another.” *Shook*, 132 F.3d at 782. The dissent views the Commission’s use of the word “initial” as necessarily precluding SLRs. *See* Dissent at p. 305 (“Something is either ‘initial,’ . . . or it is not. No room exists for anything else.”).

However, the *expressio unius* canon is not an inflexible rule of law commanding that the mere mention of one thing means the exclusion of another; rather, it is “used as a starting point in [regulatory] construction” to ascertain the intent of the drafter. *Shook*, 132 F.3d at 782. The force of the canon in a particular case, like “[t]he force of any negative implication, . . . depends on context.” *NLRB v. Sw. Gen., Inc.*, 580 U.S. \_\_\_, \_\_\_, 137 S. Ct. 929, 940 (2017) (internal quotations omitted). Thus, whether the word “initial” in section 51.53(c)(3) necessarily excludes SLRs from the regulation’s scope is a matter of Commission intent, to be determined by considering “whether or not the [Commission’s] mention of one thing . . . does really necessarily, or at least reasonably, imply the preclusion of alternatives.” *Shook*, 132 F.3d at 782; *accord Sw. Gen., Inc.*, 580 U.S. at \_\_\_, 137 S. Ct. at 940 (applying *expressio unius* “only when circumstances support . . . a sensible inference that the term left out must have been meant to be excluded”) (internal citation omitted). Our review of the circumstances surrounding the proposal and issuance of the Part 51 regulatory amendments, *see supra* Part III.A.2, reveals that the mention of initial license

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<sup>46</sup> Given the significance of this legal issue of first impression, we will refer our ruling on this matter to the Commission pursuant to 10 C.F.R. § 2.323(f)(1). We note that this issue is pending before a licensing board in another SLR proceeding, signifying that it will likely be a recurring issue until resolved by the Commission. *See* Beyond Nuclear, Inc.’s Hearing Request and Petition to Intervene, *Exelon Generation Co.* (Peach Bottom Atomic Power Station, Units 2 and 3), Nos. 50-277/278-SLR (Nov. 19, 2018).

<sup>47</sup> To be clear, we agree with the dissent’s statement that, pursuant to its plain language, section 51.53(c)(3) applies to applicants seeking an “initial renewed license.” Dissent at p. 304. Our interpretation of section 51.53(c)(3) gives full (but not preclusive) effect to this phrase.

renewals in section 51.53(c)(3) does not support a reasonable inference (much less a necessary one) that the Commission intended to exclude SLRs.<sup>48</sup>

Significantly, the dissent does not dispute that its restrictive reading of section 51.53(c)(3) places that regulation in irreconcilable tension with “sections 51.71(d), 51.95(c), and 10 C.F.R. Part 51, Subpart A, Appendix B,” Dissent at p. 308, which all refer broadly to “license renewals” rather than restrictively to “initial” license renewals. To harmonize its interpretation with these other portions of Part 51 in light of the 1991 regulatory history, the dissent suggests (but “do[es] not advocate”, *id.* at p. 309 n.38) that “the word ‘initial’ would need to be read *into* [these regulatory provisions].” *Id.* at pp. 308-09. That the dissent’s interpretation would result in the *de facto* revision of three regulations powerfully illustrates the infirmity of its analysis. Such a wholesale adjudicatory revision to the Part 51 regulatory structure in derogation of Commission intent is both unsupported and impermissible.<sup>49</sup>

According to the dissent, the fact that Part 51 provides for periodic updates of the GEIS does not mean that an SLR applicant can rely on the GEIS to prepare its ER; rather, “it simply means that when the GEIS is used [by the NRC Staff to prepare an SEIS,] the information it contains is reasonably up-to-date.” Dissent at p. 308 n.32. In our view, however, it is nonsensical — indeed, absurd — to conclude that Part 51 authorizes the NRC Staff to rely on the GEIS when preparing an SEIS, but prohibits an SLR applicant from doing so when preparing an ER. After all, in light of the periodic update of the GEIS, now, as in 1996, “[w]hen the GEIS and SEIS are combined, they cover all issues that NEPA requires be addressed in an EIS for a nuclear power plant license renewal proceeding.” *Massachusetts*, 522 F.3d at 120. Moreover, because (as we have shown) the Commission did not intend to exclude SLR applicants from using section 51.53(c)(3) in the preparation of ERs, it necessarily follows that the Commission did not intend to preclude SLR applicants from relying on the updated GEIS in the preparation of ERs. The updated GEIS (including its codification and regulatory history) as well as the agency’s interpretative rules support this conclusion.

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<sup>48</sup> The dissent’s analysis relies significantly on the snippet of regulatory history in the 1991 proposed rule that stated the rule would apply “to one renewal of the initial license for up to 20 years beyond [its] expiration.” Dissent at p. 305. However, this phrase was omitted from the regulatory history in the 1996 final rule — and with good reason. It did not comport with the regulatory purpose and structure, both of which supported a conclusion that the Commission did not intend to restrict section 51.53(c)(3) to initial license renewals. *See supra* Part III.A.2.

<sup>49</sup> In addition to suggesting an extensive regulatory revision in the guise of interpreting section 51.53(c)(3), the dissent proposes a “short-term [procedural] solution” for SLR applicants and the NRC Staff to follow in conducting their Part 51 environmental review. *See* Dissent at p. 314. This “short-term [procedural] solution,” however, would also constitute an impermissible adjudicatory revision of Part 51 in derogation of Commission intent.

Notably, if there were any question in 1991 and 1996 about whether updated GEIS findings, as codified in Part 51, could validly be applied to SLRs, an affirmative answer could be gleaned from the following discussion in the regulatory history:

(1) License renewal will involve nuclear power plants for which the *environmental impacts of operation are well understood* as a result of data evaluated from operating experience to date; (2) activities and requirements associated with license renewal are anticipated to be within this range of operating experience, thus *environmental impacts can reasonably be predicted*; and (3) changes in the environment around nuclear power plants are generally *gradual and predictable* with respect to characteristics important to environmental impact analyses.

1991 Proposed Rule, 56 Fed. Reg. at 47,016 (emphasis added); *accord* 1996 Final Rule, 61 Fed. Reg. at 28,467-68. The above principles, which explain the creation of Category 1 issues and justify their use in ERs and SEISs, apply with equal force to initial license renewals *and* SLRs. The dissent's contrary view is not tenable.

The dissent also expresses concern that our interpretation of section 51.53(c)(3) runs afoul of the Administrative Procedure Act (APA) by (1) effecting a *de facto* change to the regulation, *see* Dissent at p. 303; (2) side-stepping the rulemaking process, thereby denying the public an opportunity to comment on the rule change, *see id.* at p. 312; and (3) prejudicing petitioners who, due to their uncertainty about whether section 51.53(c)(3) applies to SLRs, fail to invoke section 2.335 to seek a waiver of a GEIS finding codified in Part 51. *See id.* at pp. 312-13. These concerns are unfounded.

First, our interpretation does not effect a *de facto* regulatory change; rather, it gives effect to Commission intent that has been rooted in the Part 51 regulatory purpose and structure from the outset. *See supra* Part III.A.2. Nothing in the APA forbids a regulatory interpretation that is permitted by the regulatory language, consistent with the regulatory purpose, supported by the regulatory structure, reinforced by published regulatory guidance, and reasonably relied upon by the industry.<sup>50</sup>

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<sup>50</sup>The dissent asserts that “the majority’s application of the regulation creates . . . a significant uncertainty about what regulatory standards are applicable” to SLRs. Dissent at p. 303. However, nothing in the instant record suggests that the regulated industry has any uncertainty about the regulatory standards that apply to SLRs. When FPL prepared its ER, it did so in accordance with the prescribed process in section 51.53(c)(3) in reasonable reliance on (1) the Part 51 regulatory purpose and structure; (2) the guidance statements in Reg. Guide 4.2; and (3) the agency’s expectation embodied in NUREG-1555. *See supra* note 43.

Nor does this record support the dissent’s claim, Dissent at p. 303, that “the majority’s appli-  
(Continued)

Nor is there merit to the dissent's concern that our interpretation improperly side-steps the rulemaking process and denies the public the opportunity to comment on a rule change. For the reasons already discussed, our interpretation does not effect a rule change and, accordingly, the public was not improperly denied an opportunity to comment. Rather, the public had an opportunity to comment between the rule's proposal in 1991 and its issuance in 1996. We note, moreover, that immediately before the agency issued the final rule in 1996, it gave the public an additional 30-day comment period, announcing that "[t]he NRC is soliciting public comment on this rule for a period of 30 days. . . . Absent a determination by the NRC that the rule should be modified, based on comments received, the final rule shall be effective on August 5, 1996. The comment period expires on July 5, 1996." 1996 Final Rule, 61 Fed. Reg. at 28,467.

Although it is true that SACE and Joint Petitioners did not invoke section 2.335 to seek a waiver of a GEIS finding, their failure to do so was not based on any misapprehension regarding the applicability of section 51.53(c)(3) to FPL's SLR. To the contrary, these petitioners recognized that the applicability of section 51.53(c)(3) to SLRs was an open question, *see, e.g.*, Joint Pet'rs Pet. at 16 n.71; SACE Reply at 3-9, and they made a conscious litigation choice not to take the precautionary step of invoking section 2.335. Petitioners were not unfairly prejudiced.<sup>51</sup>

Finally, the dissent opines that, unless its interpretation is accepted, the NRC might be encouraged to take improper "short cuts to amending its regulations in future adjudicatory proceedings." Dissent at pp. 313-14. This concern lacks merit because it is grounded on the erroneous premise that section 51.53(c)(3) applies only to initial license renewal applicants. Moreover, although we decline to base our regulatory analysis on the notion that the NRC might engage in administrative misconduct in future adjudicatory proceedings, *see Nat'l Small Shipment Traffics Conference, Inc. v. Interstate Commerce Comm'n*, 725 F.2d 1442, 1450 (D.C. Cir. 1984), we nevertheless note that "the APA contains a variety of constraints" and remedies that serve to prevent agencies from taking improper short cuts when revising their regulations. *Perez v. Mortg. Bankers Ass'n*, 575 U.S. \_\_\_, \_\_\_, 135 S. Ct. 1199, 1209 (2015).

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cation of the regulation creates . . . an obstacle to a petitioner's ability to know how to properly frame its contentions." *See infra* note 51 and accompanying text.

<sup>51</sup>In the litigation context, it is axiomatic that when a regulation (or statute) lacks clarity, it is incumbent on a party or its representative to (1) identify the uncertainty; and (2) pursue a litigation strategy that protects the party's interests. Where, as here, a party refrains from advancing an argument, that argument is deemed to be waived. *See, e.g., Hormel v. Helvering*, 312 U.S. 552, 556 (1941); *District of Columbia v. Air Fla., Inc.*, 750 F.2d 1077, 1084-85 (D.C. Cir. 1984).

**B. SACE Establishes Standing, and Each of Its Two Proffered Contentions Is Admissible in Part**

**1. SACE Establishes Standing**

SACE satisfies the requirements for representational standing, which are discussed *supra* Part II.A.<sup>52</sup> SACE states that it is “a nonprofit, nonpartisan membership organization that promotes responsible energy choices that solve global warming problems and ensure clean, safe and healthy communities throughout the Southeast.” SACE Pet. at 3. The environmental interests it seeks to protect in this proceeding are thus germane to its organizational purpose. Further, SACE provides declarations from three members who (1) live within 50 miles of the Turkey Point site and therefore have standing in their own right pursuant to the proximity presumption; and (2) authorize SACE to represent their interest in this proceeding, thus rendering it unnecessary for them to participate as individuals. *See id.*, attach. 1, Decl. of Dan Kipnis ¶¶ 2, 4 (June 19, 2018); *id.*, attach. 2, Decl. of Mark P. Oncavage ¶¶ 2, 4 (June 25, 2018); *id.*, attach. 3, Decl. of Richard Reynolds ¶¶ 2, 4 (June 20, 2018).

**2. Each of SACE’s Two Proffered Contentions Is Admissible in Part**

SACE proffers two contentions alleging deficiencies in FPL’s ER, and both are admissible in part. The Board admits Contention 1 to the extent it challenges the adequacy of the ER’s discussion of the impacts of continued operation of the cooling canal system (CCS) on the American crocodile and its critical seagrass habitat. The Board admits Contention 2 to the extent it claims that the ER improperly fails to consider as a reasonable alternative to the proposed action a scenario under which the existing CCS is replaced with draft mechanical cooling towers. We reject as inadmissible the other portions of Contentions 1 and 2.

**a. Contention 1 Is Admissible in Part**

In Contention 1, SACE asserts that the ER contains an inadequate discussion of the environmental impacts of the CCS and, accordingly, that there is no basis for its conclusion that the environmental effects of operating the CCS through the subsequent renewal term will be small. *See* SACE Pet. at 6, 8. In support of this assertion, SACE identifies three putative defects in the ER (which we designate as Contentions 1A, 1B, and 1C), each of which involves an alleged

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<sup>52</sup> Neither FPL nor the NRC Staff challenges SACE’s representational standing. *See* FPL Answer to SACE Pet. at 2; NRC Staff Answer to Joint Pet’rs Pet. and SACE Pet. at 10-11.

inadequate discussion of the environmental impacts of the CCS. *See id.* at 6-7. We examine each alleged defect in turn.

i. CONTENTION 1A: INADEQUATE ANALYSIS OF ENVIRONMENTAL IMPACTS OF CCS ON CROCODILE HABITAT, BISCAYNE AQUIFER, AND BISCAYNE BAY

SACE claims that the ER underestimates or ignores “the environmental impacts to the surrounding water resources by continuing to use the [CCS] for cooling of Turkey Point Units 3 and 4.” SACE Pet. at 6. This part of the contention challenges the ER’s alleged failure “to provide an adequate analysis of the environmental impacts of the CCS on the chemistry of groundwater, surface water and its aquatic life, and the CCS’[s] own ecosystem.” *Id.* SACE asserts that the ER incorrectly minimizes the significance of the CCS’s environmental impacts on (1) the American crocodile habitat and, as a result, on the crocodile population, *id.* at 19-20; (2) the Biscayne Aquifer related to the hypersaline plume, *id.* at 17-18; and (3) the Biscayne Bay related to nutrient releases. *Id.* at 18-19.

The NRC Staff does not oppose admission of Contention 1A insofar as it challenges the adequacy of the ER’s “analysis of the impacts of continued CCS operation on the critical habitat of the American crocodile.” NRC Staff Answer to Joint Pet’rs Pet. and SACE Pet. at 59. FPL disagrees, arguing that SACE provides no factual support to show that “the decline in American crocodile nest and hatchling numbers observed in 2015 and 2016 (as reported in the ER) indicate a long-term trend that will somehow be exacerbated by continued CCS operations and extend through the SLR period.” FPL Answer to SACE Pet. at 36. Further, FPL cites a newspaper article that reported substantial increases in the number of nests and hatchlings in the CCS for 2018. *Id.* at 35.<sup>53</sup> Finally, FPL argues that this aspect of the contention fails to raise a genuine dispute because it ignores the ER’s discussion of FPL’s crocodile management plan. *Id.* at 36.

We agree with the NRC Staff that this aspect of the contention is admissible. Although the ER discusses a crocodile management plan, we conclude that SACE raises a genuine factual dispute as to whether the ER adequately assesses the impacts of continued operation of the CCS on the American crocodile and its critical seagrass habitat. As the NRC Staff pointed out, *see* NRC Staff Answer to Joint Pet’rs Pet. and SACE Pet. at 60, SACE does not dispute the adequacy of FPL’s crocodile monitoring and protection plan, but rather challenges the ER’s conclusion that “the American crocodile population continues to remain

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<sup>53</sup> FPL cites the following newspaper article: Theresa Java, *Turkey Point’s Canal Berms Ideal for Crocodile Clutches*, Keysnews.com (Aug. 8, 2018), <https://keysnews.com/article/story/turkey-points-canal-berms-ideal-for-crocodile-clutches/>.

in a much stronger position than before the . . . CCS was established.” SACE Pet. at 19 (citing ER at 3-195). The impacts of a license renewal on threatened species is a factual issue that is within the scope of this proceeding, and SACE has provided expert support for its claim that the CCS is degrading the seagrass habitat by exposing it to excessive levels of salt and nutrients. *See* SACE Pet. at 20 (citing attach. 8, Expert Report of James Fourqurean, Ph.D. at 1-3 (May 14, 2018)). Although the ER acknowledges that a decline in the crocodile population has occurred in recent years, SACE argues that it must also take a hard look at the fact that this decline signals a critical loss of seagrass bed habitat for a threatened species caused by operation of the CCS, *see* SACE Pet. at 19, and that it must address the “cumulative effects of the CCS on the American Crocodile.” *Id.* at 27. We agree. We therefore admit Contention 1A as follows: The ER fails adequately to analyze the impacts (including cumulative) of continued CCS operation on the American Crocodile and its critical seagrass habitat.

We conclude that all other aspects of Contention 1A are not admissible. First, to the extent Contention 1A claims that the ER underestimates the impacts related to tritium releases to groundwater, it is inadmissible because (1) it lacks the requisite support, *see* 10 C.F.R. § 2.309(f)(1)(v); and (2) it fails to raise a genuine dispute with the ER. *See id.* § 2.309(f)(1)(vi). Although SACE’s experts provide support regarding tritium releases to Biscayne Bay, *see* SACE Reply at 12-13, they fail to do so regarding tritium releases to groundwater. Moreover, although SACE’s petition states that the hypersaline plume includes radioactive tritium, and that tritium, among other pollutants, affects “the underlying Biscayne Aquifer and its protected G-II groundwater,” SACE Pet. at 6, SACE provides no explanation for why releases of “tritium as one of numerous contaminants . . . pose[s] an unacceptable environmental risk” to groundwater. SACE Reply at 10. The ER acknowledges that “tritium is routinely released to the cooling canals and migrates into the groundwater,” but states that the releases are “in concentrations that do not present an environment or health risk either onsite or offsite.” ER at 3-114. SACE does not specifically dispute this, and its experts do not provide support for the claim that the environmental impacts of tritium releases on groundwater have been understated or that measured tritium concentrations are above permissible levels. This aspect of the contention is therefore inadmissible pursuant to section 2.309(f)(1)(v) and (vi).

With regard to the other aspects of Contention 1A relating to impacts to the Biscayne Bay and Aquifer, the NRC Staff and FPL argue that they constitute impermissible challenges to the regulations. Specifically, the NRC Staff states, and FPL agrees, that the following environmental impacts challenged by SACE constitute Category 1 issues that cannot be challenged in this litigation in the absence of a waiver, which SACE has not sought:

[T]he environmental impacts . . . [regarding] (1) altered salinity gradients in sur-

face waters, (2) groundwater quality degradation, (3) exposure of aquatic organisms to radionuclides, (4) the effects of non-radiological contaminants on aquatic organisms, (5) cooling system impacts on terrestrial resources, and (6) radiation (tritium) exposures to the public.

NRC Staff Answer to Joint Pet'rs Pet. and SACE Pet. at 62, 63; *see* FPL Answer to SACE Pet. at 14-15. We agree that SACE's challenges in Contention 1A relating to the above impacts implicate Category 1 issues, and are thus outside the scope of this proceeding under 10 C.F.R. § 2.309(f)(1)(iii). Because SACE did not seek a waiver, these challenges must also be rejected pursuant to 10 C.F.R. § 2.335.<sup>54</sup>

ii. CONTENTION 1B: INADEQUATE ANALYSIS OF MITIGATION MEASURES TO REDUCE SALINITY RESULTING FROM OPERATION OF CCS

In Contention 1B, SACE argues that the ER overstates the “effectiveness of existing and planned mitigative measures to reduce and remove the hypersaline plume,” SACE Pet. at 21-22, and fails to account for the “[n]egative impacts of mitigation measures to reduce salt levels in the CCS.” *Id.* at 23-24; *see also id.* at 7 (alleging that the ER fails to consider that FPL's mitigative efforts to “freshen” the CCS to reduce its salinity will negatively impact FPL's attempts to reduce the hypersaline plume).

The NRC Staff responds that SACE's argument essentially challenges the adequacy of the ER's discussions related to “altered salinity gradients in surface waters” and “groundwater quality degradation,” both of which are Category 1 issues and, therefore, not subject to direct or indirect challenge absent a waiver pursuant to 10 C.F.R. § 2.335. *See* NRC Staff Answer to Joint Pet'rs Pet. and SACE Pet. at 62-63. FPL makes a similar argument, stating that this aspect of the contention is inadmissible pursuant to Commission precedent establishing that license renewal applicants “need not address mitigation for issues’ designated Category 1.” *See* FPL Answer to SACE Pet. at 22-23 (quoting *Entergy*

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<sup>54</sup> FPL further argues that SACE's claims regarding these impacts to the Biscayne Aquifer and Bay lack factual support. *See* FPL Answer to SACE Pet at 15. Specifically, FPL argues that the ER has “fully recognized and disclosed” the plume migration and its impacts to the Biscayne Aquifer, and that FPL is in compliance with the relevant Florida Department of Environmental Protection (FDEP) Consent Order and Miami-Dade County Department of Regulatory and Economic Resources (DERM) Consent Agreement, which were entered into specifically to address CCS-related groundwater impacts. *Id.* at 18-20. As to any alleged CCS impacts to the Biscayne Bay, FPL argues that “the impairment status of Biscayne Bay/Card Sound is unrelated to the operation of the CCS[, and] SACE and its experts provide no facts to support a contrary conclusion, or their claim that alleged ‘nutrient seepage from the CCS’ is having significant adverse impacts on Biscayne Bay water quality.” *Id.* at 22 (quoting SACE Pet. at 19). We agree with FPL that this provides an alternative ground for inadmissibility pursuant to 10 C.F.R. § 2.309(f)(1)(v).



*Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-14, 71 NRC 449, 471 (2010)). FPL thus argues that “SACE’s challenges to the adequacy of FPL’s CCS-related mitigation measures (which involve Category 1 issues) are outside the scope of this proceeding as a matter of law.” *Id.* at 23. We agree that Contention 1B is inadmissible for the alternative reasons that (1) it is an impermissible challenge to a Category 1 issue pursuant to section 2.335; and (2) it is outside the scope of this proceeding pursuant to section 2.309(f)(1)(iii).<sup>55</sup>

iii. CONTENTION 1C: INADEQUATE ANALYSIS OF CUMULATIVE ENVIRONMENTAL IMPACTS

Finally, SACE argues that the ER “ignores or underestimates the cumulative impacts of past and future operations of the CCS.” SACE Pet. at 7. In particular, SACE objects to the ER’s failure to examine several issues within its cumulative impact analysis, including:

- (1) FPL’s efforts to contain pollutants from the CCS, including an examination of the “effectiveness and adverse effects of all of its mitigation measures, past, present, and proposed,” *id.* at 25;
- (2) The “combined effects of the L-31E levee and evaporation from the CCS on the degree to which the CCS and the underlying aquifer have become hypersaline and contaminated other parts of the aquifer and Biscayne Bay,” *id.* at 26;
- (3) The “cumulative impacts of the CCS, combined with other environmental factors, on hypersalinity in the CCS and the aquifer beneath,” including the “interaction of environmental factors such as salinity, turbidity, and algal concentrations with the operation of the CCS,” *id.*;
- (4) The “degree to which FPL, by attempting to mitigate one environmental problem (hypersalinity in the CCS) has seriously aggravated another environmental problem: groundwater and surface water pollution,” including the “net result of increasing the hydraulic head on the hypersaline plume by pumping more water into the CCS at the same time that FPL attempts to draw the plume back to the site boundary by pumping out the aquifer,” *id.* at 27;

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<sup>55</sup> The NRC Staff and FPL also oppose admission of the challenge to mitigation measures because it depends on the following unsupported assumptions: FDEP’s and/or DERM’s mitigation measures are inadequate; FPL will not comply with FDEP’s Consent Order and/or DERM’s Consent Agreement; and FDEP and/or DERM will not enforce their own legal requirements. *See* NRC Staff Answer to Joint Pet’rs Pet. and SACE Pet. at 64-65; FPL Answer to SACE Pet. at 23-26. FPL further argues that SACE’s claims about mitigation measures are factually incorrect, unsupported, and require the NRC Staff to reexamine and/or overrule the judgments of state regulators. *See* FPL Answer to SACE Pet. at 26-29. We agree that the above arguments constitute alternative grounds for inadmissibility.

- (5) The impacts due to “demand for water to cool or freshen the CCS . . . in relation to the demand for water to restore the Everglades, such as the water in the L-31E Canal.” *Id.*

Additionally, SACE challenges the ER’s conclusion that the cumulative impacts “will be small because FPL will comply with its permits for the CCS” because “the history of Turkey Point’s operation shows that FPL is not in compliance with its permits.” *Id.* at 24.

We conclude that Contention 1C is not admissible. First, regarding the cumulative impacts related to hypersalinity and mitigation measures, as with Contention 1B, each of the alleged omissions relates to environmental impacts that involve Category 1 issues (i.e., altered salinity gradient and groundwater degradation). This aspect of Contention 1C is inadmissible for the alternative reasons that it is (1) an impermissible challenge to a Category 1 issue pursuant to section 2.335; and (2) outside the scope of this proceeding pursuant to section 2.309(f)(1)(iii). *See* NRC Staff Answer to Joint Pet’rs Pet. and SACE Pet. at 62; FPL Answer to SACE Pet. at 8-12.

Second, the aspect of Contention 1C that attacks the adequacy of the ER’s analysis of cumulative impacts in light of FPL’s history of noncompliance with its permits relating to the CCS is inadmissible for failing to raise a genuine dispute pursuant to section 2.309(f)(1)(vi). The ER’s conclusion that cumulative impacts will be small is based on the mitigation measures imposed by FDEP in a Consent Order and by DERM in a Consent Agreement. *See* FPL Answer to SACE Pet. at 42. Notably, SACE does *not* assert that FPL currently is violating any requirement imposed by these regulatory agencies. Nor does SACE make any credible showing that (1) FDEP or DERM will fail to enforce State of Florida and local environmental requirements; or (2) FPL will commit a future violation that would alter the cumulative impacts analysis in the ER. Rather, SACE essentially argues that FPL’s past violations of permit requirements, standing alone, are sufficient to raise a genuine dispute with the ER’s conclusion that cumulative environmental impacts of the CCS will be small because FPL will comply with its current permit. We disagree. Pursuant to binding case law, we accord “substantial weight” to the determination of FDEP and DERM that FPL will comply with its legal obligations. *See Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-77-8, 5 NRC 503, 527 (1977) (holding that a finding of environmental acceptability made by a competent state authority [pursuant to a thorough hearing] “is properly entitled to substantial weight in the conduct of our own NEPA analysis.”) (internal quotation marks omitted); *cf. Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-03-2, 57 NRC 19, 29 (2003) (absent evidence to the contrary, Commission will assume that licensee will comply with license

obligations). FPL's past violations in this case, standing alone, do not constitute sufficient information to give rise to a genuine dispute with the assumption that FDEP and DERM will enforce, and FPL will comply with, the legally mandated mitigation measures in the permits. *See Florida Power & Light Co.* (Turkey Point Nuclear Generating Units 3 and 4), CLI-16-18, 84 NRC 167, 174-75 n.38 (2016).<sup>56</sup>

Finally, we conclude that SACE's argument concerning the potential water use conflict between freshening the CCS and other programs like the Central Everglades Restoration Program (CERP) lacks factual support and does not raise a genuine dispute with FPL's license renewal application. *See* NRC Staff Answer to Joint Pet'r's Pet. and SACE Pet. at 61. SACE argues that because FPL has been allowed "to remove water from the L-31E Canal on an emergency basis to reduce salinity levels in the CCS" there is the potential for "conflict with the use of canal water reserved for the CERP." SACE Pet. at 15. SACE therefore argues, on this basis alone, that the ER was required to analyze the cumulative impacts of the demand for water to freshen the CCS in relation to the demand for water to restore the Everglades. *Id.* at 27. This possible use of water on an emergency basis at some unspecified point in the future is too speculative a concern to raise a genuine dispute. Moreover, SACE does not provide the required facts or expert opinions to support admission of this aspect of Contention 1C. The only factual support it provides is that the L-31E canal was once used to supply water to the CCS, and it might be used again at some time in the future because the ER does not fully rule out the possibility of using that canal for freshening. *See* SACE Reply at 19. SACE cites to its expert report for the proposition that there may be conflicts over the need for water from the L-31E Canal for the CERP and the CCS's freshening program. SACE Pet. at 13-14 (citing attach. 4, Expert Report of William Nuttle at 10 [hereinafter Nuttle Report]). But that portion of the report does not discuss use of the L-31E Canal for freshening CCS water; instead, it discusses the potential for the hydraulic plume to reach and impact the quality of the L-31E Canal, which is a different issue. *See* Nuttle Report at 10. Therefore, Contention 1C is not admitted.<sup>57</sup>

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<sup>56</sup>This is not to say that the NRC Staff, in compiling the draft SEIS, is absolved from conducting an independent review of the relevant permits pursuant to its assessment of cumulative impacts. *See* Tr. at 131-33, 215-16. SACE provides no basis for concluding that the NRC Staff would fail to conduct such a review.

<sup>57</sup>SACE also argues that the ER fails to discuss the "cumulative effects of the CCS on the American Crocodile." SACE Pet. at 27. This argument is included in the portion of Contention 1A that we found to be admissible. *See supra* Part III.B.2.a.i.

b. *Contention 2 Is Admissible in Part*

In Contention 2, SACE argues that FPL's ER improperly "failed to consider the reasonable alternative of cooling the Turkey Point Units 3 and 4 reactors with mechanical draft cooling towers." SACE Pet. at 29. SACE asserts that FPL is required to consider reasonable mitigation alternatives pursuant to 10 C.F.R. §§ 51.45 and 51.53(c)(2), *see id.*, and SACE provides the report of an expert who opined that mechanical cooling towers would (1) eliminate the adverse environmental impacts of the CCS; (2) allow the CCS to be restored to a thriving seagrass community and wildlife habitat; and (3) be a feasible and cost-effective alternative to the CCS. *See id.* at 30-31 (citing attach. 10, Expert Report of Bill Powers (May 14, 2018) [hereinafter Powers Report]).

The NRC Staff acknowledges that it has a regulatory obligation to consider reasonable "alternatives available for reducing or avoiding adverse environmental effects." NRC Staff Answer to Joint Pet'rs Pet. and SACE Pet. at 68-69 (quoting 10 C.F.R. § 51.71(d)). The Staff does not dispute that SACE provides an adequate factual basis for its assertion that mechanical draft towers are a reasonable alternative to the CCS, nor does the Staff dispute SACE's statement that FPL's ER "omits consideration of a cooling tower alternative." *Id.* at 68. The Staff therefore does not oppose admitting Contention 2 "insofar as it asserts that the Applicant's [ER] omits consideration of mechanical draft cooling towers in connection with license renewal of Turkey Point Units 3 and 4, as a reasonable alternative to [the existing CCS]." *Id.*

We conclude that Contention 2 is an admissible contention of omission. Contrary to FPL's assertion, *see* FPL Answer to SACE Pet. at 51, Contention 2 is within the scope of the proceeding, and it raises a genuine dispute on a material fact to the extent it alleges that FPL's ER improperly fails to consider mechanical draft cooling towers as a reasonable alternative for reducing or avoiding adverse impacts on the threatened American Crocodile and its critical seagrass habitat. *See* SACE Pet. at 30; Powers Report at 1-5; *supra* Part III.B.2.a.i. Although neither the NRC Staff nor FPL is required to *select* the most environmentally superior alternative, NRC regulations require the ER and the EIS to *consider* "alternatives available for reducing or avoiding adverse environmental impacts." 10 C.F.R. §§ 51.45(c) and 51.71(d); *see Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), LBP-07-3, 65 NRC 237, 259-61, 280 (2007) (admitting a contention regarding dry cooling as a NEPA alternative in light of the sensitive biological resources affected).<sup>58</sup>

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<sup>58</sup>To be clear, Contention 2 focuses on the ER's *failure to consider* mechanical draft cooling towers as a reasonable and feasible alternative to the existing CCS for reducing or avoiding adverse environmental effects to sensitive biota. The NRC Staff states, and we agree, that the admissible

(Continued)

We therefore admit Contention 2 as follows: In light of the adverse impact of continued CCS operations on the threatened American crocodile and its critical seagrass habitat, the ER is deficient for failing to consider mechanical draft cooling towers as a reasonable alternative to the CCS in connection with the license renewal of Turkey Point Units 3 and 4.<sup>59</sup>

**C. Joint Petitioners Establish Standing, and Proffer Two Contentions That Are Admissible in Part**

**1. Joint Petitioners Establish Standing**

Joint Petitioners consist of the following three organizations: (1) Friends of the Earth, Inc. (FOE); (2) Natural Resources Defense Council, Inc. (NRDC); and (3) Miami Waterkeeper, Inc. (Waterkeeper). All three organizations have demonstrated that the interests they seek to protect in this proceeding are germane to their organizational purposes.<sup>60</sup> Further, all three organizations provide

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scope of Contention 2 does not extend to requiring a discussion of the environmental impacts resulting from operation of the CCS, because Contention 2 does not point to any alleged deficiencies in the ER regarding its discussion of environmental impacts of CCS operation. *See* NRC Staff Answer to Joint Pet'rs Pet. and SACE Pet. at 69.

<sup>59</sup> Prior to oral argument, we understood the Staff to acknowledge that Contention 2 satisfied the admissibility requirements in 10 C.F.R. § 2.309(f)(1) as a contention of omission. *See* NRC Staff Answer to Joint Pet'rs Pet. and SACE Pet. at 68-69. At oral argument, however, the Staff seemed to take the position that, on the one hand, it did not oppose admission of Contention 2 as a contention of omission, *see* Tr. at 156, but that, on the other hand, neither NEPA nor NRC regulations requires FPL or the NRC Staff to consider mechanical cooling towers as a reasonable alternative to the CCS. *See, e.g., id.* at 156, 158, 159. In petitioners' view, the position taken by the NRC Staff at oral argument was "very different" from the position it took in its brief. *See id.* at 255. Petitioners therefore requested that the NRC Staff be required to provide its seemingly new views in writing so the other participants would have the opportunity to respond. *See id.* We granted petitioners' request, *id.* at 257; *supra* notes 19 and 20, and based on our review of the supplemental briefs, we conclude that the NRC Staff's "clarified position" has no material impact on its position (or our determination) that Contention 2 satisfies the admissibility criteria as a contention of omission.

After the supplemental briefs had been filed, petitioners moved for leave to respond to what they perceived as a newly raised argument in FPL's brief. *See* Petitioners' Motion for Leave to Respond to Applicant's Response to the NRC Staff's Clarification Regarding the Admissibility of Proposed Cooling Tower Contentions (Jan. 15, 2019); Petitioners' Response to Applicant's New Arguments on the Admissibility of Petitioners' Cooling Tower Contentions (Jan. 15, 2019). FPL and the NRC Staff opposed petitioners' motion. *See* Applicant's Answer to Petitioners' Joint Motion for Leave to Respond to Applicant's Response to the NRC Staff's Clarification (Jan. 22, 2019); NRC Staff's Answer to Petitioners' Motion for Leave to Respond to Applicant's Response to the NRC Staff's Clarification (Jan. 25, 2019). Given our ruling on the admissibility of Contention 2, we deny petitioners' motion as moot.

<sup>60</sup> *See* Joint Pet'rs Pet. at 2 (FOE's mission includes "defend[ing] the environment" and "mini-  
(Continued)

declarations from members who (1) live within 50 miles of the Turkey Point site and therefore have standing in their own right pursuant to the proximity presumption; and (2) authorize their respective organizations to represent their interests in this proceeding, thus rendering it unnecessary for them to participate as individuals. *See, e.g.*, Joint Pet., attach. B, Decl. of Anne Hemingway Feuer §§ 1, 4, 14 (June 29, 2018) (member of FOE); *id.*, attach. H, Decl. of Phillip Stoddard §§ 1, 3, 13 (July 24, 2018) (member of NRDC); *id.*, attach. J, Decl. of Daniel Parobok §§ 4, 7 (July 30, 2018) (member of Waterkeeper). Joint Petitioners, therefore, satisfy the requirements for representational standing. *See supra* Part II.A.<sup>61</sup>

## **2. Joint Petitioners Proffer Two Contentions That Are Admissible in Part**

Joint Petitioners proffer five contentions (Contentions 1-E through 5-E) alleging deficiencies in FPL's ER. We conclude that Contentions 1-E and 5-E are admissible in part. Specifically, we admit Contention 1-E to the extent it claims that the ER improperly failed to consider mechanical draft cooling towers as a reasonable alternative to the CCS.<sup>62</sup> We also admit Contention 5-E to the extent it challenges the ER's failure to recognize Turkey Point Units 3 and 4 as a source of ammonia in surrounding freshwater wetlands, as well as its failure to consider the impacts of ammonia discharges on threatened and endangered species and their critical habitat. We reject as inadmissible the other portions of Contentions 1-E and 5-E, and all of Contentions 2-E, 3-E, and 4-E.

### *a. Contention 1-E Is Admissible in Part*

In Contention 1-E, Joint Petitioners assert that the ER "fails to consider a reasonable range of alternatives to the proposed action, as required by NEPA and NRC implementing regulations." Joint Pet'rs Pet. at 15-16. More particularly, they argue that the ER improperly omits consideration of the "reasonable and feasible" alternative of replacing the CCS with mechanical draft cooling towers to reduce the adverse environmental impacts of the CCS. *Id.* at 16, 19.

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miz[ing] the risks that nuclear facilities pose to its members and to the general public."); *id.* at 5 (NRDC's mission includes "maintain[ing] and enhanc[ing] environmental quality" by working to "minimize the risks that nuclear facilities pose to its members and to the general public."); *id.* at 6-7 (Waterkeeper's mission includes "defend[ing], protect[ing], and preserv[ing] the aquatic integrity of South Florida's watershed and wildlife.").

<sup>61</sup> Neither FPL nor the NRC Staff challenges Joint Petitioner's representational standing. *See* FPL Answer to Joint Pet'rs Pet. at 2; NRC Staff Answer to Joint Pet'rs Pet. and SACE Pet. at 9-10.

<sup>62</sup> This admissible portion of Contention 1-E is identical to the portion of SACE Contention 2 that we found to be admissible. *See supra* Part III.B.2.b.

Joint Petitioners provide factual information in support of their assertion that mechanical draft cooling towers would be a reasonable and feasible alternative, *see id.* at 19-22, and they claim that failing to discuss this alternative violates 10 C.F.R. § 51.45(c), which requires the ER to include a discussion of ““alternatives available for reducing or avoiding adverse environmental effects,”” including impacts on “American crocodiles, an endangered species,” and the “American crocodile habitat.” *Id.* at 18, 23, 24.

Consistent with its position concerning SACE’s Contention 2, the NRC Staff does not oppose admitting this contention “insofar as it asserts that [FPL’s ER] omits consideration of mechanical draft cooling towers in connection with license renewal of Turkey Point Units 3 and 4, as a reasonable alternative to use of the plants’ [CCS].” NRC Staff Answer to Joint Pet’rs Pet. and SACE Pet. at 29-30. FPL, on the other hand, argues that Contention 1-E is inadmissible in its entirety for essentially the same reasons it argued against admitting SACE Contention 2. *See* FPL Answer to Joint Pet’rs Pet. at 8-9.

For the reasons we admitted SACE Contention 2, and subject to the same limitations, *see supra* Part III.B.2.b, we admit Contention 1-E as follows: In light of the adverse impact of continued CCS operations on the threatened American crocodile and its critical seagrass habitat, the ER is deficient for failing to consider mechanical draft cooling towers as a reasonable alternative to the CCS in connection with the license renewal of Turkey Point Units 3 and 4.<sup>63</sup>

*b. Contention 2-E Is Not Admissible*

In Contention 2-E, Joint Petitioners allege that “the [ER] fails to adequately consider the cumulative impacts of continued operation of Units 3 and 4.” Joint Pet’rs Pet. at 30. Specifically, they argue that section 4.12 of the ER does not adequately address the cumulative impacts on water resources from the reasonably foreseeable effects of climate change on the CCS, including sea level

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<sup>63</sup> Contention 1-E also appears to challenge the ER’s (1) discussion of the environmental impacts of continued CCS operation, *see* Joint Pet’rs Pet. at 19, 23-24, and (2) failure to consider other unspecified “alternatives to the proposed action.” *Id.* at 15. Those aspects of the contention are not admissible because, contrary to 10 C.F.R. § 2.309(f)(1)(v) and (vi), they fail to provide support sufficient to demonstrate a genuine dispute on a material issue of law or fact, or to include references to specific portions of the ER that they dispute. *See* NRC Staff Answer to Joint Pet’rs Pet. and SACE Pet. at 30-31.

rise<sup>64</sup> and increasing air temperature.<sup>65</sup> *Id.* at 30-31. Joint Petitioners assert that the “reasonably foreseeable impacts from sea level rise will increase the risk of flooding at Turkey Point, including the potential for overtopping or breach[ing] of the canal system, leading to direct discharges of polluted canal water into surface water resources, including Biscayne Bay.” *Id.* at 38. The “[h]igher air temperatures,” they assert, “will increase the rate of evaporation in the [CCS] leading to more saline conditions. Higher salinity in the [CCS] will . . . adversely impact groundwater resources.” *Id.*

We agree with the NRC Staff and FPL that this contention is not admissible. *See* NRC Staff Answer to Joint Pet’rs Pet. and SACE Pet. at 34-41; FPL Answer to Joint Pet’rs Pet. at 27-36. First, even accepting Joint Petitioners’ claims regarding future increases in sea level and air temperature, they fail to link those changes to the impacts of Turkey Point’s continued operation. Joint Petitioners make conclusory assertions that (1) “sea level rise will increase the risk of flooding . . . , including the potential for overtopping or breach[ing] of the [CCS], leading to direct discharges of polluted canal water into surface water resources,” Joint Pet’rs Pet. at 38; and (2) hotter air temperature will “increase the rate of evaporation in the [CCS] leading to more saline conditions.” *Id.* But they provide no support for their claims regarding putative environmental impacts. For example, they fail to discuss such necessary information as the relationship between their projected sea levels and the relevant elevations of the Turkey Point site, its sea level barriers, or the CCS, to support their claim that the site will be flooded and the CCS will be overtopped or breached. Similarly, although an increase in air temperature can lead to increased evaporation in the CCS, Joint Petitioners provide no support to demonstrate that the higher temperatures they postulate would increase evaporation in the CCS to any particular extent,

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<sup>64</sup> In support of their arguments regarding sea level rise, Joint Petitioners rely on the expert opinion of Dr. Robert Kopp, who states, *inter alia*, that “[t]hrough 2060, . . . there is between a 68 percent chance and a 95 percent chance that average sea-level rise at Key West [which Dr. Kopp posits as a comparable location to Turkey Point] will exceed 1 foot above the National Tidal Datum Epoch.” Joint Pet’rs Pet., attach. N, Decl. of Dr. Robert Kopp at 12 (July 26, 2018). Dr. Kopp provides several probability estimates of future sea level rise, using a number of alternative assumptions. He states that, assuming storm characteristics do not change, the frequency and extent of extreme flooding associated with coast storms will increase because “a tide or storm of a given magnitude will produce a more extreme total water level than it would have with lower average sea level.” *Id.* at 13. Consequently, “[i]f the sea level rises by one foot, . . . the probability of storms increasing water levels to the height of 2.0 feet becomes 50 [percent] rather than 1 [percent].” Joint Pet’rs Pet. at 35.

<sup>65</sup> With respect to increasing temperature, Joint Petitioners aver that in the Southeast United States for the 2036-2065 time period, air temperature increases are projected to range from 3.4 to 4.3 degrees Fahrenheit, Joint Pet’rs Pet. at 35, and changes in temperature extremes are projected to be 5.79 degrees Fahrenheit for the warmest day of the year and 11.09 degrees Fahrenheit for the “warmest 5-day, 1-in-10-year event” compared to the 1976-2005 period. *Id.* at 35-36.



much less to an extent that would be sufficient to increase the CCS salinity such that it would, in turn, affect the environment. Their failure to provide adequate support for these assertions renders the contention inadmissible pursuant to 10 C.F.R. § 2.309(f)(1)(v).

Additionally, to the extent Contention 2-E expresses concerns about overtopping and increased salinity of the CCS, it is also inadmissible pursuant to 10 C.F.R. § 2.309(f)(1)(vi) for failing to provide sufficient information to show a genuine dispute on a material issue of fact. Specifically, Joint Petitioners do not discuss how these impacts are reasonably foreseeable in light of the 2016 consent order between FPL and the FDEP that requires FPL to (1) “prevent releases of groundwater from the CCS to surface waters connected to Biscayne Bay that result in exceedances of surface water quality standards in Biscayne Bay”; and (2) perform a “thorough inspection of the CCS periphery” and “address any material breaches or structural defects.” *FDEP v. FPL*, OGC File No. 16-0241 (Consent Order), at 7, 10-12 (June 20, 2016) [hereinafter Consent Order]. Even if overtopping were to occur, Joint Petitioners do not explain how it would impair the environment given that the consent order requires FPL to maintain an average annual CCS salinity at or below 34 practical salinity units (PSU) and to submit a detailed report outlining the potential sources of the nutrients found in the CCS and to implement a plan to minimize these nutrient levels. *See id.* at 7-10. Similarly, with respect to their argument that increased air temperature will result in higher CCS salinity, Joint Petitioners fail to explain why it is reasonably foreseeable that a temperature rise will lead to increased CCS salinity in light of the consent order’s requirement that FPL achieve an average annual CCS salinity at or below 34 PSU at the completion of the fourth year of freshening activities, and maintain that salinity thereafter. *See id.* at 7. Joint Petitioners’ failure to address the above features of FPL’s consent order renders Contention 2-E’s concerns about overtopping and increased salinity inadmissible pursuant to section 2.309(f)(1)(vi).<sup>66</sup>

Finally, to the extent that Contention 2-E asserts that the ER fails adequately to address cumulative impacts on groundwater from the continued operation of the CCS during the renewal period, *see* Joint Pet’rs Pet. at 31, the contention ignores that FPL’s ER discusses the cumulative impacts to groundwater resulting from the operation of Turkey Point Units 3 and 4 in combination with impacts to groundwater resulting from operation of “the other Turkey Point facilities and . . . from other projects and activities in the surrounding area,” by incorporating by reference the cumulative impacts discussion in the 2016 EIS that was

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<sup>66</sup> As discussed *supra* Part III.B.2.a.iii, any past incidents of FPL’s failure to comply with the consent order do not, standing alone, constitute sufficient information to give rise to a genuine dispute in light of the case-law supported assumptions that FDEP will enforce, and FPL will comply with, the mandated obligations in the consent order.

prepared for the combined licenses for Turkey Point Units 6 and 7. *See* ER at 4-68.<sup>67</sup> The ER concludes that the cumulative impacts to groundwater will be small and are managed because “FPL continues to comply with its permits for groundwater withdrawals and injection, the FDEP [consent order] for freshening of the cooling canals, and the [consent agreement] with Miami-Dade County for remediation of the hypersaline plume.” *Id.* at 4-69. Further, the ER cites NRC Reg. Guide 4.2, stating that for resource areas that are regulated through a permitting process “it may be assumed that cumulative impacts are managed as long as facility operations are in compliance with their respective permits.” *Id.* Contention 2-E fails to provide sufficient information to raise a genuine dispute regarding these determinations in the ER, and for this reason it is not admissible pursuant to section 2.309(f)(1)(vi).

*c. Contention 3-E Is Not Admissible*

In Contention 3-E, Joint Petitioners claim that “[t]he [ER] (§§ 3 and 5) fails to comply with 10 C.F.R. § 51.53(c)(3)(iv) because it fails to analyze new and significant information regarding the effect of sea level rise on [the following] Category 1 and 2 issues,” Joint Pet’rs Pet. at 39: (1) termination of plant operations and the decommissioning process (Category 1 issue), *see id.* at 45; (2) cumulative impacts on affected resources (Category 2 issue), *see id.* at 43-44; and (3) surface and groundwater use conflicts collectively labelled as “water resources” (Category 2 issues). *See id.* at 44.

The NRC Staff and FPL argue that this contention is not admissible. *See* NRC Staff Answer to Joint Pet’rs Pet. and SACE Pet. at 43-46; FPL Answer to Joint Pet’rs Pet. at 36-45. We agree.

First, as Joint Petitioners concede, Joint Pet’rs Pet. at 40, the aspect of Contention 3-E that implicates “[t]ermination of plant operations and decommissioning” constitutes a challenge to a Category 1 issue. *See* 10 C.F.R. pt. 51, subpt. A, app. B, table B-1. This aspect of Contention 3-E is not admissible

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<sup>67</sup> The 2016 EIS discusses the contribution from Turkey Point Units 3 and 4, as well as the effect of FPL’s consent order with FDEP requiring freshening of the CCS, and the 2015 consent agreement with Miami-Dade County for remediating the hypersaline plume. *See* [EIS] for Combined Licenses (COLs) for Turkey Point Nuclear Plant Units 6 and 7, NUREG-2176, Vol. 2, at table 7-1 (Oct. 2016) [hereinafter Turkey Point Units 6 & 7 EIS].

It appears that FPL’s ER does not cite to a specific page of the 2016 EIS. The Commission has admonished that it does not expect a litigant to merely reference large portions of material where doing so would force a tribunal to “sift through it in search of asserted factual support.” *NextEra Energy Seabrook, LLC* (Seabrook Station, Unit 1), CLI-12-5, 75 NRC 301, 332 (2012). In our view, this admonition applies with equal force to an applicant’s preparation of an ER. FPL’s failure to provide a page-specific cite, however, does not change the Board’s conclusion as to this contention’s admissibility.

because it (1) is not subject to challenge in this adjudicatory proceeding where Joint Petitioners have failed to seek a rule waiver, *see id.* § 2.335; *Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), CLI-07-3, 65 NRC 13, 18 n.15 (2007); and (2) is outside the scope of this proceeding. *See* 10 C.F.R. § 2.309(f)(1)(iii).<sup>68</sup>

Second, as to the portion of Contention 3-E that asserts the ER’s “cumulative effects analysis . . . fails entirely to discuss the sea level rise-related impacts upon affected resources,” Joint Pet’rs Pet. at 43-44, this aspect of the contention — which is reasonably characterized as a contention of omission — is not admissible, because it ignores that the ER incorporates by reference the Turkey Point 6 and 7 EIS, which does analyze the cumulative impacts of continued operation of nuclear reactors at the site in combination with climate change and sea level rise. *See* ER at 4-68; Turkey Point Units 6 & 7 EIS at I-5 to I-6. This aspect of Contention 3-E fails to raise a genuine dispute as required by 10 C.F.R. § 2.309(f)(1)(vi).

Finally, the portion of Contention 3-E alleging that the ER improperly ignores water resource conflicts insofar as it fails to “account for the effect sea level rise will have on freshwater availability, ground water resources, and release of polluted cooling water into Biscayne Bay,” Joint Pet’rs Pet. at 44, fails to raise a genuine dispute. Although Joint Petitioners allege “frequent interchange of water from Biscayne Bay and the [CCS],” *id.* at 45, they provide no explanation for why this would cause conflicts in water use for either surface or ground-water resources. Instead, Joint Petitioners simply assert that sea level rise will eliminate the “closed-loop” nature of the CCS, but they do not explain why this would create or exacerbate water use *conflicts* for either resource, thus rendering this aspect of Contention 3-E inadmissible pursuant to section 2.309(f)(1)(vi).<sup>69</sup>

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<sup>68</sup> FPL argues that this aspect of Contention 3-E is also inadmissible pursuant to section 2.309(f)(1)(v) because Joint Petitioners offer no support for their claim that sea level rise will affect FPL’s ability to terminate plant operations and decommission the plant. *See* FPL Answer to Joint Pet’rs Pet. at 40. The NRC Staff argues that this aspect of Contention 3-E constitutes a challenge to an operating licensing issue that is beyond the scope of this SLR proceeding and, hence, is inadmissible pursuant to section 2.309(f)(1)(iii). NRC Staff Answer to Joint Pet’rs Pet. and SACE Pet. at 46. We agree with both arguments.

<sup>69</sup> Joint Petitioners also do not explain how sea level rise will eliminate the “closed loop” nature of the CCS in light of FPL’s consent order with FDEP, which requires that FPL conduct a “thorough inspection of the CCS periphery” and “address any material breaches or structural defects.” Consent Order at 7, 10-12. Nor do they explain how any overtopping of the CCS would result in any significant environmental impacts in light of the consent order’s requirements that FPL (1) maintain an average annual CCS salinity at or below 34 PSU; (2) submit a detailed report outlining the potential sources of nutrients in the CCS, and implement a plan to minimize these nutrient levels; and (3) prevent releases of groundwater from the CCS to surface waters connected to Biscayne Bay

(Continued)

*d. Contention 4-E Is Not Admissible*

In Contention 4-E, Joint Petitioners argue that the “[ER] (§ 3) erroneously fails to describe the reasonably foreseeable affected environment during the subsequent license renewal period (2032-2053) in violation of 10 C.F.R. § 51.53(c)(2),” which “renders Applicant’s analyses of environmental impacts (§ 4), mitigating actions (§ 6), and alternatives analysis (§ 8) legally insufficient.” Joint Pet’rs Pet. at 47. In particular, Joint Petitioners assert that the ER “fails to discuss the changes [caused by climate change] in the surrounding environment and their effects on Turkey Point, including sea level rise, increased air temperature, increased surface water temperature, acidification, annual precipitation, drought, and increased storm intensity.” *Id.* at 48.

The NRC Staff and FPL argue that Contention 4-E is not admissible. *See* NRC Staff Answer to Joint Pet’rs Pet. and SACE Pet. at 46-51; FPL Answer to Joint Pet’rs Pet. at 46-54. We agree.

Joint Petitioners are simply incorrect in asserting that the ER fails to address the effects of climate change during the license renewal period. The 2013 GEIS contains the potential effects of climate change that Joint Petitioners claim are missing from the ER, including sea level rise, increased air temperature, increased water temperature, increased water acidity, increased precipitation, drought, and more intense hurricanes. *See* 2013 GEIS at 4-237 to 4-241.<sup>70</sup> The ER, in turn, describes the effects of climate change when combined with the effects of the proposed action. *See* ER at 4-69, 4-71. Additionally, the ER cites the Staff’s EIS for the Turkey Point Units 6 and 7 combined licenses, which also discusses the effects of climate change at the site. *See* ER at 4-68. Contention 4-E is thus based on an erroneous factual premise, which renders it inadmissible pursuant to 10 C.F.R. § 2.309(f)(1)(v) and (vi).<sup>71</sup>

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that result in exceeding of surface water quality standards in Biscayne Bay. *See id.* at 7-12; *see also* NRC Staff Answer to Joint Pet’rs Pet. and SACE Pet. at 45; FPL Answer to Joint Pet’rs Pet. at 44.

<sup>70</sup> Section 4.12.3.2 of the 2013 license renewal GEIS describes the environmental impacts that could occur from changes in global and regional climate conditions, including generic descriptions of potential long-term impacts with examples of resource changes that could occur due to climate change. *See* GEIS at 4-237 to 4-241. Section 4.13 of the GEIS describes the cumulative impacts of the proposed action, focusing on resources that could be affected by the incremental impacts from continued operations associated with license renewal. *See id.* at 4-243 to 4-249.

<sup>71</sup> Moreover, to the extent Joint Petitioners assert in Contention 4-E that section 51.53(c)(2) requires the ER to describe the “reasonably foreseeable affected environment during the subsequent license renewal period,” Joint Pet’rs Pet. at 47, they are incorrect as a matter of law. The regulation requires that ERs “describe in detail the affected environment around the plant,” not the “reasonably foreseeable” environment. 10 C.F.R. § 51.53(c)(2). This legal error also renders Contention 4-E inadmissible pursuant to section 2.309(f)(1)(iv) for failing to show that the issue raised is material to the findings the NRC must make to support the action in this proceeding.

*e. Contention 5-E Is Admissible in Part*

In Contention 5-E, Joint Petitioners allege the ER “fails to address the adverse effect of operating the [CCS] for an additional 20 years on surface waters, freshwater wetlands, and endangered species present in those wetlands” in violation of 10 C.F.R. § 51.53(c)(3)(ii)(E). Joint Pet’rs Pet. at 58-59. Specifically, Joint Petitioners fault the ER for giving “no consideration to how the salinization of freshwater wetlands caused by the [CCS] will impact threatened or endangered species, and otherwise harm important plant and animal habitats,” *id.* at 59, and for failing “to consider the impacts of ammonia discharges on threatened and endangered species and important habitat.” *Id.* at 63. Regarding the latter assertion, Joint Petitioners provide factual support for concluding that (1) violations of surface water ammonia standards have been observed in canals near Turkey Point; and (2) Turkey Point is a key source of that ammonia. *See id.* at 62 (citing attach. P, Letter from Wilbur Mayorga, Chief of Environmental Monitoring and Restoration Division, DERM, to Matthew J. Raffenberg, Senior Director of Environmental Licensing and Permitting, FPL (July 10, 2018)).

FPL opposes admission of Contention 5-E in its entirety as outside the scope, immaterial, unsupported, and failing to demonstrate a genuine dispute with the ER. *See* FPL Answer to Joint Pet’rs Pet. at 54-60.

The NRC Staff does not oppose admitting the portion of Contention 5-E that relates to “the impact of ammonia releases from Turkey Point Units 3 and 4 on endangered and threatened species.” NRC Staff Answer to Joint Pet’rs Pet. and SACE Pet. at 54. The NRC Staff “recognizes that the impacts of continued operation of the CCS on threatened and endangered species and critical habitat is a Category 2 issue” that must be analyzed in the supplemental EIS on a site-specific basis, *id.* & n.225, and in the Staff’s view, Joint Petitioners submitted sufficient supporting information to raise a genuine dispute with the ER regarding their assertions that “Turkey Point is a source of ammonia in freshwater wetlands surrounding the site, and that the potential impacts of such ammonia releases during the period of continued operation on threatened and endangered species should be analyzed.” *Id.* at 54. The Staff opposes admitting all other portions of Contention 5-E. *See id.*

For the reasons stated by the NRC Staff, we conclude that Contention 5-E satisfies the admissibility requirements in 10 C.F.R. § 2.309(f)(1) to the extent it relates to the impact of ammonia releases from Turkey Point Units 3 and 4 on endangered and threatened species and their critical habitat. We therefore admit Contention 5-E as follows: The ER is deficient in its failure to recognize Turkey Point as a source of ammonia in freshwater wetlands surrounding the site, and

in its failure to analyze the potential impacts of ammonia releases during the renewal period on threatened and endangered species and their critical habitat.<sup>72</sup>

The remaining portions of Contention 5-E are not admissible. First, to the extent that Contention 5-E asserts that the ER improperly fails to consider the impact of salinization on surface waters and freshwater wetlands caused by the CCS, *see* Joint Pet'rs Pet. at 59, it raises an impermissible challenge to a Category 1 issue. *See* 10 C.F.R. pt. 51, app. B, Table B-1 (identifying as Category 1 issues the impacts of license renewal to altered salinity gradients in surface waters, groundwater quality degradation at plants with cooling ponds in salt marshes (including Turkey Point, *see* 2013 GEIS at 4-50), and cooling system impacts on terrestrial resources in wetlands). This aspect of Contention 5-E is (1) not litigable in this adjudicatory proceeding where Joint Petitioners have failed to seek a waiver, *see* 10 C.F.R. § 2.335; and (2) outside the scope of this proceeding. *See id.* § 2.309(f)(1)(iii).<sup>73</sup>

Likewise inadmissible is the portion of Contention 5-E concerning the impacts of salinization on threatened and endangered species in the wetlands. That aspect of Contention 5-E assumes that (1) FDEP's 2016 Consent Order does not establish adequate mitigation measures to address the salinity issues caused by the CCS; (2) FPL will fail to comply with the Consent Order; and/or (3) FDEP will fail to enforce the Consent Order and its regulations.<sup>74</sup> As we previously explained, absent evidence to the contrary (which Joint Petitioners fail to provide), we presume that FDEP will enforce, and FPL will comply with, the legally mandated measures in the Consent Order. *See supra* Part III.B.2.a.iii; *see also supra* note 55. We thus conclude that this aspect of Contention 5-E is

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<sup>72</sup> Joint Petitioners also assert that the CCS causes unspecified "other pollutants" to migrate into nearby surface waters and adversely impact the habitats of threatened and endangered species. *See* Joint Pet'rs Pet. at 59. Their failure to identify these putative "other pollutants" or to provide specific facts or expert opinion to support their claim renders this aspect of Contention 5-E inadmissible pursuant to 10 C.F.R. § 2.309(f)(1)(v).

<sup>73</sup> Joint Petitioners may not circumvent the regulatory bar against challenging a Category 1 issue by alleging the existence of new and significant information. *See* Joint Pet'rs Pet. at 60-62 (alleging significant migration of salt intrusion). As the Commission has held, "the new and significant information requirement in 10 C.F.R. § 51.53(c)(3)(iv) [does] not override, for the purposes of litigating the issues in an adjudicatory proceeding, the exclusion of Category 1 issues in 10 C.F.R. § 51.53(c)(3)(i) from site-specific review. . . . [A] waiver [is] required to litigate any new and significant information relating to a Category 1 issue." *Limerick*, CLI-12-19, 76 NRC at 384.

<sup>74</sup> The 2016 Consent Order requires FPL to submit and implement a plan that will "halt the westward migration of the hypersaline plume within 3 years of commencement of the remediation project and retract the hypersaline plume to the L-31E canal within 10 years." Consent Order at 9. FPL must report on the effectiveness of this plan at the conclusion of the fifth year of the plan's implementation. If the plan is ineffective, FPL must provide an alternative plan for FDEP approval, and then implement the FDEP-sanctioned plan. *See id.* at 10.

inadmissible pursuant to 10 C.F.R. § 2.309(f)(1)(v) and (vi) for failing to provide sufficient information to give rise to a genuine dispute.

#### **D. Mr. Gomez Fails to Proffer an Admissible Contention**

FPL argues that Mr. Gomez's petition should be rejected as a threshold matter because (1) it is untimely; (2) it does not comply with the NRC's mandatory E-Filing requirements; and (3) it fails to demonstrate standing. *See* FPL Answer to Gomez Pet. at 4-13. The NRC Staff disagrees with FPL regarding Mr. Gomez's standing, stating that he "has shown that he has standing to intervene, based on the proximity presumption." NRC Staff Answer to Gomez Pet. at 9. However, the Staff agrees that Mr. Gomez's petition should be denied because it was late and improperly filed and served. *See id.* at 26-29.

We need not address any of these threshold issues, because we agree with the NRC Staff and FPL that none of the contentions proffered by Mr. Gomez is admissible. *See* NRC Staff Answer to Gomez Pet. at 26-43; FPL Answer to Gomez Pet. at 13-24.<sup>75</sup>

##### ***1. Contentions 1 and 2 Are Not Admissible***

The first two putative contentions in Mr. Gomez's Petition constitute requests for extensions of time. First, Mr. Gomez opines that FPL's application was not available to the public for a sufficient time to allow adequate review, and he therefore requests an extension of sixty days beyond August 1, 2018, to allow "petitions for hearing, submissions of contention and limited appearance statements." Gomez Pet. at unnumbered p. 2. Second, Mr. Gomez asserts that there "are current municipal board & committee motions in process within [the] City of Miami in support of an extension to the public comment period and to enable a formal response by the City of Miami Commission." *Id.* Mr. Gomez therefore requests that "an [unspecified] extension [of time for] public comments be allowed in order to reasonably accommodate the City of Miami Commission with an opportunity to review the active motion[s] . . . and comment if [it] rules in favor of entering said comment." *Id.*

Mr. Gomez's requests for extensions of time do not constitute contentions challenging FPL's license renewal application, and they fail on their face to

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<sup>75</sup> The ten contentions proffered by Mr. Gomez are located in ten numbered paragraphs and subparagraphs in the section of his Petition entitled "Petitioner[']s Contentions." *See* Gomez Pet. at unnumbered pp. 1-7.

satisfy the contention admissibility requirements in 10 C.F.R. § 2.309(f)(1). *See* NRC Staff Answer to Gomez Pet. at 31-32.<sup>76</sup>

## **2. Contention 3 Is Not Before This Board**

In Contention 3, Mr. Gomez requests “an [unspecified] extension [of time] in order to have sufficient opportunity to submit formal environmental scoping comments on issues arising under [NEPA].” Gomez Pet. at unnumbered p. 2. This portion of Mr. Gomez’s Petition is not before us, because in its referral memorandum of Mr. Gomez’s Petition to the Atomic Safety and Licensing Board Panel, the Office of the Secretary excluded this particular request and, instead, referred it to the Office of the Executive Director for Operations for appropriate action. *See* Letter from Annette L. Vietti-Cook, Secretary, U.S. Nuclear Regulatory Commission, to E. Roy Hawkens, Chief Administrative Judge, Atomic Safety and Licensing Board Panel (Aug. 9, 2018).

## **3. Contention 4 Is Not Admissible**

In Contention 4, Mr. Gomez contends that the “unlined cooling canals are leaking a host of caustic poisonous chemicals and highly saline waste water into our water supply.” Gomez Pet. at unnumbered p. 3. He refers to a “clean up regime” that “FPL has currently entered into . . . with Miami-Dade County via the Department of Environmental Resource Management,” *id.*, and he requests that the “License Renewal Applications be withheld and withdrawn until the current clean up . . . is completed” and “until any [lawsuits] related to potential clean water act violations stated within ongoing FPL [lawsuits] . . . [are] settled.” *Id.* at unnumbered pp. 3-4.

This environmental contention fails to provide a specific statement of law or reference a specific portion of the application that is disputed, as required by 10 C.F.R. § 2.309(f)(1)(i) and (vi). Additionally, to the extent Contention 4 asserts that FPL’s renewal application is deficient pursuant to NEPA until an environmental clean-up is completed and any lawsuits related to potential Clean Water Act violations within ongoing FPL lawsuits are settled, *see* Gomez Pet. at unnumbered pp. 3-4, it is outside the scope of this proceeding pursuant to section 2.309(f)(1)(iii), because, as explained *supra* Part III.A.1, NEPA “seeks to guarantee process, not specific outcomes.” *Massachusetts v. NRC*, 708 F.3d 63, 67 (1st Cir. 2013). Contention 4 also fails to satisfy section 2.309(f)(1)(v),

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<sup>76</sup> Mr. Gomez’s requests would not have fared any better if he had characterized them as extension requests. As the NRC Staff correctly states, his first request is untimely and is not supported by good cause, *see* NRC Staff Answer to Gomez Pet. at 31, and his second request is outside the scope of this adjudicatory proceeding. *See id.* at 32.



because none of its assertions is supported by specific facts or expert opinions. And because Contention 4 lacks proper support, it fails to raise a genuine dispute on a material issue of law or fact, as required by section 2.309(f)(1)(vi).

#### **4. Contention 5 Is Not Admissible**

Contention 5 is a contention of omission in which Mr. Gomez asserts that FPL's ER fails to comply with 10 C.F.R. § 52.99(c) because the "Alternative Energy Sources review [does] not include solar [or] wind power in [its] analysis." Gomez Pet. at unnumbered p. 4.

The legal basis for Contention 5 is flawed, because the regulatory requirement on which Mr. Gomez relies, section 52.99(c), governs combined license (COL) applications, not license renewals, thus rendering the contention inadmissible pursuant to section 2.309(f)(1)(ii) and (iii) as lacking a basis and outside the scope of this proceeding. Moreover, Contention 5 is based on an erroneous factual predicate. Contrary to Mr. Gomez's assertion, FPL's ER does include an analysis of solar and wind power alternatives. *See* ER at 7-4, 7-6 to 7-7, 7-9 to 7-10. Contention 5 is thus also inadmissible for failing to raise a genuine dispute with the ER as required by section 2.309(f)(1)(vi).

#### **5. Contention 6 Is Not Admissible**

Contention 6 is a contention of omission in which, again relying on section 52.99(c), Mr. Gomez asserts that the ER is incomplete because it fails to include a discussion of whether FPL intends to seek any power uprates for Units 3 and 4 during the renewal period. *See* Gomez Pet. at unnumbered pp. 4-5. Such a discussion is required, he claims, because if FPL were to seek a power uprate, and if one were granted, it could cause the plant's "safe maximum operating temperature" to be exceeded and entail "the risk of further expanding the poisonous and high salinity plume" in the groundwater. *Id.*

The legal basis for Contention 6 is flawed, because the regulatory requirement on which Mr. Gomez relies, section 52.99(c), governs COL applications, not license renewals, thus rendering the contention inadmissible pursuant to section 2.309(f)(1)(ii) and (iii) as lacking a basis and outside the scope of this proceeding. Contention 6 is also outside the scope of this proceeding because power uprates are a matter related to current plant operations and governed by 10 C.F.R. Part 50, not the license renewal requirements in Part 51 (environmental) or Part 54 (safety). Moreover, Mr. Gomez's concern that FPL *might* request an uprate sometime during the renewal period that *might*, in turn, implicate safety and environmental matters is based on unsupported conjecture and is therefore inadmissible pursuant to 2.309(f)(1)(v). Finally, Contention 6 fails to challenge

a specific portion of FPL's application, much less raise a genuine dispute of material fact or law, as required by section 2.309(f)(1)(vi).

#### **6. Contention 7 Is Not Admissible**

In Contention 7, Mr. Gomez includes a block quote that appears to combine portions of “the current EIS, GEIS and SEIS and related supplements and [appendices]” to support his assertions that the ER is deficient because it is “based on the egregious misrepresentation and [sheer] lack of local governing sea level rise projections” and “how that impacts its high level waste and spent fuel onsite storage.” Gomez Pet. at unnumbered p. 5.

To the extent that Contention 7 alleges that rising sea levels pose a potential risk to safe plant operations, including spent fuel storage, it raises a current licensing basis safety issue under 10 C.F.R. Part 50 that is outside the scope of this proceeding, contrary to section 2.309(f)(1)(iii). To the extent Contention 7 alleges an environmental issue concerning onsite storage of spent nuclear fuel, it raises a non-litigable and inadmissible Category 1 issue. *See* 10 C.F.R. pt. 51, subpt. A, app. B. Additionally, Contention 7 fails to satisfy section 2.309(f)(1)(v), because the block quote on which Mr. Gomez relies does not support his claim that there is an “egregious misrepresentation” or “lack of local governing sea level rise projections” in FPL's license renewal application.<sup>77</sup> Finally, Contention 7 fails to specify any portion of FPL's application that is inadequate, and thus fails to establish a genuine material dispute with the application, as required by section 2.309(f)(1)(vi).

#### **7. Contention 8 Is Not Admissible**

Contention 8 alleges the NRC improperly concluded in the “current EIS, GEIS and SEIS and related supplements and appendi[ces]” that the “[e]nvironmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.” Gomez Pet. at unnumbered p. 5. Mr. Gomez asserts that this conclusion “contradict[s] . . . current environmental facts” because “a federal [lawsuit] is in play related to

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<sup>77</sup> The NRC Staff accurately states that Mr. Gomez's block quote is “unattributed, and its reliability or meaning cannot be discerned.” NRC Staff Answer to Gomez Pet. at 39. The NRC Staff also observes that Mr. Gomez's Petition includes a “[s]upplemental page” that quotes an excerpt from the Commission's decision on FPL's application for COLs for Turkey Point Units 6 and 7, *Florida Power & Light Co.* (Turkey Point Nuclear Generating Units 6 and 7), CLI-18-1, 87 NRC 39, 59 (2018), regarding sea level rise at the site. *See* NRC Staff Answer to Gomez Pet. at 39-40. We agree with the NRC Staff that Mr. Gomez's mere quotation from CLI-18-1 does nothing to advance the admissibility of Contention 7. *See id.*

potential EPA violations, [and] an increasing plume migrates and expands both easterly and westerly from the current position threatening both our water supply and our federally protected bay.” *Id.*

Although Mr. Gomez does not give a specific citation for the quote on which he bases Contention 8, the NRC Staff identified this quote as “the NRC’s general definition of a ‘SMALL’ impact, as presented in its environmental impact statements prepared pursuant to NEPA, without reference to any particular environmental issue.” NRC Answer to Gomez Pet. at 41. Contention 8 thus neither references a specific relevant portion of the license renewal application, nor demonstrates that a genuine dispute exists with the applicant, as required by section 2.309(f)(1)(vi). Moreover, Mr. Gomez fails to provide support for his position, as required by section 2.309(f)(1)(v), because he fails to identify the federal lawsuit he relies on, and he fails to explain his assertion that the lawsuit represents the “current environmental facts.” Gomez Pet. at unnumbered p. 5.

#### **8. Contention 9 Is Not Admissible**

In Contention 9, Mr. Gomez states that FPL “is currently in negotiation[s] with Miami-Dade [County] related to [reclaimed wastewater] required to recharge the current cooling canals to a low enough temperature to maintain the cooling function.” Gomez Pet. at unnumbered p. 6. Mr. Gomez describes “fears that the waste water discharge may negatively impact [FPL’s ability through compliance with its consent order] to reduce [the introduction of] phosphorous and other caustic compounds into the bay and our water supply.” *Id.* He requests that the application be “withheld and withdrawn until the water demand issue is resolved . . . for safe operation of the plant without further threatening our bay or drinking and agricultural water supply.” *Id.*

Again, Mr. Gomez fails to provide alleged facts or expert opinions to support his assertion that the use of wastewater to recharge the cooling canals may present a threat to drinking water, groundwater, and safe operation of the plant, as required by section 2.309(f)(1)(v).<sup>78</sup> Nor does he refer to the specific sources and documents on which he intends to rely, as required by section 2.309(f)(1)(v). He also fails to reference a specific portion of the license renewal application that he disputes, as required by section 2.309(f)(1)(vi).

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<sup>78</sup> Contention 9 does not even provide adequate support for the proposition that Turkey Point Units 3 and 4 will use reclaimed wastewater as an additional source of cooling and CCS freshening during the renewal period. *See* FPL Answer to Gomez Pet. at 23 (“[T]here is no firm expectation or assumption in the [license renewal application] that Turkey Point Units 3 and 4 will use reclaimed wastewater during the SLR period.”).

## **9. Contention 10 Is Not Admissible**

In Contention 10, Mr. Gomez asserts that the license renewal application is deficient pursuant to 10 C.F.R. § 52.103(b) for the following reasons: (1) FPL allegedly projects a sea level rise of one foot by 2100,<sup>79</sup> which he asserts is inconsistent with projections of sea level rise by the United Nations, the U.S. Army Corps of Engineers, and the National Oceanic and Atmospheric Administration of, respectively, 31", 61", and 81"; and (2) FPL improperly fails to follow the POANHI — Process for Ongoing Assessment of Natural Hazard Information — SECY-15-0137 portion of the Post-Fukushima Near-Term Task Force Recommendations 2.2. *See* Gomez Pet. at unnumbered p. 6.

The legal basis for Contention 10 is flawed, because the regulatory requirement on which Mr. Gomez relies, section 52.103(b), governs COL applications, not license renewals, thus rendering the contention inadmissible pursuant to section 2.309(f)(1)(ii) and (iii) as lacking a basis and outside the scope of this proceeding. Additionally, although Mr. Gomez asserts that the license renewal application projects a one-foot sea level rise by 2100, he fails to specify where this projection appears in the application, if at all, and he thus fails to raise a genuine dispute with the application, as required by section 2.309(f)(1)(vi). The POANHI process that Mr. Gomez asserts should be used by FPL pertains to operational safety issues under 10 C.F.R. Part 50 with respect to flooding hazards, rather than to the aging management safety issues involved in the license renewal process; accordingly, this aspect of Contention 10 is not within the scope of this proceeding, as required by section 2.309(f)(1)(iii). Finally, to the extent that Contention 10 endeavors to raise an environmental challenge, it fails to provide any support or explanation as to how sea level rise, in combination with the effects of the continued operation of Turkey Point, will impact the environment, as required by section 2.309(f)(1)(v).

## **E. Monroe County, Florida May Participate as an Interested Governmental Participant**

As relevant here, a licensing board “will afford an interested . . . local governmental body (county, municipality or other subdivision) . . . that has not been admitted as a party under § 2.309, a reasonable opportunity to participate in a hearing.” 10 C.F.R. § 2.315(c). Section 2.315(c) does not require a demonstration of standing from an entity that seeks to participate as an interested govern-

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<sup>79</sup> Mr. Gomez initially states that FPL’s sea level rise projection is “1” (i.e., one inch), but in a later sentence he states the projection is one foot. *See* Gomez Pet. at unnumbered p. 6. We agree with the NRC Staff’s assumption that Mr. Gomez means one foot. *See* NRC Staff Answer to Gomez Pet. at 42.

mental participant. Rather, it requires the entity to (1) identify those contentions on which it intends to participate; and (2) designate a single representative for the hearing. *See id.* The designated representative may

introduce evidence, interrogate witnesses where cross examination by the parties is permitted, advise the Commission without [being required] to take a position with respect to the issue, file proposed findings in those proceedings where findings are permitted, and petition for review by the Commission under section 2.341 with respect to the admitted contentions.

*Id.*

As indicated *supra* Part I, Monroe County, Florida filed a request to participate as an interested governmental participant. The request explains that Monroe County borders Miami-Dade County and comprises natural resources including the Florida Keys, three national parks, four national wildlife refuges, and three state aquatic preserves. *See* Monroe County Request at unnumbered p. 1. Given its proximity to the Turkey Point facility,<sup>80</sup> Monroe County is concerned about the adverse impact of the CCS on (1) the County's drinking water; and (2) Biscayne Bay, which will threaten the tourism and fishing industries on which the County's identity and economy are based. *See id.* at unnumbered p. 2. Monroe County identifies SACE's two contentions as those in which it intends to participate, *see id.* at unnumbered p. 3, and it designates the Monroe County Board of County Commissioners as its representative. *See id.* at unnumbered p. 2.

We conclude that Monroe County satisfies the regulatory criteria for participating in this proceeding as an interested governmental participant, and we grant its request to participate on SACE's two contentions, as admitted.

#### IV. CONCLUSION AND ORDER

For the foregoing reasons, we (1) *grant* SACE's hearing request, admitting Contention 1A and Contention 2 as framed by this Board;<sup>81</sup> (2) *grant* Joint Peti-

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<sup>80</sup> The NRC Staff advises that the Turkey Point facility and the CCS appear to be located about eight miles and four miles, respectively, from the nearest boundary of Monroe County. *See* NRC Staff Response to Monroe County at 5 n.23.

<sup>81</sup> SACE Contention 1A (as admitted) states: The ER fails adequately to analyze the impacts (including cumulative) of continued CCS operation on the American Crocodile and its critical seagrass habitat. *See supra* p. 279.

SACE Contention 2 (as admitted) is identical to Joint Petitioners' Contention 1-E (as admitted) and states: In light of the adverse impact of continued CCS operations on the threatened American

*(Continued)*

tioners' hearing request, admitting Contention 1-E and Contention 5-E as framed by this Board;<sup>82</sup> (3) *deny* Mr. Gomez's hearing request; and (4) *grant* Monroe County's request to participate as an interested governmental participant.

Pursuant to 10 C.F.R. § 2.323(f)(1), we refer to the Commission our ruling *infra* Part III.A that section 51.53(c)(3) applies to the preparation of ERs in SLR proceedings. *See supra* note 46.

We deny as moot petitioners' motion dated January 15, 2019, which requested permission to respond to an FPL filing. *See supra* note 59.

This proceeding shall be conducted pursuant to the Simplified Hearing Procedures for NRC Adjudications described in Subpart L of 10 C.F.R. Part 2.

This Memorandum and Order is subject to appeal in accordance with the provisions in 10 C.F.R. § 2.311(b) and (d)(1).

It is so ORDERED.

THE ATOMIC SAFETY AND  
LICENSING BOARD

E. Roy Hawkens, Chairman  
ADMINISTRATIVE JUDGE

Dr. Michael F. Kennedy  
ADMINISTRATIVE JUDGE

Rockville, Maryland  
March 7, 2019

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crocodile and its critical seagrass habitat, the ER is deficient for failing to consider mechanical draft cooling towers as a reasonable alternative to the CCS in connection with the license renewal of Turkey Point Units 3 and 4. *See supra* p. 287.

<sup>82</sup> Joint Petitioners' Contention 1-E (as admitted) is identical to SACE Contention 2 (as admitted) and states: In light of the adverse impact of continued CCS operations on the threatened American crocodile and its critical seagrass habitat, the ER is deficient for failing to consider mechanical draft cooling towers as a reasonable alternative to the CCS in connection with the license renewal of Turkey Point Units 3 and 4. *See supra* p. 285.

Joint Petitioners' Contention 5-E (as admitted) states: The ER is deficient in its failure to recognize Turkey Point as a source of ammonia in freshwater wetlands surrounding the site, and in its failure to analyze the potential impacts of ammonia releases during the renewal period on threatened and endangered species and their critical habitat. *See supra* pp. 293-94.

## Judge Abreu, Concurring in Part, and Dissenting in Part

### I. INTRODUCTION

While I agree with the majority's rulings on standing and, to a degree, contention admissibility as outlined in section III below, I must dissent from an important aspect of their contention admissibility findings because I respectfully disagree with their opinion that 10 C.F.R. § 51.53(c)(3) applies to subsequent license renewal. The plain language of the regulation states that it applies to an initial not a subsequent renewal. The APA requires a regulation adopted through notice and comment to be amended through notice and comment. Especially here, where the majority's application of the regulation creates both a significant uncertainty about what regulatory standards are applicable and an obstacle to a petitioner's ability to know how to properly frame its contentions, proper notice is essential. Although the agency's approach to subsequent license renewals may have evolved since section 51.53(c)(3) was proposed in 1991, to use that evolution as an excuse for an adjudicatory body to *de facto* change the regulation would subvert the intent of the APA and potentially risk the agency's credibility as to the openness, clarity, and reliability of its regulations — three of the agency's "Principles of Good Regulation."<sup>1</sup>

### II. ANALYSIS OF SECTION 51.53(c)(3)

FPL and the Staff ask us to ignore the plain language of section 51.53(c)(3) because, they claim, it does not reflect the Commission's intent. They would have us ignore the word "initial" and apply the rule to subsequent license renewal applications because, as FPL and the Staff assert, reading the regulation in accordance with its plain language leads to an "absurd" result.<sup>2</sup> The majority likewise frames the issue before us as a "question of Commission intent" and concludes that the Commission intended section 51.53(c)(3) to apply to all license renewal applications.<sup>3</sup> But the majority delves too deeply to find its answer. The regulation is clear on its face, and reading it in accordance with its plain language presents no absurdity or conflict with the agency's regulatory structure. Therefore, neither the Board nor the Commission has the authority to effectively amend a regulation to reflect new Commission "intent" outside of the

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<sup>1</sup> See NRC Principles of Good Regulation (ADAMS Accession No. ML14135A076).

<sup>2</sup> FPL Surreply at 4; NRC Staff Response to FPL Surreply at 1-2.

<sup>3</sup> Majority at p. 263.

notice and comment process.<sup>4</sup> When presented with an unambiguous regulation, an agency may not, “under the guise of interpreting [that] regulation, . . . create *de facto* a new regulation.”<sup>5</sup> Because the NRC promulgated section 51.53(c)(3) through notice-and-comment rulemaking, it must use the same procedure if it wants to amend or repeal the rule.<sup>6</sup>

The “interpretation of any regulation must begin with the language and structure of the provision itself.”<sup>7</sup> Contrary to the majority’s characterization,<sup>8</sup> section 51.53(c)(3) is not “silent” as to its scope. The regulation is quite specific, and we must give all of its words full effect.<sup>9</sup> It applies to applicants: (1) seeking an “*initial renewed license*”; and (2) holding an operating license, construction permit, or combined license issued as of June 30, 1995.<sup>10</sup> These applicants must include in their environmental reports the information described in 10 C.F.R. § 51.53(c)(2), along with various “conditions and considerations” that, among other things, allow them to take advantage of the generic determinations in the GEIS for Category 1 environmental issues.<sup>11</sup> “[T]he admitted rules of statutory construction declare that a legislature is presumed to have used no superfluous words. Courts are to accord a meaning, if possible, to every word in a statute.”<sup>12</sup> The oft-used principle, “*expressio unius est exclusio alterius*” (that is, the mention of one thing is the exclusion of the other), is instructive here.<sup>13</sup> Of the categories of license renewal applicants, the Commission chose “initial,” thus implying that this was done to the exclusion of “subsequent.”<sup>14</sup> Had the Com-

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<sup>4</sup> See *Conn. Nat’l Bank v. Germain*, 503 U.S. 249, 253-54 (1992) (“[C]ourts must presume that a legislature says in a statute what it means and means in a statute what it says . . . . When the words of a statute are unambiguous, . . . ‘judicial inquiry is complete.’” (quoting *Rubin v. United States*, 449 U.S. 424, 430 (1981))).

<sup>5</sup> *Christensen v. Harris Cty.*, 529 U.S. 576, 588 (2000).

<sup>6</sup> See *Perez v. Mortg. Bankers Ass’n*, 575 U.S. \_\_\_, 135 S. Ct. 1199, 1206 (2015) (citing *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (2009)) (describing the APA’s “mandate that agencies use the same procedures when they amend or repeal a rule as they used to issue the rule in the first instance”).

<sup>7</sup> *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-900, 28 NRC 275, 288 (1988).

<sup>8</sup> Majority at p. 265.

<sup>9</sup> *Shoreham*, ALAB-900, 28 NRC at 288.

<sup>10</sup> 10 C.F.R. § 51.53(c)(3) (emphasis added).

<sup>11</sup> *Id.*

<sup>12</sup> *Platt v. Union Pac. R.R. Co.*, 99 U.S. 48, 58 (1878).

<sup>13</sup> See, e.g., *Christensen*, 529 U.S. at 582-83.

<sup>14</sup> The force of the “*expressio unius*” principle depends on context; the analysis “will turn on whether, looking at the structure of the statute and perhaps its legislative history, one can be confident that a normal draftsman when he expressed ‘the one thing’ would have likely considered the

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mission meant “initial and subsequent,” it could have said just that, or “initial” simply could have been deleted.

The majority relies on *Federal Express Corp. v. Holowecki* to support its approach to discerning the Commission’s intent regarding the scope of section 51.53(c)(3).<sup>15</sup> But unlike here, *Holowecki* involved a statute and implementing regulations whose language left some room for interpretation: what constitutes a “charge” when alleging unlawful age discrimination.<sup>16</sup> Here, using the word “initial” by definition limits the regulation’s scope. Something is either “initial,” i.e., first, or it is not.<sup>17</sup> No room exists for anything else.

Resorting to regulatory history is unnecessary when the meaning of a regulation is clear.<sup>18</sup> But even so, the regulatory history here supports an interpretation of the word “initial” as a limitation on the application of section 51.53(c)(3). In the Statement of Considerations for the 1991 proposed rule, the NRC anticipated that a licensee might file multiple license renewal applications, but nevertheless limited application of the efficiencies to be gained by the Part 51 amendments. The NRC stated that the safety considerations for license renewal application reviews outlined in Part 54 “could be applied to *multiple* renewals of an operating license for various increments,” but in the very next sentence stated that the environmental considerations in the Part 51 amendments would apply only “to *one* renewal of the initial license for up to 20 years beyond [its] expiration.”<sup>19</sup> This history of the Part 51 amendments demonstrates that the word “initial” in section 51.53(c)(3) was used with forethought. In 1991, the agency intended the Part 51 amendments for license renewal reviews to apply to one renewal, not multiple renewals.

When the final rule was promulgated in 1996, the Statement of Considerations analyzed the comments received and explained major changes in response to those comments — for example, the agency’s decision to prepare a supplemental environmental impact statement for each license renewal application,

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alternatives that are arguably precluded.” *Shook v. D.C. Fin. Responsibility & Mgmt. Assistance Auth.*, 132 F.3d 775, 782 (D.C. Cir. 1998). As discussed below, “initial,” by definition, necessarily precludes “subsequent,” and the regulatory history further supports its preclusive effect. Therefore, based on context, it is fair to say that the Commission, in choosing to include the word “initial,” considered but nevertheless excluded all other alternatives. *See id.*

<sup>15</sup> *See* Majority at p. 265.

<sup>16</sup> *Fed. Express Corp. v. Holowecki*, 552 U.S. 389, 393 (2008).

<sup>17</sup> *Initial*, Merriam-Webster’s Collegiate Dictionary (10th ed. 1993) (defining “initial” to mean “of or relating to the beginning . . . placed at the beginning: first”).

<sup>18</sup> *See, e.g., Conn. Nat’l Bank*, 503 U.S. at 253-54.

<sup>19</sup> Proposed Rule, Environmental Review for Renewal of Operating Licenses, 56 Fed. Reg. 47,016, 47,017 (Sept. 17, 1991) (emphasis added) [hereinafter 1991 Proposed Rule].

rather than an environmental assessment.<sup>20</sup> The NRC did not repeat the “one-renewal” rationale, but to do so was not necessary; no comments about the one-renewal limitation on Part 51 were reported.<sup>21</sup> And the NRC reaffirmed that the changes in the final rule, while substantial, did not alter “the generic approach and scope” of the 1991 proposed rule.<sup>22</sup> Significantly, the final rule retained the word “initial” in section 51.53(c)(3).<sup>23</sup> Moreover, despite several changes to Part 51 since 1996, including changes to section 51.53(c)(3), “initial” remains in the rule to this day.<sup>24</sup>

Notably, in the 2009 proposed rule that accompanied the agency’s proposed revisions to the GEIS, the NRC repeated the scope of section 51.53(c)(3) in the Statement of Considerations, explaining that it applies to “initial license renewal.”<sup>25</sup> This slight phrasal change from the rule’s text (i.e., “initial renewed license”) demonstrates the agency’s awareness of the rule’s scope, revealing much more than would a rote copy-and-paste, and shows that the rule means what it says: it applies to “initial license renewal,” not to “any” renewal.<sup>26</sup>

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<sup>20</sup> See Final Rule, Environmental Review for Renewal of Nuclear Power Plant Operating Licenses, 61 Fed. Reg. 28,467, 28,468 (June 5, 1996) [hereinafter 1996 Final Rule].

<sup>21</sup> See generally “Public Comments on the Proposed 10 CFR Part 51 Rule for Renewal of Nuclear Power Plant Operating Licenses and Supporting Documents: Review of Concerns and NRC Staff Response,” NUREG-1529, vols. 1 & 2 (May 1996) (ADAMS Accession No. ML16362A344 (package)).

<sup>22</sup> 1996 Final Rule, 61 Fed. Reg. at 28,468.

<sup>23</sup> See *id.* at 28,487.

<sup>24</sup> See generally Final Rule, Miscellaneous Corrections, 79 Fed. Reg. 66,598 (Nov. 10, 2014) (making minor revisions for clarity and to correct typographical errors) [hereinafter Final Rule, Miscellaneous Corrections]; Final Rule, Revisions to Environmental Review for Renewal of Nuclear Power Plant Operating Licenses, 78 Fed. Reg. 37,282 (June 20, 2013) (updating the number and scope of the environmental issues to be addressed in license renewal proceedings consistent with the revised GEIS); Final Rule, Licenses, Certifications, and Approvals for Nuclear Power Plants, 72 Fed. Reg. 49,352, 49,432 (Aug. 28, 2007) (adding “combined licenses” to section 51.53(c)(3)) [hereinafter Final Rule, Licenses, Certifications, and Approvals]; Final Rule, Changes to Requirements for Environmental Review for Renewal of Nuclear Power Plant Operating Licenses, 64 Fed. Reg. 48,496 (Sept. 3, 1999) (expanding generic findings regarding transportation of spent fuel and waste); Final Rule, Environmental Review for Renewal of Nuclear Power Plant Operating Licenses, 61 Fed. Reg. 66,537 (Dec. 18, 1996) (making “minor clarifying and conforming changes and add[ing] language inadvertently omitted from Table B-1” of the 1996 final rule).

<sup>25</sup> Proposed Rule, Revisions to Environmental Review for Renewal of Nuclear Power Plant Operating Licenses, 74 Fed. Reg. 38,117, 38,128 (July 31, 2009).

<sup>26</sup> Despite this, the majority maintains that there is “nothing in the regulatory history indicating that the scope of section 51.53(c)(3) — in 1996 or thereafter — was intended to be restricted to initial license renewals,” Majority at p. 266 n.33, and avoids mentioning that nothing in the post-1996 regulatory history directly indicates that the regulation applies to subsequent license renewal.

(Continued)

It is quite a stretch to interpret the agency's failure to repeat the "one-renewal" rationale for Part 51 in the 1996 Statement of Considerations as signaling a complete abandonment of its original position. Nor does it make sense to further assume that retention of the word "initial" in the final rule was a mere ministerial error. Rather, it makes far more sense to assume that the agency meant what it said originally. Had the NRC abandoned its one-renewal limit on the 1991 Part 51 amendments without expressly explaining why, the agency's action would have been subject to challenge as "arbitrary and capricious."<sup>27</sup> And even if we assume that the word "initial" had been retained by mistake for several years, the Commission could have, and still could, fix the error with the same notice process it has used with past Part 51 changes.<sup>28</sup>

FPL and the Staff can conceive of no reason why the Commission might place a limit on the use of the GEIS determinations in the environmental report beyond one renewal of a power reactor license.<sup>29</sup> Similarly, the majority finds that reading the rule consistent with its plain language would "undermine the regulatory purpose" of injecting efficiencies into the license renewal process.<sup>30</sup> But limiting the use of the rule for preparation of environmental reports to one license renewal was not an unreasonable approach for the agency to take, considering its obligations under NEPA. The Commission has recognized "the NRC's continuing duty to take a 'hard look' at new and significant information for each 'major federal action' to be taken."<sup>31</sup> So the agency reasonably could have determined that after a certain point — here, following the term of the initial license plus twenty years — the environmental impacts of license renewal should be considered afresh in the environmental report. The GEIS (in its original and revised form) bears this out. As Petitioners point out, references

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Moreover, the majority's observation is off target. Because the rule's stated application only to initial license renewals is unchanged to this day, the relevant regulatory history is the expressed intent when the rule was promulgated.

<sup>27</sup> See 5 U.S.C. § 706(2)(A).

<sup>28</sup> See, e.g., Final Rule, Miscellaneous Corrections, 79 Fed. Reg. at 66,600 (direct final rule; good cause found to waive notice and comment). If, as the majority asserts, the 1996 final rule's lack of mention of section 51.53(c)(3)'s "initial" qualifier shows intent *not* to limit the application of this regulation to one renewal, then why wasn't 51.53(c)(3) changed to reflect that intent in one of the several amendments that were made since 1996? See Majority at pp. 265-66. Even if the lack of change was a simple oversight, the proper way to correct that oversight is through rulemaking. While the agency could try to justify a "good cause" waiver of the notice requirements in 5 U.S.C. § 553 for a quick fix to the rule, see 5 U.S.C. § 553(b)(3)(B), in my view, removing "initial" would have a substantive impact on subsequent license renewal applicants and hearing petitioners, thus requiring notice-and-comment rulemaking, but that is for the agency to decide.

<sup>29</sup> See FPL Surreply at 4, 9-10; NRC Staff Response to FPL Surreply at 11-13.

<sup>30</sup> Majority at p. 267.

<sup>31</sup> *Exelon Generation Co., LLC* (Limerick Generating Station, Units 1 and 2), CLI-13-7, 78 NRC 199, 216 (2013) (quoting *Marsh v. Or. Nat. Res. Council*, 490 U.S. 360, 374 (1989)).

throughout the GEIS indicate that it contemplates only the forty-year term of the original license plus twenty years, for a total of sixty years — not the eighty or more years allowed for subsequent license renewal.<sup>32</sup> Of note, as part of the discussion of severe accidents, the revised GEIS expressly states that “the revision only covers one initial license renewal period for each plant (as did the 1996 GEIS),” confirming that both the revised and the original GEIS look only at the temporal period of one license renewal.<sup>33</sup>

FPL and the Staff nonetheless assert, and the majority agrees, that the plain language of section 51.53(c)(3), with its use of the word “initial” in the environmental report instructions, cannot be reconciled with the rules governing the preparation of an environmental impact statement in sections 51.71(d), 51.95(c), and 10 C.F.R. Part 51, Subpart A, Appendix B, which refer generally to license renewal.<sup>34</sup> FPL and the Staff argue that the Staff is required to incorporate information from the GEIS for Category 1 issues for all power plant license renewal applications, initial and subsequent.<sup>35</sup> But the more general reference to license renewal in sections 51.95 and 10 C.F.R. Part 51, Subpart A, Appendix B dates to the 1991 proposed rule when the NRC explained that the “[P]art 51 amendments apply to *one* renewal of the initial license for up to 20 years.”<sup>36</sup> And the 1996 final rule included 10 C.F.R. § 51.71(d) and the general reference to the “license renewal” stage, but within the context of a rule that retained the same “generic approach and scope” of the proposed rule.<sup>37</sup> The use of the plural to describe the amendments to Part 51 as a whole, not just section 51.53(c)(3), is telling. Therefore, if one wanted to resort to regulatory history, as the majority does, to reconcile the language of these sections in a manner consistent with each other, the word “initial” would need to be read *into* sections 51.71(d), 51.95(c), and 10 C.F.R. Part 51, Subpart A, Appendix B, rather than out of

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<sup>32</sup> See Pet’rs. Response to FPL Surreply at 5-8. As its discussion makes clear, see Majority at pp. 267-68, the majority basically accepts FPL’s argument that “[t]he Commission’s decision to retain the 10-year GEIS review and update provision in its 2013 revisions to Part 51 would make no sense if it had intended for the GEIS and Table B-1 to apply only to initial operating license renewals.” FPL Surreply at 6. But the fact that the Commission expressed an intent to update the GEIS periodically in no way means that the GEIS analyses cover the temporal scope of a subsequent license renewal. Rather it simply means that when the GEIS is used the information it contains is reasonably up-to-date. Certainly, an applicant may reference the GEIS to make preparation of its environmental report more efficient, but it may not use section 51.53(c)(3)’s protections until the regulation is updated to include subsequent license renewals.

<sup>33</sup> 2013 GEIS at E-2.

<sup>34</sup> See FPL Surreply at 7-9; NRC Staff Response to FPL Surreply at 16-19; Majority at pp. 267 & n.35.

<sup>35</sup> See FPL Surreply at 8-9; NRC Staff Response to FPL Surreply at 16-17.

<sup>36</sup> 1991 Proposed Rule, 56 Fed. Reg. at 47,017 (emphasis added); see also *id.* at 47,029.

<sup>37</sup> 1996 Final Rule, 61 Fed. Reg. at 28,468.

section 51.53(c)(3), as the majority effectively suggests, even though that is not the outcome they seek.<sup>38</sup>

The Staff further argues that section 51.53(c)(3) must apply to subsequent license renewal applications, notwithstanding the word “initial,” because “the Commission has not promulgated any other requirements that specifically apply to an environmental report submitted for [a subsequent license renewal application].”<sup>39</sup> But this is not really an issue.<sup>40</sup> Applicants seeking a subsequent license renewal still must meet the requirements in 10 C.F.R. § 51.53(c)(1) and (c)(2). Section 51.53(c)(2) requires a license renewal applicant to include in the environmental report a description of the proposed action, a detailed description of the “affected environment around the plant,” “the modifications directly affecting the environment or any plant effluents, and any planned refurbishment activities,” as well as “the environmental impacts of alternatives and any other matters described in [10 C.F.R.] § 51.45.”<sup>41</sup> Section 51.45, in turn, provides general requirements for environmental reports, with the exception, cross-referenced as section 51.53(c) and reflected in section 51.53(c)(2), that license renewal environmental reports “need not discuss the economic or technical benefits and costs of either the proposed action or alternatives except if these benefits and costs are either essential for a determination regarding the inclusion of an alternative in the range of alternatives considered or relevant to mitigation.”<sup>42</sup> Sections 51.53(c)(1) and (c)(2), together with the cross-reference to the general requirements in section 51.45, thus would seem to ensure that sufficient information is available to aid the Staff in the development of an environmental impact statement, which as the majority notes, is the intended purpose of an environmental report.<sup>43</sup>

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<sup>38</sup> See 1991 Proposed Rule, 56 Fed. Reg. at 47,017. Further, section 51.53(c)(3)’s greater specificity, that it applies only to initial renewal, rather than any renewal, is an indicator that “initial” should not be ignored. “Ordinarily, where a specific provision conflicts with a general one, the specific governs.” *Edmond v. United States*, 520 U.S. 651, 657 (1997) (citing *Busic v. United States*, 446 U.S. 398, 406 (1980)); see also *Union of Concerned Scientists v. NRC*, 711 F.2d 370, 381 (D.C. Cir. 1983) (determining that between the general provisions in the APA and the more specific requirements in the Atomic Energy Act, the Atomic Energy Act controls). To be clear, I do not advocate that “initial” should now be read into other sections of Part 51. I am simply saying that the 1991 proposed regulations had inconsistencies. Given that, we must look at the plain language, which is supported by the Statement of Considerations, for the foundation of the interpretation of section 51.53(c)(3), regardless of the inconsistencies. These inconsistencies must be addressed through rulemaking.

<sup>39</sup> NRC Staff Response to FPL Surreply at 10 (emphasis omitted).

<sup>40</sup> And if it were an issue, the agency would need to promulgate regulations through the rulemaking process.

<sup>41</sup> 10 C.F.R. § 51.53(c)(2).

<sup>42</sup> *Id.* § 51.45(c); see also *id.* § 51.53(c)(2).

<sup>43</sup> See Majority at p. 267.

Even if applying the plain language of section 51.53(c)(3) may be inefficient in some instances, applying the regulation as written is not what produces a “discordant,” “untenable,” or even an “absurd” result, as the majority asserts.<sup>44</sup> Instead, what has created this inefficiency is the agency’s change of policy without a parallel change to the implementing regulation. As discussed above, the agency made the conscious policy decision to limit the use of the Part 51 amendments to one renewal per reactor unit when the rule was proposed in 1991, which was not changed in the 1996 final rule. But if the agency now finds this policy objectionable or inefficient, we are not the ones to provide a remedy in this adjudication. When faced with a similar choice in *Griffin v. Oceanic Contractors*, the Court declined to ignore the plain language of a statute, observing that it has “refus[ed] to nullify statutes, however hard or unexpected the particular effect.”<sup>45</sup> The Court further reasoned that “[l]aws enacted with good intention, when put to the test, frequently, and to the surprise of the law maker himself, turn out to be mischievous, absurd or otherwise objectionable. But in such case, the remedy lies with the law making authority, and not with the courts.”<sup>46</sup>

Just as the “remedy for . . . dissatisfaction with the results [of applying the plain language of a statute] lies with Congress, and not with th[e] Court,” the remedy for dissatisfaction with the results of applying section 51.53(c)(3) according to its plain text lies with the NRC in its rulemaking authority, not the Board.<sup>47</sup> If the Commission wishes to abandon its “initial renewal” provision, it has a clear path to do so: the NRC must amend the regulation the same way in which the regulation was adopted — through the rulemaking process.<sup>48</sup>

FPL and the Staff also claim, and the majority agrees, that the Staff Requirements Memorandum for SECY-14-0016 compels an interpretation of the regulations that would require use of the GEIS determinations when preparing the environmental report in subsequent license renewal proceedings.<sup>49</sup> This argument fails for two reasons. First, the documents associated with the Commission’s action on SECY-14-0016 do not support such an interpretation. Although the Staff, in its paper, discussed its activities relative to the environmental impacts of license renewal, the Staff dismissed the need to amend Part 51 in a

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<sup>44</sup> *Id.* at p. 272.

<sup>45</sup> 458 U.S. 564, 575 (1982) (holding under terms of statute, district court was required to impose \$300,000 penalty on ship owner for failing, without good cause, to promptly pay a seaman \$412.50 in earned wages).

<sup>46</sup> *Id.* (citation omitted).

<sup>47</sup> *Id.* at 576.

<sup>48</sup> See *Mortg. Bankers*, 575 U.S. at \_\_\_, 135 S. Ct. at 1206.

<sup>49</sup> See Majority at p. 269; FPL Surreply at 12-14; NRC Staff Response to FPL Surreply at 10-11, 13.

single sentence, stating that it “does not recommend updating the environmental regulatory framework under 10 [C.F.R.] Part 51 . . . because environmental issues can be adequately addressed by the existing GEIS and through future GEIS revisions.”<sup>50</sup> At the same time, the options laid out for Commission action in the Staff’s paper, as well as the Staff’s recommended option, all pertained to safety concerns.<sup>51</sup> And the voting record for SECY-14-0016 reflects that the Commission was responding to the safety aspects of subsequent license renewal and whether changes should be made to 10 C.F.R. Part 54, rather than any potential changes to the environmental regulations in Part 51.<sup>52</sup>

Second, even were we to assume that the Staff Requirements Memorandum for SECY-14-0016 implies a Commission determination that no change to Part 51 was necessary because the rules and the GEIS already applied to subsequent license renewal, neither the Commission’s nor the Staff’s interpretation is sufficient to amend section 51.53(c)(3).<sup>53</sup> FPL and the Staff argue that we should

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<sup>50</sup> “Ongoing Staff Activities to Assess Regulatory Considerations for Power Reactor Subsequent License Renewal,” Commission Paper SECY-14-0016 (Jan. 31, 2014) at 5, encl. 1 (ADAMS Accession No. ML14050A306) [hereinafter SECY-14-0016]. A common-sense view of how we got to this point is that the word “initial” in 51.53(c)(3) has simply been overlooked when Part 51 has been reviewed the past several years while the requirements for subsequent license renewal were being considered. If not this, then how else could the Staff tell the Commissioners in this SECY paper that updating Part 51 is *not* recommended? But just because “initial” has been overlooked, this does not give the Board authority to change its meaning to what the Staff wants today.

<sup>51</sup> SECY-14-0016, at 1-2, 5-9.

<sup>52</sup> See Commission Voting Record, “SECY-14-0016 — Ongoing Staff Activities to Assess Regulatory Considerations for Power Reactor Subsequent License Renewal” (Aug. 29, 2014) (ADAMS Accession No. ML14245A118). Rather than approving anything, the Commission disapproved the Staff’s recommendation to initiate a rulemaking pertaining to Part 54. Staff Requirements — SECY-14-0016 — Ongoing Staff Activities to Assess Regulatory Considerations for Power Reactor Subsequent License Renewal (Aug. 29, 2014) (Adams Accession No. ML14241A578) [hereinafter SRM-SECY-14-0016].

Also, it seems strange that these distinctly amorphous circumstances are the best evidence of Commission intent FPL and the Staff (and the majority) can point to in the context of what is apparently the last instance in which the Commission dealt with the rule provisions in question. Given its obvious significance, if the Commission had been fully aware of this section 51.53(c)(3) issue, surely some definitive indication of the Commission’s “intent” would have been expressed. Perhaps the first opportunity the Commission may actually have to directly express its “intent” on this subject may be in response to this Board’s referred ruling on this issue. See 10 C.F.R. § 2.323(f)(1).

<sup>53</sup> See, e.g., *Christensen*, 529 U.S. at 588 (declining to defer to an agency interpretation that conflicted with an unambiguous regulation because to do so “would be to permit the agency, under the guise of interpreting a regulation, to create *de facto* a new regulation”). The same rationale applies to FPL’s reference to the July 2018 status report the agency sent to the U.S. Senate Committee on Environment and Public Works, which FPL claims demonstrates “that the Commission views the

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accept their interpretation of section 51.53(c)(3) because to do otherwise would lead to an “absurd result.” But it is far more absurd to read out of the regulation a word that has been retained over the course of several years and that was the product of a rulemaking involving broad public participation, including public meetings and workshops, at the time it was adopted.<sup>54</sup> Nor do we have the authority to do so.

Although the Commission has not issued a formal statement directly addressing the issue before us, such an interpretive rule would also put the agency at risk. As the Court has cautioned, “when an agency’s decision to issue an interpretive rule, rather than a legislative rule, is driven primarily by a desire to skirt notice-and-comment provisions,” the agency may be challenged under the “arbitrary and capricious standard.”<sup>55</sup> Under the APA, an agency must “provide more substantial justification when ‘its new policy rests upon factual findings that contradict those which underlay its prior policy; or when its prior policy has engendered serious reliance interests [in the written regulation] that must be taken into account. It would be arbitrary and capricious to ignore such matters.’”<sup>56</sup>

Sidestepping the rulemaking process denies the public an opportunity to comment on a not-insignificant change to the NRC’s regulations. And, in this case, that change would add another hurdle for petitioners. In past license renewal adjudicatory proceedings, a petitioner raising a challenge to a Category 1 issue had to meet the requirements for a waiver petition in 10 C.F.R. § 2.335, in addition to the contention admissibility requirements in 10 C.F.R. § 2.309, because such a contention would have been a challenge to the rule.<sup>57</sup> In those

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current Part 51 regulatory framework,” including the GEIS, “as applicable to [subsequent license renewal applications].” FPL Surreply at 14-15. Even assuming the status report is an expression of that intent, the report to Congress would not be enough to overcome the plain language of section 51.53(c)(3). See *Christensen*, 529 U.S. at 588.

<sup>54</sup> See 1996 Final Rule, 61 Fed. Reg. at 28,469 (describing several public meetings and workshops over a rulemaking history spanning almost ten years). The majority describes a hypothetical that “would result in the wasteful expenditure of private and governmental resources.” Majority at p. 272. This brings to mind *TVA v. Hill*, in which use of a federally funded multi-million-dollar dam project was halted to protect a small fish. Although not operating the dam similarly could have been described as a “wasteful expenditure,” the Court declined to use such an excuse to go beyond the plain meaning of the Endangered Species Act. 437 U.S. 153, 187 (1978). Congress thereafter passed legislation to exempt the dam from the Endangered Species Act so that the dam could operate. See Pub. L. No. 96-69, 93 Stat. 437, 449-50 (1979). The legislature fixed the problem it created, rather than the Court.

<sup>55</sup> *Mortg. Bankers*, 575 U.S. at \_\_\_, 135 S. Ct. at 1209.

<sup>56</sup> *Id.* (quoting *Fox Television*, 556 U.S. at 515).

<sup>57</sup> See *Exelon Generation Co., LLC* (Limerick Generating Station, Units 1 and 2), CLI-12-19, 76

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proceedings, however, applicants were seeking the *initial* renewal of their licenses, and therefore section 51.53(c)(3) plainly applied. To expect this case's petitioners to have sought a waiver of a regulation that does not clearly apply to this subsequent license renewal proceeding would be unfair.<sup>58</sup>

While I agree that the agency's current intent is to streamline the subsequent license renewal process, the agency has not amended 51.53(c)(3) to keep up with the evolved policy. The agency's expressed intent at the time the regulation was proposed was clearly that it applies only to initial license renewal. Looking to current intent while trying to explain away the expressed original intent of the regulation is a bridge too far. The agency's intent today may not be the same as the agency's intent when the regulation was created, but that original intent is what ultimately matters for regulatory interpretation. As the Appeal Board explained in the *Shoreham* proceeding, "[a]lthough administrative history and other available guidance may be consulted for background information and the resolution of ambiguities in a regulation's language, its interpretation may not conflict with the plain meaning of the wording used in that regulation."<sup>59</sup> The majority's tortuous approach to determining the regulation's applicability wipes away the plain meaning and the original regulatory intent, and instead skips to the Staff's more recent guidance documents and to the inconsistency the agency created when it did not update section 51.53(c)(3) to match that new intent.

The agency's new position clearly conflicts with the plain language of the rule, and we may not fix the problem in this adjudication.<sup>60</sup> To do so would run afoul of the APA and set a troubling precedent that might encourage the agency

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NRC 377, 384, 386 (2012); *Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), CLI-07-3, 65 NRC 13, 16 (2007); *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-01-17, 54 NRC 3, 22-23 (2001).

<sup>58</sup> Cf. *Limerick*, CLI-13-7, 78 NRC at 203 (offering a belated opportunity to submit a waiver petition after resolving "an apparent ambiguity in [the] license renewal regulations").

<sup>59</sup> *Shoreham*, ALAB-900, 28 NRC at 288.

<sup>60</sup> See "Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants," NUREG-2192 at 1.1-2 (July 2017) (ADAMS Accession No. ML17188A158) (providing that the Staff reviewer will check that the applicant has prepared its environmental report "in accordance with the guidelines in NUREG-1555, 'Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal,'" which refers generally to license renewal applicants); accord "Preparation of Environmental Reports for Nuclear Power Plant License Renewal Applications," Reg. Guide 4.2 (supp. 1, rev. 1) (June 2013) (ADAMS Accession No. ML13067A354) (referring generally to "license renewal applications") [hereinafter Reg. Guide 4.2]. But see Reg. Guide 4.2 at 33 (guiding the applicant to show the relationships between plant operation and resource attributes, and "[i]f any adverse impacts are identified," guiding the applicant to describe "the mitigation measures that have been used to reduce the adverse impacts during the initial license period or that are expected to be used during the license renewal period and their expected effects") (emphasis added).

to take short cuts to amending its regulations in future adjudicatory proceedings. The majority points out the inefficiency of admitted contentions then becoming inadmissible if the regulations are applied as written,<sup>61</sup> but this inefficiency was created by the agency that is responsible for ensuring that the regulations are up-to-date. An agency may not create a situation that is inconsistent with an existing regulation and then use that disparity as an excuse to make a *de facto* amendment without notice and comment. For example, if the agency can change the meaning of “initial,” what is to stop it from changing the June 30, 1995, limitation in section 51.53(c)(3) without notice and comment?<sup>62</sup>

If the NRC truly wants section 51.53(c)(3) to apply to subsequent license renewals, it must amend its regulations via the rulemaking process. Until that is completed, a short-term solution might be for the NRC to allow FPL and similarly situated subsequent license renewal applicants the option to reference the information in the GEIS for Category 1 issues in their environmental reports (rather than generating that information anew), thus gaining the procedural efficiencies that the Staff and the Commission may desire for subsequent license renewal.<sup>63</sup> But until section 51.53(c)(3) is revised to include subsequent license

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<sup>61</sup> Majority at p. 272.

<sup>62</sup> The NRC might again be presented with a need to amend section 51.53(c)(3) when the time comes for a combined license holder to seek a renewed license. Although the agency amended the regulation in 2007 to include “combined licenses,” section 51.53(c)(3) is limited to license holders as of “June 30, 1995,” at which time no combined license had been issued, thereby precluding its use for those licensees. See Final Rule, Licenses, Certifications, and Approvals, 72 Fed. Reg. at 49,432, 49,513; *Southern Nuclear Operating Co. (Vogtle Electric Generating Plant, Units 3 and 4)*, CLI-12-2, 75 NRC 63, 122 (2012) (authorizing issuance of the first combined licenses). The “June 30, 1995,” restriction also appears in Part 51, Subpart A, Appendix B, but this appendix does not include combined licenses among the types of licenses that may be renewed using the GEIS-associated efficiencies in the rule.

<sup>63</sup> Applicants for subsequent license renewal still retain the efficiencies accorded under Part 54, as contemplated in the original rulemaking and reaffirmed by the Commission in SECY-14-0016. See, e.g., 1991 Proposed Rule at 47,017 (“The [P]art 54 rule could be applied to multiple renewals of an operating license for various increments.”); SRM-SECY-14-0016 (disapproving the Staff’s recommendation to initiate a rulemaking to amend Part 54 for power reactor subsequent license renewal). I recognize that in the long run, the outcome is not in question: section 51.53(c)(3) will end up applying to any renewal, either because the Commission upholds the majority’s decision or because the agency changes the regulation via the notice-and-comment process. The real issue is what road the Commission takes to get there. And given the short-term solution proposed above, no immediacy exists here that might counsel in favor of taking action outside the rulemaking process and risking an APA violation. In the interim, the Staff has the option of incorporating information from the GEIS in the supplemental environmental impact statement. But given that there is some question as to whether the GEIS contemplates the temporal scope of subsequent license renewal, see *supra* Dissent notes 32-33 and accompanying text, the Staff should ensure that its environmental review of subsequent license renewal applications is sufficiently forward-looking.

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renewal applicants, petitioners must be allowed to challenge the substantive viability of any GEIS analyses incorporated by reference, without having to request a section 2.335 waiver, provided that they meet the standards for intervention in section 2.309. Requiring petitioners to meet only the contention admissibility standards would not shift the burden, as FPL would have it,<sup>64</sup> but instead maintains the status quo, given that contentions challenging environmental report Category 1 issues in subsequent license renewal proceedings do not challenge the regulations as currently written.<sup>65</sup>

### III. STANDING AND CONTENTION ADMISSIBILITY

I concur with the majority's rulings on standing for SACE and the Joint Petitioners and on the admission of limited portions of contentions related to the discussion of the cooling tower alternative, the effects on the American crocodile, the source of surface water ammonia, and the impacts of ammonia discharges.<sup>66</sup> I concur with the majority not to admit all other contentions, or portions of contentions, whose inadmissibility was based on reasons that did not include the need for a section 2.335 waiver.

I also concur with allowing Monroe County to join as an interested government participant regarding SACE's two admitted contentions. And finally, I concur in the majority's determination to refer its ruling on the section 51.53(c)(3) matter to the Commission pursuant to 10 C.F.R. § 2.323(f)(1).

Relative to the contentions the majority has judged inadmissible due to, at least in part, the need for a section 2.335 waiver to challenge a Category 1 issue, I abstain from endorsing that result due to my conviction that section 51.53(c)(3), as written, cannot apply to subsequent license renewal applications.

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*Cf. New York v. NRC*, 681 F.3d 471, 478-79, 483 (D.C. Cir. 2012) (“[A] generic analysis must be forward looking and have enough breadth to support the Commission’s conclusions.”), and *petition for review denied*, 824 F.3d 1012 (D.C. Cir. 2016).

<sup>64</sup> See Tr. at 65-66.

<sup>65</sup> By the same token, if any admitted contentions challenging Category 1 issues were outstanding if and when a rulemaking change to section 51.53(c)(3) becomes effective (thus precluding Category 1 items from being subject to adjudicatory consideration in a subsequent license renewal proceeding), the sponsors of those contentions should be afforded a reasonable opportunity, in accordance with section 2.335(b), to submit a rule waiver petition regarding the subject matter of those contentions.

<sup>66</sup> Regarding the admission of ammonia-related issues, although section 51.53(c)(3)(ii)(E) is referenced, the Joint Petitioners also noted that if section 51.53(c)(3) does not apply to subsequent license renewal applications, section 51.53(c)(1) and (c)(2) (along with section 51.45) apply in the alternative. Joint Pet’rs Pet. at 16 n.71.



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION

Ho K. Nieh, Director

In the Matter of

Docket Nos. 50-334 and 50-412  
50-346  
50-440  
(License Nos. DPR-66 and NPF-73,  
NPF-3,  
NPF-58)

FIRSTENERGY NUCLEAR OPERATING  
COMPANY  
(Beaver Valley Power Station,  
Units 1 and 2)  
(Davis-Besse Nuclear Power  
Station, Unit 1)  
(Perry Nuclear Power Plant,  
Unit 1)

April 3, 2019

As a result of the NRC Staff's evaluation, NRR has denied the Petitioner's requests. The request to issue Demands for Information is denied because the licensees are required to provide the information requested, as applicable, in the decommissioning funding status reports. These decommissioning funding status reports were submitted to the NRC on March 15, 2019, and will undergo NRC review. The requests to issue a Notice of Violation and Notice of Civil Penalties to FE, FES, NG, and FENOC, and the request to issue an Order suspending NG's and FENOC's licenses, are denied as current information available to the NRC does not demonstrate that the entities are out of compliance with NRC regulations. Therefore, there is an insufficient basis on which to take enforcement action, issue civil penalties, or suspend a license.

In accordance with 10 C.F.R. § 2.206(c), a copy of this director's decision will be filed with the Secretary of the Commission for Commission review. As

provided for by this regulation, the decision will constitute the final action of the Commission 25 days after the date of the decision unless the Commission, on its own motion, institutes a review of the decision within that time.

## **DIRECTOR'S DECISION UNDER 10 C.F.R. § 2.206**

### **I. INTRODUCTION**

By letter dated March 27, 2018, as supplemented on October 8, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML18094A642 and ML18282A242, respectively), the Environmental Law and Policy Center filed a petition with the U.S. Nuclear Regulatory Commission (NRC or the Commission) pursuant to Title 10 of the *Code of Federal Regulations* (10 C.F.R.) § 2.206, "Requests for action under this subpart." The Petitioner requested that the NRC take the following actions.

#### **A. Issue Demands for Information**

- (1) Promptly issue a Demand for Information to FirstEnergy Corp. (FE), FirstEnergy Solutions (FES), FirstEnergy Nuclear Generation, LLC (NG), and FirstEnergy Nuclear Operating Company (FENOC) requesting site-specific decommissioning funding plans for Beaver Valley Power Station, Units 1 and 2 (BVPS), Davis-Besse Nuclear Power Station, Unit 1 (DBNPS), and Perry Nuclear Power Plant, Unit 1 (PNPP).
- (2) Promptly issue a Demand for Information to FE, FES, NG, and FENOC with regard to their reliance on external trust funds from FE and FES to satisfy their decommissioning financial obligations.
- (3) Promptly issue a Demand for Information to FE, FES, NG, and FENOC with regard to their continued reliance on parent company guarantees from FE to satisfy decommissioning funding obligations, including the ability of FE to satisfy the parent company guarantee financial test under Appendix A, "Criteria Relating to Use of Financial Tests and Parent Company Guarantees for Providing Reasonable Assurance of Funds for Decommissioning," to 10 C.F.R. Part 30, "Rules of General Applicability to the Domestic Licensing of Byproduct Material."
- (4) Promptly issue a Demand for Information to FES, NG, and FENOC to the extent that they are relying on parent company guarantees from FES to satisfy decommissioning funding obligations, including the ability

of FES to satisfy the parent company guarantee financial test under 10 C.F.R. Part 30, Appendix A.

- (5) Promptly issue a Demand for Information to FE, FES, NG, and FENOC with regard to their proposed investment and financial contribution plans to make up the current decommissioning shortfall.
- (6) Promptly issue a Demand for Information to FE and FES with regard to each of their commitments to guarantee coverage of NG's and FENOC's decommissioning trust fund shortfalls in the event of bankruptcy.

**B. Notice of Violation and Penalties**

- (1) Promptly issue a Notice of Violation against FE, FES, NG, and FENOC for operating nuclear facilities without sufficient decommissioning funds in violation of 42 U.S.C.A. § 2201(x)(1), and 10 C.F.R. § 50.75, "Reporting and Recordkeeping for Decommissioning Planning."
- (2) Promptly issue civil penalties against FE, FES, NG, and FENOC for operating nuclear facilities without sufficient decommissioning funds in violation of 42 U.S.C.A. § 2201(x)(1), and 10 C.F.R. § 50.75.
- (3) Promptly issue an order to suspend NG's and FENOC's licenses for BVPS, DBNPS, and PNPP.

**C. Other Requests**

The Petitioner also urges the NRC to prohibit NG and FENOC from placing their nuclear facilities into a safe storage (SAFSTOR) status for purely financial reasons. Under SAFSTOR, often considered "deferred dismantling," a nuclear facility is maintained and monitored in a condition that allows the radioactivity to decay; afterwards, the plant is dismantled and the property decontaminated. The Petitioner requests that the NRC give immediate emergency consideration to this petition in light of FE's and FES's rapidly deteriorating financial conditions.

**D. Basis for Petitioner's Request**

The following points summarize the basis for the Petitioner's request, as stated in the petition and the supplement:

- (1) NG's and FENOC's decommissioning trust amounts are insufficient on their own to provide reasonable assurance of funding.

- (2) FE cannot rely on rate increases forced on retail ratepayers to pay for the decommissioning trust fund shortfalls.
- (3) The costs, including SAFSTOR, may be much higher than expected because of significantly higher trust fund shortfalls, as reported by the Callan Institute and flaws in the NRC's cost estimating formula.
- (4) On March 28, 2018, FES and FENOC announced and informed the NRC by letter dated April 25, 2018 (ADAMS Accession No. ML18115-A007), that they would permanently retire all four of their reactors within the next 3 years. If the plants close in 2020 and 2021, the funds cannot grow to levels that will pay for the required decommissioning.
- (5) The parent companies FE and FES filed for bankruptcy on March 31, 2018.
- (6) According to the Petitioner, the transcript from a recent Federal court proceeding provides additional information about funding for FE's nuclear plant decommissioning in the FES bankruptcy case (see Case No. 18-50757, "Motion of Debtors to Approve Settlement (dated August 26, 2018)", which was heard on September 25, 2018, by the Honorable Judge Alan M. Koschik, for the U.S. Bankruptcy Court for the Northern District of Ohio.

Although the petition does not request specific immediate action(s), it does request "immediate emergency consideration." Based on the information provided in the petition, the Petition Review Board (PRB) determined that the financial concerns do not raise an imminent safety issue or indicate that the Licensee, FENOC, is unable to safely operate the facilities listed in the petition. The PRB concluded that there is no current public health and safety concern requiring immediate NRC action because financial concerns do not raise an imminent safety issue or indicate that FENOC is unable to safely operate the facilities listed in the petition. The petition manager informed the Petitioner of this conclusion by e-mail dated May 2, 2018 (ADAMS Accession No. ML18123A299). The supplement, which the Petitioner submitted on October 8, 2018 (ADAMS Accession No. ML18282A242), did not expand the scope of the petition or request additional actions that should be considered as a new petition.

Additionally, the Petitioner met with the PRB on June 19, 2018, to discuss the petition. The transcript of this meeting is treated as a supplement to the petition and is publicly available online at ADAMS Accession No. ML18194A395. The transcript is also available for purchase and examination at the NRC's Public Document Room (PDR), located at O1F21, 11555 Rockville Pike (first floor), Rockville, MD 20852. Publicly available documents created or received at



the NRC are accessible electronically through ADAMS at <http://www.nrc.gov/reading-rm/adams.html>. Persons who do not have access to ADAMS or who encounter problems in accessing the documents in ADAMS should contact the NRC's Public Document Room (PDR) reference staff by telephone at 1-800-397-4209, or 301-415-4737, or by e-mail to [pdr.resource@nrc.gov](mailto:pdr.resource@nrc.gov).

On August 2, 2018, the petition manager informed the Petitioner by letter that the PRB had determined that the petition meets the acceptance criteria for review and that the PRB has made an initial recommendation to accept the petition for review (ADAMS Accession No. ML18220B314). The petition manager also asked whether the Petitioner desired an opportunity to comment on this recommendation, in person or through a teleconference, consistent with Management Directive 8.11, "Review Process for 10 CFR 2.206 Petitions," dated October 25, 2000. The Petitioner declined this offer for a second meeting with the PRB.

On January 8, 2019, the NRC sent the proposed director's decision to the Petitioner and to the Licensee for comments (ADAMS Accession Nos. ML18309-A228 and ML18309A189, respectively). The Petitioner responded with comments on the proposed director's decision on January 22, 2019 (ADAMS Accession No. ML19037A340). The Licensee did not submit comments on the proposed director's decision. The Petitioner's comments and the Staff's responses to the comments are included as an attachment to this director's decision.

Based on the Staff's evaluation of the Petitioner's January 22, 2019, comments, the final director's decision has not changed from the proposed director's decision.

## **II. DISCUSSION**

### **A. FENOC Is Currently in Compliance with NRC Regulations**

The NRC has a comprehensive, regulation-based, framework that provides oversight of a licensee's decommissioning funding during operations and decommissioning. During operations, licensees must biennially submit decommissioning funding status reports by March 31. At 5 years before the projected permanent shutdown of their reactors until license termination, licensees must submit annual decommissioning funding status reports by March 31 of each year. Additionally, at intervals not to exceed 3 years, a licensee must update and submit its decommissioning funding plans for its independent spent fuel storage installations (ISFSIs) to account for any changes in costs.

FE is the parent company of FES and FENOC, which are wholly owned subsidiaries. The NG owns the nuclear plants, which is a wholly owned subsidiary of FES. FENOC operates the nuclear plants. FENOC and NG are the licensees for BVPS, DBNPS, and PNPP. FENOC submitted its most recent de-

commissioning funding status reports for BVPS, DBNPS, and PNPP in a letter to the NRC dated March 24, 2017 (ADAMS Accession No. ML17083B221). Based on its review of these reports, the NRC Staff concluded that FENOC met the minimum funding requirements for future radiological decommissioning of its NRC-licensed facilities for the 2017 reporting cycle, and that there were no shortfalls in decommissioning funding.

In accordance with 10 C.F.R. § 50.75(f)(1), FENOC is required to submit its next decommissioning funding status reports for BVPS, DBNPS, and PNPP to the NRC by March 31, 2019. The reports were submitted to the NRC on March 15, 2019 (ADAMS Accession No. ML19074A242). The NRC Staff will conduct a similar review of these decommissioning funding status reports for the units, and will consider the new expected shutdown dates, funding levels as of December 31, 2018, and any updated financial information necessary to demonstrate reasonable assurance that sufficient funds will be available for the radiological decommissioning of the sites. If the Staff identifies a funding shortfall, the NRC will evaluate any such scenario on a case-by-case basis. For an operating power reactor, the NRC reserves the right to take additional steps, in accordance with 10 C.F.R. § 50.75(e)(2), including reviewing the rate of accumulation of decommissioning funds, and to take additional actions, either independently or in cooperation with the Federal Energy Regulatory Commission and the licensee's state public utility commission, as appropriate. Additional actions may include modifying the licensee's schedule for accumulating decommissioning funds. In accordance with 10 C.F.R. § 50.82(c), if a licensee permanently ceases operation before the expiration of its license, the NRC will determine the collection period for any shortfall of funds on a case-by-case basis upon application by the licensee, and will consider the specific financial situation of each licensee. The NRC continues to monitor FENOC's decommissioning financial assurance for its reactors and ISFSIs to ensure adequate funding and compliance with requirements for decommissioning funding.

## **B. Bankruptcy Proceedings**

On March 31, 2018, FES, FENOC, and NG filed a petition for reorganization under Chapter 11 of the U.S. Bankruptcy Code. FE has not filed for bankruptcy. The U.S. Department of Justice and the NRC's Office of the General Counsel are working closely together to represent the NRC's interests in the bankruptcy proceeding, including protection and preservation of the decommissioning trust funds and continued compliance with the requirements for decommissioning funding. The proceeding in the U.S. bankruptcy court may result in changes to FENOC's debt structure, including reorganization and the transfer of control of the reactor operating licenses. Any such license transfers would be subject to NRC review and approval. NRC license transfer reviews include, among other

things, a review of the applicant's financial qualifications, technical qualifications, and decommissioning funding, and would provide for public participation and an opportunity to request a hearing and petition to intervene. While the bankruptcy proceeding is in progress, and until license termination, licensees are required to continue to comply with NRC regulations.

Additionally, on October 8, 2018, the Petitioner submitted the transcript from the recent Federal court proceeding in the FES bankruptcy case to the NRC as a supplement to the petition (ADAMS Accession No. ML18282A242). The NRC Staff reviewed this transcript and did not find any information in the supplement of which it was not previously aware or that warranted immediate action. The NRC will continue to monitor the bankruptcy proceedings and take action, as necessary, to ensure that the Licensee remains in compliance with the agency's regulations.

### **C. SAFSTOR**

The petition "urges the NRC to prohibit NG and FENOC from placing their nuclear facilities into SAFSTOR for purely financial reasons." Section 3.2.2, "SAFSTOR" of NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," Supplement 1, "Regarding the Decommissioning of Nuclear Power Plants," Volume 1, issued November 2002 (ADAMS Accession No. ML023470304), lists SAFSTOR as one of three options that the NRC finds acceptable for a licensee to use in decommissioning its facility. As such, SAFSTOR is an option currently available to FENOC.

The NRC is currently considering changes to its decommissioning requirements through rulemaking. The NRC expects to publish the proposed rule later this year in the *Federal Register*. After the agency publishes the proposed rule, members of the public will be able to access the rule through a link on the NRC's public Web site at <https://www.nrc.gov/reading-rm/doc-collections/rulemaking-ruleforum/active/RuleDetails.html?id=49>. During the comment period, members of the public may submit their comments through a link on the NRC's Web site at: <https://www.regulations.gov/docket?D=NRC-2015-0070>.

## **III. CONCLUSION**

In summary, the NRC has a comprehensive, regulation-based, framework that provides for oversight of a licensee's decommissioning funding during operation and decommissioning. The licensees' current decommissioning funding status report, dated March 24, 2017, indicates that the licensees met the minimum funding requirements for future radiological decommissioning of the NRC-licensed facilities for the 2017 reporting cycle, and that there were no

shortfalls in decommissioning funding. If the NRC Staff identifies a funding shortfall in its evaluation of the status reports, which were submitted to the NRC on March 15, 2019, the NRC will take appropriate action, including enforcement action, if necessary. Further, the NRC Staff will continue to work with the U.S. Department of Justice to protect and preserve its interests in FENOC's compliance with decommissioning requirements in the bankruptcy proceeding. Based on the current information available, the NRC Staff concludes that there is an insufficient basis to find that the licensees are out of compliance with the NRC's decommissioning financial assurance requirements. Therefore, based on the continuing oversight and actions described above, no further action is necessary at this time.

As a result of the NRC Staff's evaluation, NRR has denied the Petitioner's requests. The request to issue Demands for Information is denied because the licensees are required to provide the information requested, as applicable, in the decommissioning funding status reports. These decommissioning funding status reports were submitted to the NRC on March 15, 2019, and will undergo NRC review. The requests to issue a Notice of Violation and Notice of Civil Penalties to FE, FES, NG, and FENOC, and the request to issue an Order suspending NG's and FENOC's licenses, are denied as current information available to the NRC does not demonstrate that the entities are out of compliance with NRC regulations. Therefore, there is an insufficient basis on which to take enforcement action, issue civil penalties, or suspend a license.

In accordance with 10 C.F.R. § 2.206(c), a copy of this director's decision will be filed with the Secretary of the Commission for Commission review. As provided for by this regulation, the decision will constitute the final action of the Commission 25 days after the date of the decision unless the Commission, on its own motion, institutes a review of the decision within that time.

For the Nuclear Regulatory  
Commission

Ho K. Nieh, Director  
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland,  
this 3d day of April, 2019.

Attachment:  
Petitioner's Comments on Proposed  
Director's Decision and NRC Response

## ATTACHMENT

### PETITIONER'S COMMENTS ON PROPOSED DIRECTOR'S DECISION AND NUCLEAR REGULATORY COMMISSION RESPONSE

The Petitioner provided comments to the U.S. Nuclear Regulatory Commission (NRC) on the proposed director's decision (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18309A157) by letter dated January 22, 2019 (ADAMS Accession No. ML19037A340).

The Petitioner's comments do not alter the Staff's conclusions in the proposed director's decision and, therefore, do not require modification to the final director's decision. This attachment provides the Petitioner's comments on the proposed director's decision and the NRC responses to the comments.

The Petitioner's comments are summarized as follows.

#### **Comment 1 (from the Petitioner's Letter Dated January 22, 2019, Pages 1 and 2)**

The NRC Staff should issue Demands for Information to immediately request the updated decommissioning funding status report from FirstEnergy Corp. (FE), FirstEnergy Solutions (FES), FirstEnergy Nuclear Generation, LLC (NG), and FirstEnergy Nuclear Operating Company (FENOC). Specifically, the NRC should order FE, FES, FENOC and NG to provide the most up-to-date information on decommissioning funds with respect to: site-specific funding plans (Request No. 1), reliance on any external funds or parent company guarantees (Request Nos. 2-4), proposed investment and financial contribution plans (Request No. 5), and commitments to guarantee coverage of shortfalls in light of bankruptcy (Request No. 6).

#### **Response 1**

This comment restates the Petitioner's original requests. As stated in the proposed director's decision, the next decommissioning funding status reports for Beaver Valley Power Station, Units 1 and 2, Davis-Besse Nuclear Power Station, Unit 1, and Perry Nuclear Power Plant, Unit 1 are due to the NRC by March 31, 2019, and were submitted on March 15, 2019 (ADAMS Accession No. ML19074A242). If the Staff identifies a funding shortfall in those reports, the NRC will evaluate any such scenario on a case-by-case basis. For an operating power reactor, the NRC reserves the right to take additional steps, in accordance with section 50.75(e)(2) of Title 10 of the *Code of Federal Regulations*

(10 C.F.R.), including reviewing the rate of accumulation of decommissioning funds, and to take additional actions, either independently or in cooperation with the Federal Energy Regulatory Commission and the licensee's state public utility commission, as appropriate. Additional actions may include modifying the licensee's schedule for accumulating decommissioning funds. In accordance with 10 C.F.R. § 50.82(c), if a licensee permanently ceases operation before the expiration of its license, the NRC will determine the collection period for any shortfall of funds on a case-by-case basis upon application by the licensee, and will consider the specific financial situation of each licensee. The NRC Office of Nuclear Reactor Regulation continues to monitor FENOC's decommissioning financial assurance for its reactors and ISFSIs to ensure adequate funding and compliance with requirements for decommissioning funding.

The Petition Review Board (PRB) determined that no further actions were needed, and the NRC made no changes to the final director's decision as a result of this comment.

**Comment 2 (from the Petitioner's Letter Dated January 22, 2019, Page 2)**

The Environmental Law and Policy Center (ELPC) requested that the NRC postpone acting upon the proposed director's decision and hold open ELPC's petition until the NRC can review the December 31, 2018, decommissioning funding status information.

**Response 2**

In the proposed director's decision, the NRC described the existing requirements and processes in place to monitor the decommissioning funding status of the licensees. If the report demonstrates that FENOC has sufficient funding in its trust, then no further action is necessary. For licensees that are no longer rate-regulated or do not have access to a non-bypassable charge, as is the case for FENOC and NG, any shortfalls identified in the report must be corrected by the time the next decommissioning funding status reports are due (March 31, 2020).

The PRB determined that no further actions were needed, and the NRC made no changes to the final director's decision as a result of this comment.

**Comment 3 (from the Petitioner's Letter Dated January 22, 2019, Pages 2 and 3)**

If the NRC does not act now to ensure that FES, FENOC, and NG reserve adequate funds for decommissioning, parent company FE could seek to fully

extricate itself from any decommissioning obligations before the NRC can identify the extent of the funding shortfalls.

### **Response 3**

As stated in the proposed director's decision, the U.S. Department of Justice and the NRC's Office of the General Counsel are working closely together to represent the NRC's interests in the bankruptcy proceeding, including protection and preservation of the decommissioning trust funds and continued compliance with decommissioning requirements. The proceeding in the U.S. Bankruptcy Court may result in changes to FENOC's debt structure, including reorganization and the transfer of control of the reactor operating licenses. Any such license transfers would be subject to NRC review and approval. As such, NRC approval of a license transfer would be required before FE could be removed from the current corporate structure for purposes relating to NRC licensing. NRC license transfer reviews include, among other things, a review of the applicant's financial qualifications, technical qualifications, and decommissioning funding. To approve the license transfer, the NRC must find that the applicant has demonstrated that there is reasonable assurance that sufficient funds will be available for the decommissioning process. Ultimately, the licensee is responsible for compliance with NRC decommissioning financial assurance regulations, and the NRC will continue to monitor the remaining licensee's continued compliance. While the bankruptcy proceeding is in progress, and until license termination, licensees are required to continue to comply with NRC regulations.

The PRB determined that no further actions were needed, and the NRC made no changes to the final director's decision as a result of this comment.

### **Comment 4 (from the Petitioner's Letter Dated January 22, 2019, Page 3)**

There is no suggestion in the proposed Director's Decision that the NRC has reviewed Chapter 11 monthly statements of financial affairs, nor that it has assessed the status of the Chapter 11 proceedings.

### **Response 4**

As stated in the proposed director's decision, the U.S. Department of Justice and the NRC's Office of the General Counsel are working closely together to represent the NRC's interests in the bankruptcy proceeding, including protection and preservation of the decommissioning trust funds and continued compliance with decommissioning requirements. The U.S. Department of Justice

has reviewed Chapter 11 monthly statements of financial affairs, and is actively involved in the status of the Chapter 11 proceedings.

The PRB determined that no further actions were needed, and the NRC made no changes to the final director's decision as a result of this comment.



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

**COMMISSIONERS:**

**Kristine L. Svinicki**, Chairman  
**Jeff Baran**  
**Annie Caputo**  
**David A. Wright**

**In the Matter of**

**Docket No. 40-8943-OLA**

**CROW BUTTE RESOURCES, INC.**  
**(License Renewal for the *In Situ***  
**Leach Facility, Crawford, Nebraska)**

**May 30, 2019**

**CONTENTIONS, LATE-FILED**

Where application supplied facts on which Intervenors could have formulated their contention, non-material differences in the environmental assessment's discussion of the same subject matter would not supply good cause for filing the late contention.

**CONTENTIONS**

Where an erroneously admitted contention proceeds to a hearing, the Commission may vacate the Board's merits decision. Regardless of the vacatur, as a matter of discretion, the Commission may still consider the adjudicatory record compiled by the Board in making further decisions in the proceeding.

**MEMORANDUM AND ORDER**

Today we address Crow Butte Resources, Inc.'s petition for review of the Atomic Safety and Licensing Board's second partial initial decision, LBP-16-13, and its earlier decision admitting certain new and amended contentions,

LBP-15-11.<sup>1</sup> As discussed below, we grant in part Crow Butte's petition for review, which pertains to Contention 12B. We take review of LBP-15-11 and find that Contention 12B was untimely filed without good cause shown and reverse the Board's contention admissibility decision. Therefore, we vacate the Board's ensuing merits decision on Contention 12B in LBP-16-13. In light of these holdings, we do not reach Crow Butte's petition for review with respect to LBP-16-13. As a matter of discretion, we consider the environmental record developed during the adjudication of Contention 12B and determine that the NRC Staff's environmental review of the issues raised by Contention 12B, as supplemented by the adjudicatory record in this proceeding, is sufficient.

## I. BACKGROUND

Crow Butte holds a license for an *in situ* leach (ISL) uranium recovery facility in Crawford, Nebraska; the license was first issued in 1989 and renewed for a ten-year term in 1998.<sup>2</sup> In 2007, Crow Butte applied to renew the license a second time.<sup>3</sup> In response to a notice of opportunity to request a hearing,<sup>4</sup> Consolidated Intervenor and the Oglala Sioux Tribe (the Tribe) (together, the Intervenor) sought to intervene in the proceeding and were granted a hearing.<sup>5</sup> At that time, the Board admitted nine environmental and technical contentions.<sup>6</sup>

The Staff completed its review of the application with the publication of its final Environmental Assessment in October 2014.<sup>7</sup> Consistent with its findings in

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<sup>1</sup> Petition for Review of LBP-15-11 and LBP-16-13 (Dec. 29, 2016) (Crow Butte Petition); *see* LBP-16-13, 84 NRC 271 (2016); LBP-15-11, 81 NRC 401 (2015).

<sup>2</sup> *See* Ex. CBR-011, Application for 2007 License Renewal USNRC Source Materials License SUA-1534 Crow Butte License Area (Nov. 27, 2007), at 1-1, 10-2 (updated and compiled through November 2014) (LRA).

<sup>3</sup> *See id.*

<sup>4</sup> Notice of Opportunity for Hearing, Crow Butte Resources, Inc., Crawford, NE, In Situ Leach Recovery Facility, and Order Imposing Procedures for Access to Sensitive Unclassified Non-Safeguards Information (SUNSI) for Contention Preparation, 73 Fed. Reg. 30,426 (May 27, 2008).

<sup>5</sup> LBP-08-24, 68 NRC 691 (2008); *see* CLI-09-9, 69 NRC 331, 366 (2009) (affirming in large part the Board's ruling with respect to standing and reversing the Board's decision to admit several contentions not at issue here). At the time, Consolidated Intervenor included Beatrice Long Visitor Holy Dance (now deceased); Joe American Horse, Sr.; Debra White Plume; Loretta Afraid of Bear Cook; Thomas Kanatakeniate Cook; Afraid of Bear/Cook Tiwahe; American Horse Tiospaye; Owe Aku/Bring Back the Way; and Western Nebraska Resources Council. *See* LBP-08-24, 68 NRC at 760.

<sup>6</sup> LBP-08-24, 68 NRC at 760-61.

<sup>7</sup> *See* Ex. NRC-010, Final Environmental Assessment for the License Renewal of U.S. Nuclear Regulatory Commission License No. SUA-1534 (Oct. 2014) (EA). The Staff's Safety Evaluation

(Continued)

the Environmental Assessment, the Staff published a Finding of No Significant Impact (FONSI) on October 30, 2014.<sup>8</sup> Shortly thereafter, the Staff issued the renewed license.<sup>9</sup>

In January 2015, the Intervenor moved to admit new and amended contentions based on the Environmental Assessment.<sup>10</sup> Among these was Contention 12, in which the Intervenor asserted (in relevant part) that “the Final EA fails to properly account for impacts to wildlife resulting from land application of ISL wastes.”<sup>11</sup> In support of the contention, the Intervenor referenced two documents. The first was a 2007 letter to the NRC from the U.S. Fish and Wildlife Service (FWS) submitted in response to a notice of intent to prepare a generic environmental impact statement on ISL uranium milling facilities (the ISL GEIS).<sup>12</sup> In its letter, FWS cited a second document, a 1998 study of grassland irrigated with treated wastewater from an ISL facility in Wyoming; the Intervenor also

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Report was completed in December 2012 and supplemented in August 2014. *See* Safety Evaluation Report, License Renewal of the Crow Butte Resources ISR Facility, Dawes County, Nebraska, Materials License No. SUA-1534 (Dec. 2012) (ADAMS accession no. ML103470470); Ex. NRC-009, Safety Evaluation Report (Revised), License Renewal of the Crow Butte Resources ISR Facility, Dawes County, Nebraska, Materials License No. SUA-1534 (Aug. 2014) (SER).

<sup>8</sup> *See* Ex. NRC-011, License Renewal of Crow Butte ISR, Uranium In Situ Recovery Project; Environmental Assessment and Finding of No Significant Impact; Issuance, 79 Fed. Reg. 64,629 (Oct. 30, 2014).

<sup>9</sup> *See* Ex. NRC-012, Materials License No. SUA-1534 (Nov. 5, 2014) (License). NRC regulations authorize the Staff to issue a license when it has completed its review during the pendency of a hearing if it gives the Board and parties notice and an “explanation why the public health and safety is protected and why the action is in accord with the common defense and security despite the pendency of the contested matter.” 10 C.F.R. § 2.1202(a). The Intervenor sought to stay the effectiveness of the renewed license; the Board declined to issue a stay. LBP-15-2, 81 NRC 48, *interlocutory review denied*, CLI-15-17, 82 NRC 33 (2015).

<sup>10</sup> *See* Consolidated Intervenor’s New Contentions Based on the Final Environmental Assessment (October 2014) (Jan. 5, 2015) (Consolidated Intervenor’s New Contentions); The Oglala Sioux Tribe’s Renewed and New Contentions Based on the Final Environmental Assessment (October 2014) (Jan. 5, 2015) (Tribe’s New Contentions). The Tribe “join[ed], adopt[ed], and restate[d] . . . in large part the Final EA Contentions contained” in the Consolidated Intervenor’s filing; the Board considered them as joint contentions. *See* Tribe’s New Contentions at 1; LBP-15-11, 81 NRC at 435 nn.216-17, 219.

<sup>11</sup> Consolidated Intervenor’s New Contentions at 96; Tribe’s New Contentions at 108. “Land application uses agricultural irrigation equipment to apply treated water to land where the water can evaporate directly or be transpired by plants.” “Generic Environmental Impact Statement for Uranium Milling Facilities” (Final Report), NUREG-1910, vols. 1-2 (May 2009), at 2-37 (ML15093A368 (package) & ML15093A486 (package)) (ISL GEIS).

<sup>12</sup> *See* Consolidated Intervenor’s New Contentions at 96 & Ex. N, Letter from Mike Stempel, Assistant Regional Director, United States Department of the Interior, FWS, to Patrice Bubar, Deputy Director, Division of Intergovernmental Liaison and Rulemaking, NRC (Sept. 5, 2007) (2007 FWS Letter) (entered into the record as Ex. INT-018); *see* ISL GEIS.

referenced that study.<sup>13</sup> The Intervenors argued that the final Environmental Assessment failed to account for the impacts of selenium and presented no “credible evidence and scientific evaluation addressing” why the concerns raised in the 2007 FWS Letter and the FWS Selenium Study did not apply to the Crow Butte site.<sup>14</sup>

In LBP-15-11, the Board admitted in part and rejected in part the new and amended contentions.<sup>15</sup> Relevant here, the Board at that time admitted a narrowed Contention 12: “The Final [Environmental Assessment] . . . inadequately discusses the potential impacts from land application of ISL mining wastewater.”<sup>16</sup> The Board later designated this portion of the contention as “Contention 12B.”<sup>17</sup>

Crow Butte sought interlocutory review of LBP-15-11 and argued that the Board’s timeliness rulings were so overbroad as to “affect[ ] the basic structure of the proceeding in a pervasive or unusual manner.”<sup>18</sup> Crow Butte made no argument specific to Contention 12 in that petition but argued generally that the Board disregarded the requirement that a new contention filed on a staff document prepared pursuant to the National Environmental Policy Act (NEPA) must still meet the timeliness requirements of 10 C.F.R. § 2.309(c).<sup>19</sup> In CLI-

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<sup>13</sup> See Consolidated Intervenors’ New Contentions at 96 & Ex. O, Pedro Ramirez, Jr. & Brad Rogers, FWS Region 6, Selenium in a Wyoming Grassland Community Receiving Wastewater from an *In Situ* Uranium Mine (Sept. 2000) (FWS Selenium Study) (admitted into the record as Ex. INT-019). The FWS Selenium Study “was designed to: determine selenium concentrations in water, soil, terrestrial invertebrates, vegetation, birds, and bird eggs; determine pathways of selenium in the food chain; and document potential adverse effects to migratory birds resulting from selenium bioaccumulation. *Id.* at 2. FWS concluded that selenium from the wastewater had been mobilized into, and had bioaccumulated in, the food chain. *Id.* at 16. FWS therefore recommended that red-winged blackbirds be discouraged from nesting at the irrigated area. Further study was recommended as to the sensitivity of two other grassland bird species. *Id.*

<sup>14</sup> Consolidated Intervenors’ New Contentions at 96; Tribe’s New Contentions at 109.

<sup>15</sup> LBP-15-11, 81 NRC at 449. As tallied by the Board, the total number of admitted contentions remained at nine. *Id.*

<sup>16</sup> *Id.* at 434-42, 451; *see id.* at 438 (“Intervenors have properly pled a contention of inadequacy and omission regarding the [Environmental Assessment’s] discussion of land application of ISL wastewater and selenium contamination, supported by documents from [the U.S. Fish and Wildlife Service].”).

<sup>17</sup> LBP-16-13, 84 NRC at 422, 425. The Board designated another portion of the contention that challenged the environmental impacts of tornados as Contention 12A. With respect to that contention, the Board ultimately held that the discussion in the Environmental Assessment was sufficient. LBP-16-13, 84 NRC at 422-24.

<sup>18</sup> Petition for Interlocutory Review of LBP-15-11 (Mar. 25, 2015), at 2-4 (citing 10 C.F.R. § 2.341(f)(2)(ii)) (Crow Butte LBP-15-11 Petition). The Staff also petitioned for review but did not challenge the admission of Contention 12. *See* NRC Staff’s Petition for Review of LBP-15-11 (Apr. 10, 2015).

<sup>19</sup> Crow Butte LBP-15-11 Petition at 4-6; *see* 10 C.F.R. § 2.309(f)(2).

15-17, we denied review consistent with our longstanding policy that routine contention admissibility rulings do not warrant the extraordinary step of interlocutory review.<sup>20</sup>

The Board held an evidentiary hearing in 2015.<sup>21</sup> It issued LBP-16-7, its first partial initial decision resolving only Contention 1, in May 2016.<sup>22</sup> In LBP-16-13, the Board resolved the eight remaining contentions, all but a portion of one in favor of Crow Butte and the Staff.<sup>23</sup>

Although the Board's comprehensive decision resolved many distinct issues, only one concerns us here. With respect to Contention 12B, the Board found that the Environmental Assessment had not adequately considered the potential impact to wildlife should Crow Butte use land application to dispose of ISL wastewater.<sup>24</sup> Crow Butte has not, to date, used land application to dispose of excess wastewater. But it holds a National Pollutant Discharge Elimination System (NPDES) permit from the Nebraska Department of Environmental Quality (Nebraska DEQ) that would allow land application of treated wastewater.<sup>25</sup> Its NRC license also expressly authorizes this activity.<sup>26</sup> Although the water must be

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<sup>20</sup> CLI-15-17, 82 NRC 33, 44 (2015) (citing, among others, *Connecticut Yankee Atomic Power Co.* (Haddam Neck Plant), CLI-01-25, 54 NRC 368, 374 (2001) (mere increase in the litigation burden caused by the Board's admission of an additional contention is not a pervasive and unusual effect on the litigation or an irreparable harm warranting interlocutory review)); *see also Sacramento Municipal Utility District* (Rancho Seco Nuclear Generating Station), CLI-94-2, 39 NRC 91, 93-94 (1994) ("mere expansion of issues" due to admission of a contention "rarely, if ever," warrants interlocutory review); *Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 and 3), CLI-11-14, 74 NRC 801, 811-12 (2011) (where the Board granted summary disposition in favor of intervenors on NEPA contention, neither the potential that the Board erred nor the need for the Staff to perform potentially unnecessary analysis in the environmental impact statement presented a compelling case for interlocutory review). We likewise rejected the Staff's petition for interlocutory review. *Id.* at 46-47.

<sup>21</sup> *See* Atomic Safety and Licensing Board; Before Administrative Judges: Michael M. Gibson, Chair, Dr. Richard E. Wardwell, Brian K. Hajek, Alan S. Rosenthal (Special Assistant to the Board); In the Matter of Crow Butte Resources, Inc. (License Renewal for the In Situ Leach Facility, Crawford, Nebraska); Notice of Hearing, 80 Fed. Reg. 42,552 (July 17, 2015).

<sup>22</sup> LBP-16-7, 83 NRC 340 (2016). Crow Butte has appealed LBP-16-7; we will address that appeal separately. *See* Petition for Review of LBP-15-11 and LBP-16-07 (June 20, 2016) (pending).

<sup>23</sup> LBP-16-13, 84 NRC at 441. Consolidated Intervenors petitioned for review of LBP-16-13, which was denied. *See* CLI-18-8, 88 NRC 141 (2018).

<sup>24</sup> LBP-16-13, 84 NRC at 429-38; *see* Ex. CBR-043, Nebraska Department of Environmental Quality, Authorization to Discharge Under the National Pollutant Discharge Elimination System (NPDES) (Oct. 1, 2011) (NPDES Permit).

<sup>25</sup> *See* Ex. NRC-062, Letter from Stephen P. Collings, President, Ferret Exploration Company of Nebraska, Inc. to Ramon Hall, NRC Region IV Uranium Recovery Field Office (June 7, 1993) (enclosing NPDES permit application to Nebraska DEQ) (Crow Butte NPDES Permit Application) (Crow Butte's predecessor describing the reverse osmosis process); Ex. CBR-043, NPDES Permit.

<sup>26</sup> Ex. NRC-012, License, License Condition 10.17.

treated to maximum contaminant levels for groundwater as set by the Nebraska DEQ — 50 micrograms per liter (50 µg/L) for selenium<sup>27</sup> — the Intervenor argued that selenium at this level could nevertheless be harmful to wildlife.

The Board found that the Intervenor had shown that “selenium in ISL wastewater poses potentially significant risks to wildlife”<sup>28</sup> and that the Environmental Assessment had not considered these effects.<sup>29</sup> Specifically, the Board found that the presence of selenium in ISL wastewater was undisputed.<sup>30</sup> The Board further found — particularly given the terms of the NRC license — that it was reasonably foreseeable that Crow Butte will use land application in the future.<sup>31</sup> And it found that the Intervenor presented substantial testimony on the toxicity of selenium and its potential harm to wildlife; neither the Staff’s nor Crow Butte’s witnesses “disputed the general science on selenium toxicity” as set forth in the Intervenor’s testimony.<sup>32</sup> The Board rejected Crow Butte’s and the Staff’s argument that other documents, such as the ISL GEIS, concluded that “there would be minimal adverse effects to soils, surface water, and wildlife.”<sup>33</sup>

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<sup>27</sup> See Ex. NRC-062, Crow Butte NPDES Permit Application, at 18 (proposing a selenium limit of 0.05 milligrams per liter (mg/L), consistent with Nebraska DEQ maximum contaminant levels). See 118 Neb. Admin. Code § 4-002. The 0.05 mg/L (or 50 micrograms per liter (µg/L)) limit for selenium is the same maximum contaminant level as set by the U.S. Environmental Protection Agency (EPA) pursuant to the Safe Drinking Water Act, 42 U.S.C. §§ 300f-300j. See 40 C.F.R. § 141.62; see also Ex. CBR-043, NPDES Permit, app. A, Condition 2 (requiring compliance with effluent standards established under section 307(a) of the Clean Water Act for “toxic pollutants”). “Selenium and its compounds” are included in the list of “toxic pollutants” set forth in 40 C.F.R. § 401.15.

<sup>28</sup> LBP-16-13, 84 NRC at 427.

<sup>29</sup> *Id.* at 427, 429-32, 434.

<sup>30</sup> *Id.* at 427.

<sup>31</sup> *Id.* at 429. The Board particularly noted that Crow Butte sought approval for land application in 1993, obtained the requisite federal and state permits, and testified that it intends to renew its Nebraska DEQ permit authorizing land application. *Id.* While initiating land application would involve installation of additional infrastructure, the Board found that testimony given by Crow Butte’s expert witness demonstrated “considerable knowledge” of how Crow Butte would install such a system. *Id.* The Board stated that it was undisputed that initiating land application would require a license amendment from the Staff. *Id.* It is not completely clear from the record, however, that this is so. See, e.g., Tr. at 1936 (“We would be required to submit the plans [for installation of infrastructure to the NRC] and, through [the NRC’s] review process, [the NRC] would issue a license amendment, or at least [perform] a technical review.”) (Mr. Teahon for Crow Butte). Our decision today does not require that we determine whether a separate license amendment would be needed.

<sup>32</sup> LBP-16-13, 84 NRC at 428; see Ex. INT-048, Expert Opinion Testimony of Linsey McLean (May 1, 2015) (McLean Testimony).

<sup>33</sup> LBP-16-13, 84 NRC at 429-30. The Board noted that nothing in the Environmental Assessment explained how these documents supported the Staff’s conclusion on possible land application of ISL

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The Board further found that the documents in question (the ISL GEIS, an Environmental Assessment associated with the 1998 license renewal, and the Safety Evaluation Report issued in conjunction with the instant application) have not been properly incorporated into the Environmental Assessment.<sup>34</sup>

The Board also found that the Staff could not rely on the pollutant limits in the NPDES Permit as a substitute for its own independent NEPA review because there was no record evidence demonstrating that Nebraska DEQ considered impacts to wildlife in issuing that permit.<sup>35</sup> The Board therefore concluded that the Staff's Environmental Assessment and FONSI were deficient with respect to the discussion of the land application of ISL wastewater with respect to the potential impacts from selenium on wildlife.<sup>36</sup> The Board declined, however, to make the finding itself that land application of ISL wastewater at selenium concentrations of 50 µg/L would cause a significant impact to wildlife and instead ruled that the Staff must "reach its own independent conclusion" when it cures the deficiencies in the Environmental Assessment.<sup>37</sup>

Crow Butte now petitions for review of the Board's ruling on Contention 12B. Consolidated Intervenor's oppose the petition.<sup>38</sup>

## II. DISCUSSION

### A. Standard of Review

When acting in our adjudicatory capacity, we will grant a petition for review at our discretion, upon a showing that the petitioner has raised a substantial question as to the following considerations:

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wastewater. *Id.* at 430. In addition, the Board observed that the ISL GEIS did not establish that the overall effects of land application in the license area would be small; the ISL GEIS "does not even discuss the impact of land application on fauna." *Id.* at 432. In a similar vein, the Board observed that the SER states, without additional discussion or analysis, that land application of wastewater is an option that Crow Butte has no current plan to pursue. *Id.* at 431; *see Ex. NRC-009, SER §§ 3.1.3.5.4, 4.2.3.1.1.*

<sup>34</sup>LBP-16-13, 84 NRC at 430. The Board determined that the Staff did not properly tier to the ISL GEIS. *Id.*

<sup>35</sup>*Id.* at 433. The Board noted that the selenium concentration limit imposed in the NPDES Permit "appears to be based solely on a regulation designed to protect drinking water quality for humans and does not in any way address possible ingestion and ultimate bioaccumulation in wildlife." *Id.*

<sup>36</sup>*Id.* at 434, 439.

<sup>37</sup>*Id.* at 434. The Board did not direct the Staff's actions in resolving the issue, although it observed that "the most efficient method for curing this NEPA deficiency would be for the NRC Staff to publicly supplement its [Environmental Assessment] with additional analyses and findings with respect to the plausible impacts on wildlife from the land application of [in situ uranium recovery] wastewater." *Id.* at 440.

<sup>38</sup>Consolidated Intervenor's Answer Opposing Crow Butte's Petition for Review (Jan. 23, 2017) (Consolidated Intervenor's Answer).

- (i) a finding of material fact is clearly erroneous or in conflict with a finding as to the same fact in a different proceeding;
- (ii) a necessary legal conclusion is without governing precedent or is a departure from or contrary to established law;
- (iii) a substantial and important question of law, policy, or discretion has been raised;
- (iv) the conduct of the proceeding involved a prejudicial procedural error; or
- (v) any other consideration that we may deem to be in the public interest.<sup>39</sup>

Crow Butte claims that the Board erred in admitting Contention 12B, and it also claims that the Board made certain errors of material fact in its merits decision. We defer to the Board on issues of contention admissibility unless the Board made an error of law — that is, the contention rests on an erroneous legal premise — or abused its discretion.<sup>40</sup> And we defer to the Board’s findings with respect to the facts in a merits decision unless the findings are “clearly erroneous.”<sup>41</sup> The standard for showing “clear error” is deliberately high: a petitioner must show that, in light of the record as a whole, the Board’s determination is “not even plausible.”<sup>42</sup> “[W]here a petition for review relies primarily on claims that the Board erred in weighing the evidence in a merits decision, we seldom grant review.”<sup>43</sup>

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<sup>39</sup> 10 C.F.R. § 2.341(b)(4).

<sup>40</sup> *Southern Nuclear Operating Co.* (Vogtle Electric Generating Plant, Units 3 and 4), CLI-09-16, 70 NRC 33, 35 (2009); *Calvert Cliffs 3 Nuclear Project, LLC, and UniStar Nuclear Operating Services, LLC* (Calvert Cliffs Nuclear Power Plant, Unit 3), CLI-09-20, 70 NRC 911, 914 (2009). We generally defer to the Board’s judgment as to whether a proposed contention has a sufficient factual basis to be admitted. *Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 and 3), CLI-15-6, 81 NRC 340, 354-55 (2015); *Crow Butte Resources, Inc.* (Marsland Expansion Area), CLI-14-2, 79 NRC 11, 26 (2014).

<sup>41</sup> See, e.g., *Honeywell International, Inc.* (Metropolis Works Uranium Conversion Facility), CLI-13-1, 77 NRC 1, 18-19 (2013) (citing *David Geisen*, CLI-10-23, 72 NRC 210, 224-25 & n.61 (2010) and *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-03-8, 58 NRC 11, 26 (2003)).

<sup>42</sup> See, e.g., *Shaw AREVA MOX Services, LLC* (Mixed Oxide Fuel Fabrication Facility), CLI-15-9, 81 NRC 512, 519 (2015) (citations omitted).

<sup>43</sup> *Strata Energy, Inc.* (Ross In Situ Uranium Recovery Project), CLI-16-13, 83 NRC 566, 573 (2016) (citing *DTE Electric Co.* (Fermi Nuclear Power Plant, Unit 3), CLI-14-10, 80 NRC 157, 162-63 (2014); *Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim

(Continued)



## B. Crow Butte's Appeal

The lengthy procedural history of this case is set forth in LBP-16-7. We do not repeat it here except as it relates to Crow Butte's instant appeal.<sup>44</sup>

### 1. LBP-15-11 — Contention Admissibility

Crow Butte argues that Contention 12B was untimely and inadequately supported and therefore should not have been admitted for hearing in the first instance.<sup>45</sup> As discussed above, Contention 12 was among the contentions first proposed as a challenge to the Staff's Environmental Assessment.<sup>46</sup> At that time, both Crow Butte and the Staff opposed the proposed contention. The Staff argued that the contention could have been raised at the outset of the proceeding. Specifically, the license renewal application had identified land application as an option for disposal of wastewater, and the exhibits on which the Intervenor relied in 2015 were publicly available at the time the application was submitted. Further, the Staff argued that the Environmental Assessment contained no analysis or conclusions that were materially different from those in the application.<sup>47</sup> As to timeliness, Crow Butte asserted generally that the Intervenor had "failed to . . . address the basis for a timely filing."<sup>48</sup>

The Board found Contention 12B to be timely because statements in the Environmental Assessment "differ[ed] materially" from statements in the application.<sup>49</sup> Citing various conflicting statements both within the application and

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Nuclear Power Station), CLI-12-1, 75 NRC 39, 45-46 (2012)), *aff'd sub nom. NRDC & Powder River Basin Res. Council v. NRC*, 879 F.3d 1202 (D.C. Cir. 2018).

<sup>44</sup> See LBP-16-7, 83 NRC at 347-49.

<sup>45</sup> Crow Butte Petition at 5-11.

<sup>46</sup> See Consolidated Intervenor's New Contentions at 94-97; Tribe's New Contentions at 107-09; *see also* LBP-15-11, 81 NRC at 437-42.

<sup>47</sup> See NRC Staff's Combined Answer to New Contentions Filed by Consolidated Intervenor and the Oglala Sioux Tribe (Jan. 30, 2015), at 59 (Staff's Answer to New Contentions). The Staff also argued that the Intervenor had not raised a genuine dispute with the Environmental Assessment. For example, the Staff argued that the ISL GEIS had considered land application, cited requirements at NRC-licensed *in situ* uranium recovery facilities to monitor and control irrigation areas to maintain levels of constituents (including selenium) within allowable release standards, and concluded that the impacts of land application on ecological resources would be small. *See id.* at 59-60.

<sup>48</sup> See Crow Butte Resources' Response to Proposed New Contentions Based on Final Environmental Assessment (Jan. 30, 2015), at 5, 37 (Crow Butte Answer to New Contentions). Crow Butte asserted that information regarding land application was available in the 2014 Safety Evaluation Report associated with the application. *Id.* at 36-37. But Crow Butte principally argued that, while Crow Butte has a permit to discharge treated wastewater via land application, it has not used the permit "and has not indicated that it will in the future." *Id.* at 36 (citation omitted).

<sup>49</sup> LBP-15-11, 81 NRC at 442.

between the application and the Environmental Assessment, the Board reasoned that the Environmental Assessment included two rationales for not discussing the impacts of land application of wastewater: first, that Crow Butte is not pursuing the option of land application and second, that Crow Butte was not likely to use land application “because it [lacked] an appropriate state permit, or has ‘not indicated’ it will use the permit it has at this time.”<sup>50</sup> The Board found that this information in the Environmental Assessment differed from the application, which acknowledged that land application “is being considered or employed” at the facility.<sup>51</sup>

On appeal, Crow Butte argues that the Board incorrectly applied the timeliness criteria in 10 C.F.R. §§ 2.309(f)(2) and (c). We find that Crow Butte has raised a substantial question warranting review of the Board’s admissibility ruling with respect to Contention 12B.

We agree with Crow Butte that the contention was untimely. As relevant here, section 2.309(f)(2) of our regulations states that a participant in an adjudication may file a new environmental contention after the deadline for initial intervention petitions based on a draft or final environmental review document (here, the final Environmental Assessment) if that contention complies with the requirements of 10 C.F.R. § 2.309(c). Section 2.309(c)(1), in turn, provides that a contention filed after the deadline for initial petitions will not be entertained absent a determination that the petitioner has demonstrated good cause by showing that: (1) the information on which the filing is based was not previously available, (2) that information is materially different from information that was previously available, and (3) the contention is timely filed based on the availability of the subsequent information.

In this case, the information that the Intervenors provided to support Contention 12B — particularly, the two FWS documents — predated the application and was publicly available at the time of the initial intervention petition. The application disclosed the potential for land disposal of treated wastewater.<sup>52</sup> Further, the application did not address any potential adverse effects that land disposal of wastewater could have on wildlife.

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<sup>50</sup> *Id.* (citing Ex. NRC-010, EA §§ 2.4, 4.6.1.3; Tr. at 794-95).

<sup>51</sup> *Id.* The Board also noted that the Environmental Assessment omitted limited discussions of selenium and heavy metal contamination that had been included in the license renewal application. *See id.* at 442 n.273.

<sup>52</sup> *See* Ex. CBR-011, LRA § 7.13 (“Liquid wastes generated from production and restoration activities are handled by one of three methods: solar evaporation ponds, deep well injection, or land application. All three methods are currently being employed at Crow Butte.”). But the application also stated accurately elsewhere that land application is permitted but not currently being pursued. *Id.* § 8.3.1.3. The Environmental Assessment clarifies that, as discussed *supra*, land application has not been used at the site to date. *See* Ex. NRC-010, EA § 4.6.1.3.

Although there were some differences between information in the license renewal application and the Environmental Assessment, the Intervenor did not identify any information that was materially different from information previously available to provide a basis for a timely new contention. First, the Board erred in finding that the Environmental Assessment’s “new rationales” for not discussing the effects of selenium could form the basis of a timely new contention. The Board found that the Environmental Assessment’s statement that land application was not being used was new information because it was a “new rationale” for not discussing selenium impacts. Although the Board was correct that the license renewal application was inconsistent as to the status of land disposal of ISL wastewater at the site, the Board erred with respect to the materiality of that fact. Despite its inconsistencies, the application nonetheless disclosed to the Intervenor the fact that Crow Butte was at the time permitted to use such land application as a wastewater disposal method. Therefore, information regarding the ability of Crow Butte to undertake land application of ISL wastewater was available prior to the issuance of the Environmental Assessment. The Environmental Assessment’s clarification — that land disposal is not *currently* being used — did not change the fact that such disposal could occur during the license term.<sup>53</sup>

Second, the statements in the Environmental Assessment suggesting that Crow Butte would need additional permits before it could use land application did not constitute “materially different information” on which Contention 12B was based. The Board appears to have misinterpreted the Environmental Assessment, which did not state that Crow Butte needed additional permits before it could use land application.<sup>54</sup> At the time of the Board’s contention admissibility ruling, the Environmental Assessment stated that “[l]and application after wet weather events will not be utilized by [Crow Butte] since it is not included in the current NPDES permit NE0130613 from the State of Nebraska.”<sup>55</sup> In July 2015, the Staff clarified that the converse was true — Crow Butte’s NPDES Permit *only* allows land application “during and immediately after” wet weather events.<sup>56</sup> But regardless of the conditions under which the NPDES Permit allows land application, the Environmental Assessment acknowledges that the permit currently allows land application at times. Sections 2.4.1, 2.4.2, and 2.4.3 of the Environmental Assessment all note that “[i]f there is any land application activity associated with the disposal of the pond water that is not included in Crow Butte’s NPDES permit . . . [Crow Butte] will be required to apply for additional permits.” These statements do not imply that Crow Butte’s current

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<sup>53</sup> See 10 C.F.R. § 2.309(c)(1)(i).

<sup>54</sup> See LBP-15-11, 81 NRC at 442 (citing Ex. NRC-010, EA § 2.4).

<sup>55</sup> Ex. NRC-010, EA § 2.4.1.

<sup>56</sup> Ex. NRC-092, Errata to the Final Environmental Assessment (July 23, 2015) (EA Errata).

NPDES Permit does not allow any land application of ISL wastewater. But fundamentally, regardless of whether Crow Butte will need to seek additional permits before using land disposal, the Intervenor knew from information in the license renewal application that land disposal was contemplated and allowed by the NPDES Permit and the NRC license. The Board therefore erred in finding Contention 12B timely on this basis.

Neither of the differences that the Board highlighted in LBP-15-11 altered the fact that the Intervenor could have raised their contention at the outset.<sup>57</sup> For these reasons, we reverse the Board's decision in LBP-15-11 to admit Contention 12B.<sup>58</sup> Because the Board should not have admitted the contention in the first instance, it should have been dismissed and not adjudicated on the merits. We therefore vacate the Board's decision in LBP-16-13 as it relates to Contention 12B.<sup>59</sup>

This case presents us with an unusual situation. While we find that Contention 12B was improperly admitted, we nonetheless have before us the Board's merits ruling, issued following a comprehensive evidentiary hearing, that the Environmental Assessment fails to discuss the environmental effects of land application of ISL wastewater on wildlife. We need not consider Crow Butte's merits challenges due to our timeliness ruling and vacatur. Nonetheless, the agency has a duty under NEPA to examine all reasonably foreseeable environmental impacts of the proposed action regardless of the pendency of a contested issue. As a discretionary matter, we decline to disregard the extensive adjudicatory record that has been compiled on the issue. Rather, we consider, as an exercise of our inherent supervisory authority over the Staff, whether any additional information developed during the adjudication necessitates further NEPA activities.<sup>60</sup> Because we undertake this consideration outside of our adjudicatory

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<sup>57</sup> We are not persuaded by Consolidated Intervenor's argument that broadly interprets our 2009 decision in this proceeding as allowing an intervenor to defer filing all "NEPA-based contentions" until after the Staff has issued its environmental review document. *See* Consolidated Intervenor's Answer at 2-3 (citing CLI-09-9, 69 NRC at 348-51). That decision concerned Contention 1 and pertained to the Staff's consultation obligations under the National Historic Preservation Act, as amended, 54 U.S.C. §§ 300101-307108 (previously codified at 16 U.S.C. §§ 470(a)-470x-6). *See* CLI-09-9, 69 NRC at 350-51. Our decision in no way implied that any environmental contentions should, as a general matter, be delayed until after completion of the Staff's review.

<sup>58</sup> Crow Butte also argues that "[e]ven if [the contention] were timely, it was still inadmissible." Crow Butte Petition at 11. Because we find that Contention 12B was not timely, we need not reach these arguments. *See Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-15-21, 82 NRC 295, 305 n.50 (2015).

<sup>59</sup> *Cf. Southern California Edison Co.* (San Onofre Nuclear Generating Station, Units 2 and 3), CLI-13-9, 78 NRC 551 (2013) (noting that the Commission "will vacate [unreviewed Board decisions] when appellate review is cut short by mootness").

<sup>60</sup> *See U.S. Department of Energy* (High-Level Waste Repository), CLI-14-1, 79 NRC 1, 2 (2014)

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role, our normal standards of appellate review do not apply. Based on our evaluation in this supervisory capacity, we determine that the information in the record, as reflected in our discussion today, continues to support issuance of the renewed license.

The purpose of an environmental assessment informs our consideration of this issue. Among other things, an environmental assessment must include a “brief discussion of . . . [t]he environmental impacts of a proposed action.”<sup>61</sup> Additionally, an environmental assessment should provide “sufficient evidence and analysis for determining whether to prepare an [environmental impact statement] or a finding of no significant impact (FONSI). If the [environmental assessment] supports a FONSI, the environmental process is complete. [If not,] the environmental review activities transition to the process to develop an” environmental impact statement, which is a longer environmental review document.<sup>62</sup> In considering the adequacy of the Staff’s environmental analysis, we are not limited to the discussion in the Environmental Assessment itself. “We have previously held that a Board’s hearing, hearing record, and subsequent decision on a contested environmental record augment the environmental record of decision developed by the Staff . . . .”<sup>63</sup>

Here, we discern that the discussion in the Environmental Assessment, the documents referenced in the Environmental Assessment, and the additional testimony from expert witnesses provide sufficient information to conclude that the environmental impacts on wildlife through land application of ISL wastewater will be small and would not constitute a significant impact. Therefore, we decline to direct the Staff to undertake additional analysis or prepare additional NEPA documentation or condition or otherwise modify the terms of the license renewal.

First, as noted in the Environmental Assessment itself, the licensee has not used land application at the Crow Butte site and has no plans to use this ap-

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(“We undertook CLI-13-8 and the companion SRM pursuant to our inherent authority to supervise the Staff’s work and adjudicatory proceedings related to license applications.”); *see also Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), CLI-16-12, 83 NRC 542, 558 (2016) (noting that generally Commission direction to the Staff is not reviewable in an NRC adjudication but deciding to consider such a petition discretionarily).

<sup>61</sup> 10 C.F.R. § 51.30(a)(1)(iii).

<sup>62</sup> “Environmental Review Guidance for Licensing Actions Associated with NMSS Programs” (Final Report), NUREG-1748 (Aug. 2003), at 1-2 (ML032450279); *see also* 10 C.F.R. § 51.31.

<sup>63</sup> *Strata*, CLI-16-13, 83 NRC at 595; *see NRDC*, 879 F.3d at 1210-12 (where Board augmented environmental record of decision with additional information but the information did not alter Board’s conclusion, no “harmful consequence of the supplementation” was identified, and there was therefore “nothing to be gained by . . . consider[ing] the same information again”).

proach.<sup>64</sup> Even if it were to do so, it must comply with the terms of its NPDES Permit, which contains limits for several hazardous substances, including a 50 µg/L limit for selenium that is identical to the EPA's standard for safe drinking water.<sup>65</sup> In challenging the Environmental Assessment, the Intervenors relied on a letter from FWS transmitting comments on the ISL GEIS and the 2007 FWS study suggesting that land application of ISL wastewater containing selenium could be hazardous to wildlife, particularly red-winged blackbirds, lark buntings, and western meadowlarks.<sup>66</sup> In response, the Staff noted that the FWS Selenium Study was "unable to determine whether elevated selenium concentrations caused reproductive or other effects on red-wing blackbirds [and] the effects of selenium on lark buntings and western meadowlarks."<sup>67</sup> Moreover, the Staff observed that recorded selenium levels at the site of the FWS Selenium Study greatly exceeded the 50 µg/L enforceable limit in Crow Butte's NPDES permit for land application.<sup>68</sup> The Staff therefore concluded that the results of the FWS Selenium Study did not indicate similar environmental impacts at the Crow Butte site.<sup>69</sup> Additionally, both the FWS Selenium Study and the Intervenors' challenges concerning potential environmental impacts of land application cited generic concerns rather than site-specific conditions or regulatory requirements in place at the Crow Butte site.<sup>70</sup>

While the FWS also expressed concern about selenium levels in excess of 2 µg/L, it raised these concerns in relation to evaporation ponds, a different form of disposal than land application.<sup>71</sup> And contrary to the Board's suggestion, the Staff considered the FWS concerns related to the selenium levels above 2 µg/L in evaporation ponds and responded to those concerns in the ISL GEIS.<sup>72</sup> In

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<sup>64</sup> Ex. NRC-010, EA §§ 2.4.1, 4.6.1.3; *see* Tr. at 1923 (explaining that Crow Butte has no plans to use land application of wastewater and noting additional infrastructure will be required to implement land application of wastewater); Ex. CBR-010, Initial Written Testimony of Crow Butte Resources Witness Larry Teahon on Contention 12 (May 8, 2015), at 4-5 (Teahon Testimony).

<sup>65</sup> Ex. NRC-010, EA §§ 2.4.1, 4.6.1.3; *see also* Ex. NRC-092, EA Errata; Ex. NRC-001-R, NRC Staff's Initial Testimony (May 8, 2015), at 101-02 (Staff Testimony).

<sup>66</sup> Ex. INT-018, 2007 FWS Letter; Ex. INT-019, FWS Selenium Study.

<sup>67</sup> Ex. NRC-001-R, Staff Testimony, at 103.

<sup>68</sup> *Id.* at 103-04; *see* Ex. CBR-043, NPDES Permit, app. A, Condition 2; Ex. NRC-012, License, License Condition 10.17; Ex. CBR-010, Teahon Testimony, at 10-11 (explaining that the level of selenium in wastewater after required reprocessing is expected to be "1000 to 2000 times lower than levels at the FWS Report site").

<sup>69</sup> Ex. NRC-001-R, Staff Testimony, at 104.

<sup>70</sup> *See* Ex. CBR-054, Rebuttal Testimony of Crow Butte Resources Witness Larry Teahon on Contention 12 (June 8, 2015), at 5; *see also* Ex. NRC-071, Rebuttal Testimony of Linsey McLean (July 31, 2015), at 5-6 (asserting that "[t]he potential impacts for Crow Butte for selenium contamination are the same as have been recognized at all other ISL sites").

<sup>71</sup> Ex. INT-018, 2007 FWS Letter, at 1.

<sup>72</sup> *Compare* LBP-16-13, 84 NRC at 431-32, with ISL GEIS § G5.25.1.

particular, the ISL GEIS concluded that the impacts would be small based on mitigation measures such as fencing, netting, and best management practices.<sup>73</sup> Moreover, Crow Butte stated that the reverse osmosis process used at the site was capable of reducing selenium levels to 1 µg/L, as reflected in the Staff’s memorandum evaluating the proposed land application of restoration wastewater.<sup>74</sup> Notably, the Board acknowledged that the Intervenors neither rebutted Crow Butte’s evidence that its reverse osmosis process could reduce selenium concentrations nor suggested that “concentrations at or less than 2 µg/L pose any threat to wildlife.”<sup>75</sup> Consequently, we conclude that the Environmental Assessment, as supplemented by the record developed by the Board in this adjudication, is sufficient to support the Staff’s determination that the environmental impacts of wildlife exposure to selenium and other hazards through land application of ISL wastewater would be small. Accordingly, we decline to direct the Staff to undertake further action.<sup>76</sup>

### III. CONCLUSION

For the reasons discussed above, we *grant* in part Crow Butte’s petition for review. We *grant review* of the Board’s contention admissibility decision in LBP-15-11, and we *reverse* the Board’s decision with respect to the admissibility of Contention 12B. We therefore *vacate* the Board’s merits decision in LBP-16-13 with respect to Contention 12B, and therefore we need not consider Crow Butte’s petition for review of that decision. Nevertheless, as a matter of

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<sup>73</sup> ISL GEIS §§ 4.2.5.2, G5.25.1.

<sup>74</sup> Ex. CBR-010, Teahon Testimony, at 10-11 (explaining that “due to the required processing and treatment of wastewater before land application the expected level of selenium in discharged wastewater at Crow Butte would be . . . 1000 to 2000 times lower than levels at the FWS Report site”); Ex. CBR-042, Memorandum from Joel Grimm, Project Manager, NRC to Docket File 40-8943 regarding Land Application of Restoration Waste Water — Ferret’s Crow Butte ISL Facility (Nov. 16, 1993), at 4, tbl. 1 (Grimm Memorandum). As noted at the hearing, the Staff considered the land application proposal at the time it was approved. Tr. at 1927; see Ex. CBR-042, Grimm Memorandum, at 6 (finding that “proposed changes to [the licensee’s] water land application program . . . will not affect the average operating conditions of the land application system”).

<sup>75</sup> LBP-16-13, 84 NRC at 434.

<sup>76</sup> During the pendency of this appeal, the Staff, at Crow Butte’s request, suspended work on curative actions associated with the Board’s merits decisions on Contentions 1 and 12B. See Letter from Mike Thomas, Cameco Resources, to Marc Dapas, NRC (Dec. 7, 2016) (ML16349A381); Letter from Mike Thomas, Cameco Resources, to Mark Dapas, NRC (Jan. 10, 2017) (attached to Letter from Marcia J. Simon, NRC, to the Administrative Judges (Jan. 11, 2017)). In their answer to Crow Butte’s appeal, Consolidated Intervenors ask that we direct the Staff to re-commence its activities. Because we have not directed the Staff to take further action with respect to the Environmental Assessment, we need not consider Consolidated Intervenors’ request with respect to Contention 12B.

discretion, we *consider* the issues raised by Contention 12B and *determine* that the environmental record in this case is sufficient to satisfy NEPA with respect to those issues.

IT IS SO ORDERED.

For the Commission

Annette L. Vietti-Cook  
Secretary of the Commission

Dated at Rockville, Maryland,  
this 30th day of May 2019.



## **Dissenting Views of Commissioner Baran**

In my view, the Commission should affirm the Board's decision in LBP-15-11 that Contention 12B is admissible and leave the Board's merits decision in LBP-16-13 in place. Therefore, I respectfully dissent.

### **A. Contention Admissibility**

Crow Butte contends that Contention 12B should not have been admitted for hearing, arguing that it was untimely and inadequately supported.<sup>1</sup> Citing various conflicting statements both within the application and between the application and the Environmental Assessment, the Board found that the contention was timely filed.<sup>2</sup> On appeal, Crow Butte argues that the Board incorrectly applied the timeliness criteria in 10 C.F.R. §§ 2.309(f)(2) and (c). I agree with the majority that Crow Butte has raised a substantial question warranting review of the Board's admissibility ruling on Contention 12B.

As the majority decision notes, Section 2.309(c)(1) provides that a contention filed after the deadline for initial petitions will not be entertained absent a determination that the petitioner has demonstrated good cause by showing that: (1) the information on which the filing is based was not previously available, (2) that information is materially different from information that was previously available, and (3) the contention is timely filed based on the availability of the subsequent information.

Here, there were material differences between information in the license renewal application and the Environmental Assessment that provide the basis for a timely new contention. The Board correctly observed that the license renewal application contained conflicting statements regarding disposal of wastewater by land application. In Chapter 7 of the application, Crow Butte stated that it used three methods for handling wastewater — one of which was land application — and that all three methods “are currently being employed at Crow Butte.”<sup>3</sup> In the next chapter, however, Crow Butte made the contradictory statement that, of the three methods it could use to handle liquid wastes, “only solar evaporation ponds and deep disposal have been implemented.”<sup>4</sup>

The Staff's Environmental Assessment exacerbated the confusion. As the Board correctly noted, the Environmental Assessment stated, at the time of the Board's admissibility determination, that “[l]and application . . . will not be

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<sup>1</sup> Crow Butte Petition at 5-11.

<sup>2</sup> LBP-15-11, 81 NRC at 442.

<sup>3</sup> See Ex. CBR-011, LRA § 7.13.

<sup>4</sup> *Id.* § 8.3.1.3.

utilized by [Crow Butte] since it is not included in the current NPDES permit.”<sup>5</sup> However, in another section of the Environmental Assessment, the Staff states that Crow Butte did indeed have a permit for land application for wastewater disposal but that Crow Butte had not used land application and had “not indicated they will in the future.”<sup>6</sup> Though the Staff later attempted to clarify these ambiguities, the Board had already made its admissibility determination.<sup>7</sup>

Thus, the statements of both Crow Butte in the license renewal application and the Staff in its Environmental Assessment, created significant confusion about the status of land application of wastewater by Crow Butte. Given the conflicting statements about whether land application was authorized and whether it was actually being implemented, the information on which the contention is based cannot be considered “available” to the Intervenors at the time of the license renewal application. The application did not effectively disclose to the Intervenors that they needed to file their contention regarding land application of wastewater. Therefore, the Intervenors could not reasonably be expected to file a contention at that time, even though the U.S. Fish and Wildlife Service (FWS) documents relied upon for the contention pre-dated the application. While NRC’s procedural rules require a petitioner to bear the burden of meeting strict contention admissibility standards, they do not require Intervenors to untangle and decipher a series of conflicting statements made by both Crow Butte and the Staff. That is not a reasonable burden to place on interested persons who may have safety or environmental concerns about a licensing action.

I therefore conclude that the record before the Board supported a finding of a material difference between the license application and the Environmental Assessment, such that the Intervenors could not reasonably have been expected to formulate a Contention 12B prior to issuance of the EA. Because I conclude that the Board’s admissibility determination was not an error of law or abuse of discretion, I believe the Commission should defer to the Board’s judgment in admitting Contention 12B as timely and adequately supported. I agree with the Board’s determination that Contention 12B, as pled by the Intervenors, constituted an admissible “contention of inadequacy and omission” that was “supported by documents from FWS.”<sup>8</sup> Contention 12B contained the required statement of law along with an explanation of the bases for the contention, with adequate document support, and a specific discussion concerning the Environmental Assessment’s omission of an analysis of impacts to wildlife resulting from land application of ISL wastewater.<sup>9</sup>

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<sup>5</sup> See LBP-15-11, 81 NRC at 441 (citing Ex. NRC-010, EA § 2.4.1).

<sup>6</sup> Ex. NRC-010, EA § 4.6.1.3.

<sup>7</sup> Ex. NRC-092, Errata to the Final Environmental Assessment (July 23, 2015).

<sup>8</sup> See LBP-15-11, 81 NRC at 438.

<sup>9</sup> See Consolidated Intervenors’ New Contentions at 94-97; Tribe’s New Contentions at 108-09.

## B. Merits Decision

Crow Butte additionally challenges the Board's merits ruling that the Staff's Environmental Assessment is insufficient as to its discussion of the impacts of selenium on wildlife that could result from the land application of ISL wastewater. I would deny review of the Board's merits ruling.

Crow Butte advances one principal argument with respect to the Board's decision on the merits: that the Board should have found the Environmental Assessment sufficient because "Crow Butte has no plans to perform land application and has never even constructed the facilities that would be needed to do so."<sup>10</sup> Crow Butte asserts that the Staff was therefore "well within its discretion to include minimal discussion" of land application in the Environmental Assessment.<sup>11</sup> And Crow Butte argues that, in the unlikely event it were to use land application in the future, the stringent contaminant concentration limits in its NPDES Permit and its NRC license would minimize adverse effects.

In my view, Crow Butte has not raised a substantial question as to the Board's determination that it is reasonably foreseeable that Crow Butte will employ land application of wastewater in the future. Under NEPA, an environmental impact is "reasonably foreseeable" if it is "sufficiently likely to occur that a person of ordinary prudence would take it into account in reaching a decision."<sup>12</sup> Whether an impact is reasonably foreseeable, or whether a person of ordinary prudence would consider it, is a question of fact.

Crow Butte argues that because NEPA only requires consideration of the "likely" consequences of a licensing decision, the Environmental Assessment satisfied the law by explaining that land application is not likely to happen.<sup>13</sup> There is evidence in the record to support the assertion that land application is unlikely to be used by Crow Butte. Although Crow Butte has held an NPDES permit that allows land application since 1993, it has not, to date, used this disposal method.<sup>14</sup> Moreover, at the evidentiary hearing, Crow Butte's witness, Mr. Teahon, testified that Crow Butte does not currently have the equipment in place to dispose of wastewater via land application as described in its NPDES

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<sup>10</sup> Crow Butte Petition at 13.

<sup>11</sup> *Id.* at 13-14.

<sup>12</sup> *Sierra Club v. Marsh*, 976 F.2d 763, 767 (1st Cir. 1992).

<sup>13</sup> Crow Butte Petition at 13-14.

<sup>14</sup> *See* Ex. CBR-043, NPDES Permit. This permit expired on September 30, 2016. Crow Butte's representative testified at the evidentiary hearing that Crow Butte intended to renew the permit. *See* Tr. at 1924 (Mr. Teahon). Crow Butte has since done so. *See* State of Nebraska, Authorization to Discharge under the National Pollutant Discharge Elimination System (NPDES), Permit No. NE0130613, Facility ID 63416 (Cameco Resources) (Sept 30, 2016).

permit.<sup>15</sup> Mr. Teahon further testified that Crow Butte has no current plans to use land application and that it would be costly to do so.<sup>16</sup>

But other record evidence convinced the Board that it is reasonably foreseeable that Crow Butte could use land application in the future.<sup>17</sup> It is undisputed that Crow Butte's renewed license expressly authorizes land application of ISL wastewater and that Crow Butte has in hand an NPDES Permit that authorizes the activity.<sup>18</sup> Mr. Teahon also testified that Crow Butte might use land application if, for example, its deep injection wells were to fail.<sup>19</sup>

Based on its consideration of all of the available evidence, the Board plausibly found that Crow Butte's current lack of interest in pursuing land application was not sufficient to excuse the Staff from considering the reasonably foreseeable environmental impacts of the activity should Crow Butte decide to do so. The Board determined that, in view of its NRC license and NPDES Permit, the decision whether to use such a disposal method is entirely in Crow Butte's hands. Furthermore, the record reflects that Crow Butte has taken steps to ensure that the option remains available.<sup>20</sup> And the Staff testified that it would not reconsider the environmental consequences should Crow Butte decide to use land application because the Environmental Assessment the Staff performed for this license renewal application has addressed this option.<sup>21</sup> What Crow Butte presents here is a dispute with how the Board weighed the evidence; Crow Butte disagrees with the Board's finding that it is reasonably foreseeable that Crow Butte will use land application of ISL wastewater at some point during the renewed license term. But Crow Butte does not point to any facts not considered by the Board or otherwise identify error in the Board's reasoning that would render its conclusions implausible.

Crow Butte also asks the Commission to reverse the Board's decision and find that the Environmental Assessment "passes muster under NEPA" because it addresses the environmental impacts of the "likely" disposal methods of ISL

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<sup>15</sup> See Tr. at 1918-19 (Mr. Teahon).

<sup>16</sup> *Id.* at 1923. To use land application, Crow Butte testified that it would have to construct infrastructure to withdraw wastewater from the existing evaporation ponds and return it to the treatment facility, as well as additional infrastructure to pipe the water to the two outfalls designated in its NPDES Permit. See Tr. at 1919-20 (Mr. Teahon).

<sup>17</sup> See LBP-16-13, 84 NRC at 429.

<sup>18</sup> See Ex. NRC-012, License, License Condition 10.17. Crow Butte originally sought and received NRC approval for land application in 1993. See Ex. NRC-062, Crow Butte NPDES Permit Application; Ex. CBR-042, Memorandum from Joel Grimm, Project Manager, NRC to Docket File 40-8943 regarding Land Application of Restoration Waste Water — Ferret's Crow Butte ISL Facility (Nov. 16, 1993) (Grimm Memo).

<sup>19</sup> Tr. at 1928-29 (Mr. Teahon).

<sup>20</sup> LBP-16-13, 84 NRC at 429 (citing Tr. 1928-29 (Mr. Teahon)).

<sup>21</sup> Tr. at 1935-36, 37 (Mr. Goodman).

wastewater.<sup>22</sup> Crow Butte argues that the Staff's discussion of potential environmental impacts met NEPA's "rule of reason."<sup>23</sup> The question is whether Crow Butte has raised a substantial question for review with respect to the Board's finding that the Staff failed to review the potential environmental impacts of selenium on wildlife.

The evidentiary hearing generated substantial evidence concerning the environmental impacts of selenium on wildlife. The Intervenors sought to show that even small concentrations of selenium, if deposited on land, will accumulate on the surface of the land and then up the food chain, causing adverse impacts to wildlife. The FWS Selenium Study that the Intervenors used to support Contention 12B found that "elevated selenium concentrations in water, soil, grasshoppers, and [certain bird eggs and livers] collected from the Study Area [the Highland Uranium Project in Wyoming] demonstrate that selenium is being mobilized and bioaccumulated in the food chain."<sup>24</sup> The Intervenors' expert, Ms. McLean, described toxic effects to wildlife and humans of selenium found in uranium recovery process wastewater.<sup>25</sup> She also testified that selenium may bioaccumulate in the food chain.<sup>26</sup> She explained that selenium can exist in both organic and inorganic forms and is more biologically available in its organic forms.<sup>27</sup> Ms. McLean also testified that reverse osmosis, the type of purification employed at Crow Butte, is not effective at removing organic forms of metals.<sup>28</sup> The Board found that "none of the witnesses for the NRC Staff or Crow Butte disputed the general science on toxicity as set forth in Ms. McLean's testimony."<sup>29</sup>

Witnesses for both the Staff and Crow Butte argued that the 50 µg/L limit in the NPDES Permit is sufficient to prevent any significant environmental impacts.<sup>30</sup> Mr. Goodman, testifying for the Staff, stated that the 50 µg/L limit is identical to the EPA's maximum contaminant level for drinking water, which in turn is "based on the best available science."<sup>31</sup> Mr. Teahon also testified for

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<sup>22</sup> Crow Butte Petition at 12-14.

<sup>23</sup> *Id.* at 13-14.

<sup>24</sup> Ex. INT-019, FWS Selenium Study, at 14; *see id.* at 16 ("Selenium concentrations in [the bird eggs] were at levels suspected of causing reduced hatchability in this species.").

<sup>25</sup> *See* Ex. INT-048, McLean Testimony, at 6-9 (effects of heavy metals, including selenium), 12-28, 19-20 (effects of selenium specifically).

<sup>26</sup> *Id.* at 5, 20, 22.

<sup>27</sup> Tr. at 1937-38 (Ms. McLean).

<sup>28</sup> *See* Ex. INT-048, McLean Testimony, at 4; Tr. at 1937-38 (Ms. McLean).

<sup>29</sup> LBP-16-13, 84 NRC at 428.

<sup>30</sup> *See id.* at 432-33.

<sup>31</sup> Ex. NRC-001-R, NRC Staff's Initial Testimony, at 102 (May 8, 2015) (testimony of Mr. Goodman).

Crow Butte that its treatment processes are capable of reducing selenium concentrations to 1 µg/L,<sup>32</sup> although Crow Butte was “not committing” to reducing selenium to concentrations any less than the permitted limit of 50 µg/L.<sup>33</sup> But the Board observed that the Environmental Assessment had failed to examine the environmental impacts of either a 50 µg/L or 2 µg/L concentration of selenium on wildlife.<sup>34</sup>

In my view, Crow Butte has not raised a substantial question as to whether the Board erred in its determination that adverse effects to wildlife from ISL wastewater disposal are reasonably foreseeable and have not been adequately considered in the Environmental Assessment. Mere disagreement on how the Board weighed conflicting evidence does not raise a substantial question for our review.<sup>35</sup> Therefore, the Commission should decline to review the Board’s ruling that the NRC Staff should consider these impacts.

A decision to decline review on the merits would leave in place the Board’s conclusion that the Environmental Assessment is deficient as to its discussion of the environmental impacts associated with Crow Butte’s possible land application of ISL wastewater, specifically as to the impacts of selenium on wildlife. The Board, which cannot direct the Staff’s curative action, suggested that the “most efficient method” for curing the deficiency would be for the Staff to issue a public supplement to its Environmental Assessment “with additional analyses and findings with respect to” the reasonably foreseeable impacts on wildlife from the land application of ISL wastewater.<sup>36</sup> I agree that preparation of a short supplement to the Environmental Assessment would be an effective curative action.

In completing the supplement, I would have the Staff consider relevant available information, including evidence adduced at the hearing, and how the supplement affects the Finding of No Significant Impact. I believe the Commission should direct the Staff to provide, within 30 days of the date of this decision, a status report to the Board that lays out its timeline and plans for completing the supplement.<sup>37</sup> Absent compelling circumstances, I would require the Staff’s effort to be completed within four months.

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<sup>32</sup> Tr. at 1941 (Mr. Teahon); *see also* Ex. CBR-010, Teahon Testimony, at 10.

<sup>33</sup> Tr. at 1941 (Mr. Teahon).

<sup>34</sup> LBP-16-13, 84 NRC at 434.

<sup>35</sup> *See, e.g., Strata*, CLI-16-13, 83 NRC at 586. In this case, I also do not believe that an exercise of the Commission’s inherent supervisory authority is warranted.

<sup>36</sup> LBP-16-13, 84 NRC at 440.

<sup>37</sup> Because the Board has now ruled on all pending contentions in this matter, ordinarily its jurisdiction in the case would be terminated. *Virginia Electric and Power Co. d/b/a Dominion Virginia Power and Old Dominion Electric Cooperative* (North Anna Power Station, Unit 3), CLI-12-14, 75

(Continued)

### **C. Conclusion**

For the reasons discussed above, I would grant in part and deny in part Crow Butte's petition for review. I would grant review of the Board's contention admissibility decision in LBP-15-11 and affirm the Board's decision with respect to the admissibility of Contention 12B. I would deny review of the Board's merits decision in LBP-16-13. Because I would not disturb the Board's decision as to the Environmental Assessment, I would direct the Staff to provide a status report to the Board detailing its plans for completing curative actions within 30 days of the date of its decision, with the objective of completing the supplement within four months.

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NRC 692 (2012). In this case, the Board retained jurisdiction for the purpose of affording the Intervenor the opportunity to file new contentions to contest the adequacy of the Staff's chosen curative action with respect to Contention 12B. LBP-16-13, 84 NRC at 441. As an exercise of adjudicatory efficiency, the Commission should leave in place the Board's decision to retain jurisdiction.





UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

**ATOMIC SAFETY AND LICENSING BOARD**

**Before Administrative Judges:**

**Paul S. Ryerson**, Chairman  
**Nicholas G. Trikouros**  
**Dr. Gary S. Arnold**

**In the Matter of**

**Docket No. 72-1051-ISFSI**  
**(ASLBP No. 18-958-01-ISFSI-BD01)**

**HOLTEC INTERNATIONAL**  
**(HI-STORE Consolidated Interim**  
**Storage Facility)**

**May 7, 2019**

This proceeding concerns Holtec International's application to construct and operate a consolidated interim storage facility for spent nuclear fuel in Lea County, New Mexico. The Board considered petitions to intervene and requests for a hearing from six petitioners: (1) Beyond Nuclear, Inc. (Beyond Nuclear); (2) Sierra Club; (3) Don't Waste Michigan, Citizens for Alternatives to Chemical Contamination, Nuclear Energy Information Service, Public Citizen, Inc., San Luis Obispo Mothers for Peace, and Nuclear Issues Studies Group (collectively, Joint Petitioners); (4) Fasken Land and Minerals, Ltd. and Permian Basin Land and Royalty Owners (together, Fasken); (5) Alliance for Environmental Strategies (AFES); and (6) NAC International Inc. (NAC). The Board determined that Beyond Nuclear, Sierra Club, and Fasken demonstrated standing, but that no petitioners proffered an admissible contention.

**RULES OF PRACTICE: INTERVENTION**

To intervene as a party in an adjudicatory proceeding, a petitioner must (1) establish it has standing; and (2) proffer at least one admissible contention.

**RULES OF PRACTICE: STANDING**

The Commission directs the Board to construe the petition in favor of the petitioner when determining whether a petitioner has demonstrated standing.

**RULES OF PRACTICE: STANDING (BURDEN)**

It is each petitioner's burden to demonstrate that standing requirements are met.

**RULES OF PRACTICE: STANDING**

A petitioner may show traditional standing by demonstrating that an individual or organization has suffered or might suffer a concrete and particularized injury that is: (1) fairly traceable to the challenged action; (2) likely redressable by a favorable decision; and (3) arguably within the zone of interests protected by the governing statutes.

**RULES OF PRACTICE: STANDING (PROXIMITY PLUS PRESUMPTION)**

Although the NRC applies traditional standing concepts, in certain proceedings the Commission applies simplified standing requirements for individuals who reside within, or have contacts with, a geographic zone of potential harm. The pertinent zone in power reactor construction and operating license proceedings is the area within a 50-mile radius of the site. The relevant distance from a consolidated interim storage facility is likely less than 50 miles because such a storage facility is essentially a passive structure and therefore has less chance of widespread radioactive release.

**RULES OF PRACTICE: STANDING (REPRESENTATIONAL)**

An organization may represent the interests of its members using representational standing if it can: (1) show that the interests it seeks to protect are germane to its own purpose; (2) identify at least one member who qualifies for standing in his or her own right; (3) show that it is authorized by that member to request a hearing on his or her behalf; and (4) show that neither the claim asserted nor the relief requested requires an individual member's participation in the organization's legal action.

**RULES OF PRACTICE: CONTENTIONS (ADMISSIBILITY)**

An admissible contention must: (1) state the specific legal or factual issue to be raised or controverted; (2) provide a brief explanation for the basis of the contention; (3) demonstrate that the issue raised is within the proceeding's scope; (4) demonstrate that the issue raised is material to the findings the NRC must make to support the action that is involved in the proceeding; (5) concisely state the alleged facts or expert opinions that support the petitioner's position and on which the petitioner intends to rely at the hearing, including references to the specific sources and documents on which the petitioner intends to rely; and (6) show that a genuine dispute exists on a material issue of law or fact by referring to specific portions of the application that the petitioner disputes or, if the application is alleged to be deficient, by identifying such deficiencies and the supporting reasons for this allegation.

**RULES OF PRACTICE: CONTENTIONS (ADMISSIBILITY)**

A petitioner may not challenge an NRC rule or regulation in a contention unless the petitioner seeks and obtains a waiver from the Commission in accordance with 10 C.F.R. § 2.335.

**RULES OF PRACTICE: CONTENTIONS (ADMISSIBILITY)**

The contention admissibility standards are strict by design. Over time, the Commission strengthened the admissibility standards to afford evidentiary hearings only to those who proffer at least some minimal factual and legal foundation in support of their contentions. Failure to satisfy even one of the contention admissibility standards requires the Board to reject the contention.

**RULES OF PRACTICE: AMENDMENT OF CONTENTIONS**

A petitioner who seeks to amend its original contention or proffer a new one after the initial deadline for filing contentions must meet the good cause standard in 10 C.F.R. § 2.309. Good cause exists if the petitioner can show: (1) the information upon which the amended or new contention is based was not previously available; (2) the information upon which the filing is based is materially different from information previously available; and (3) the filing has been submitted in a timely fashion based on the availability of the subsequent information. Previously available information that is newly acquired by the petitioner does not constitute good cause.

#### **RULES OF PRACTICE: CONTENTIONS (ENVIRONMENTAL)**

All contentions must be based on documents or other information available at the time the petition is to be filed. Petitioners have an obligation to raise issues in licensing proceedings as soon as the information becomes available to them. For environmental contentions, petitioners must file contentions based on the applicant's Environmental Report.

#### **NATIONAL ENVIRONMENTAL POLICY ACT: ENVIRONMENTAL IMPACT STATEMENT**

The National Environmental Policy Act mandates that federal agencies prepare an environmental impact statement before undertaking any major federal actions significantly affecting the quality of the human environment.

#### **NATIONAL ENVIRONMENTAL POLICY ACT: HARD LOOK**

The National Environmental Policy Act requires agencies to take a hard look at environmental consequences of the proposed action, and imposes a duty upon the agency to both consider every significant aspect of the environmental impact of a proposed action and inform the public of its analysis and conclusion.

#### **NATIONAL ENVIRONMENTAL POLICY ACT: HARD LOOK**

The hard look is subject to a rule of reason, meaning that the agency need not perform analyses concerning events that would be considered worst case scenarios involving the project, or those considered remote and highly speculative. The National Environmental Policy Act does not necessitate certainty or precision, nor does it mandate particular results from the agency. Rather, it requires an estimate of anticipated (not unduly speculative) impacts from the agency.

#### **ADJUDICATORY PROCEEDINGS: SCOPE OF REVIEW**

The NRC is not in the business of regulating the market strategies of licensees or determining whether market strategies warrant commencing operations.

#### **ENVIRONMENTAL JUSTICE**

The NRC considers social and economic impacts ancillary to environmental impacts: that is, environmental justice concerns. Environmental justice is a federal policy established by Executive Order 12898 in 1994 directing federal

agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.

**RULES OF PRACTICE: PARTICIPATION BY AN INTERESTED STATE OR LOCAL GOVERNMENT**

Pursuant to 10 C.F.R. § 2.315(c), a local governmental body that is not admitted as a party under 10 C.F.R. § 2.309 shall, upon request, be permitted a reasonable opportunity to participate in a hearing as an interested non-party. Section 2.315(c) does not require a demonstration of standing, but does require identification of those contentions on which the non-party intends to participate.

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**MEMORANDUM AND ORDER**  
**(Ruling on Petitions for Intervention and Requests for Hearing)**

Before the Board are six petitions to intervene and requests for a hearing concerning a license application by Holtec International (Holtec) to construct and operate a consolidated interim storage facility for spent nuclear fuel in Lea County, New Mexico. The petitioners are: (1) Beyond Nuclear, Inc. (Beyond Nuclear); (2) Sierra Club; (3) Don't Waste Michigan, Citizens for Alternatives to Chemical Contamination, Nuclear Energy Information Service, Public Citizen, Inc., San Luis Obispo Mothers for Peace, and Nuclear Issues Studies Group (collectively, Joint Petitioners); (4) Fasken Land and Minerals, Ltd. and Permian Basin Land and Royalty Owners (together, Fasken); (5) Alliance for Environmental Strategies (AFES); and (6) NAC International Inc. (NAC).

Because Holtec has revised its license application in response to petitioners' initial contentions, both the Board's and the NRC Staff's views as to their admissibility have changed over time. It appears the NRC Staff now asserts that two of the six hearing requests should be granted because, in its view (1) Beyond Nuclear has demonstrated standing and its only proffered contention is admissible; and (2) Sierra Club has demonstrated standing and has proffered two admissible contentions (Sierra Club Contentions 1 and 4).<sup>1</sup> Holtec opposes the standing of all six petitioners and asserts that none of their proffered contentions is admissible.

The Board concludes that Beyond Nuclear, Sierra Club, and Fasken have demonstrated standing. However, the Board denies Beyond Nuclear's petition, because its sole contention no longer identifies a genuine dispute with Holtec's license application. Likewise, neither Sierra Club nor Fasken has proffered an admissible contention and their petitions are therefore denied. Although the Board does not rule on its standing, AFES has not proffered an admissible contention and its petition is denied for that reason. Joint Petitioners and NAC have neither demonstrated standing nor proffered an admissible contention. Because no petitioner has both demonstrated standing and proffered an admissible contention, this proceeding is terminated.

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<sup>1</sup> See NRC Staff's Consolidated Response to Petitions to Intervene and Requests for Hearing Filed by [AFES], [Beyond Nuclear], [Joint Petitioners], [NAC], and the Sierra Club (Oct. 9, 2018) at 65-67, 72-74 [hereinafter NRC Staff Consol. Answer]; NRC Staff Answer to Motions to Amend Contentions Regarding Federal Ownership of Spent Fuel (Feb. 19, 2019) [hereinafter NRC Staff Answer to Beyond Nuclear and Fasken Motion]. *But see* Tr. at 331-35 (NRC Staff stating at oral argument that issues identified in Beyond Nuclear's contention and in Sierra Club Contention 1 appeared "to have been cured for the present time"). Initially, the Staff also deemed Sierra Club Contention 8 to be admissible (NRC Staff Consol. Answer at 79), but announced at oral argument that it no longer was taking a position on the admissibility of that contention. Tr. at 261.

## I. BACKGROUND

The nation's growing inventory of spent nuclear fuel from commercial nuclear power reactors is generally stored at the reactor sites where it was generated, initially immersed in pools of water and then, after a suitable delay, encased in protective dry-cask storage systems.<sup>2</sup> What to do with the spent fuel "has vexed scientists, Congress, and regulatory agencies for the last half-century."<sup>3</sup> After rejecting early disposal proposals that ranged from "burying nuclear waste in polar ice caps to rocketing it to the sun," a consensus appeared to settle on deep geologic burial in a permanent repository.<sup>4</sup> Congress passed the Nuclear Waste Policy Act of 1982 (NWPA),<sup>5</sup> which ultimately led the U.S. Department of Energy (DOE) to submit an application to the NRC for authorization to construct a geologic repository at Yucca Mountain, Nevada.<sup>6</sup> However, shortly after DOE's application was submitted in June 2008, Congress stopped funding the Yucca Mountain project, and a pending adjudication before an NRC licensing board was suspended in September 2011.<sup>7</sup> To date, more than seven years later, Congress has provided no new funding for a permanent nuclear waste repository at Yucca Mountain.

The Holtec proposal before the Board is not for another permanent repository, but for what is acknowledged by its very name to be a temporary solution: a consolidated interim storage facility (CISF). While a license to construct and operate Yucca Mountain would have required DOE to demonstrate a reasonable expectation that it would meet specified performance standards throughout the "period of geologic stability," defined to "end 1 million years after disposal,"<sup>8</sup> the licensing requirements for an interim storage facility under 10 C.F.R. Part 72 apply to renewable terms of no more than "40 years from the date of issuance."<sup>9</sup>

On March 30, 2017, Holtec submitted an application to the NRC to construct

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<sup>2</sup> U.S. Gov't Accountability Off., GAO-17-340, Commercial Nuclear Waste: Resuming Licensing of the Yucca Mountain Repository Would Require Rebuilding Capacity at DOE and NRC, Among Other Key Steps at 1 (2017).

<sup>3</sup> *Nuclear Energy Inst. v. EPA*, 373 F.3d 1251, 1257 (D.C. Cir. 2004).

<sup>4</sup> *Id.*

<sup>5</sup> Nuclear Waste Policy Act of 1982, 42 U.S.C. § 10101 (1983) [hereinafter NWPA].

<sup>6</sup> See Letter from Edward F. Sproat III, Director, DOE Office of Civilian Radioactive Waste Management, to Michael F. Weber, Director, NRC Office of Nuclear Material Safety and Safeguards (NMSS) (June 3, 2008) (ADAMS Accession No. ML081560407).

<sup>7</sup> *U.S. Department of Energy* (High-Level Waste Repository), LBP-11-24, 74 NRC 368 (2011).

<sup>8</sup> 10 C.F.R. § 63.302.

<sup>9</sup> *Id.* § 72.42(a).

and operate a CISF.<sup>10</sup> Holtec intends to construct and operate the first phase of its CISF on approximately 1,000 acres of land in Lea County, New Mexico.<sup>11</sup> Holtec seeks to store 8,680 metric tons of uranium (MTUs) in two different models of Holtec canisters, up to 500 canisters in total, for a license period of 40 years.<sup>12</sup> On March 19, 2018, the NRC accepted and docketed Holtec's application.<sup>13</sup> If its initial license is granted, Holtec plans "19 subsequent expansion phases to be completed over the course of 20 years," with each phase necessitating a license amendment request.<sup>14</sup>

Holtec's Environmental and Safety Analysis Reports demonstrate marked differences between its proposed facility and a permanent waste repository, such as Yucca Mountain. Holtec's project is substantially less ambitious. For example, Yucca Mountain was to be constructed to comply with performance standards for one million years, but Holtec's Environmental Report anticipates storage at its proposed facility for 120 years (40 years for initial licensing, plus 80 years of potential extensions), and acknowledges that this 120 year period could be reduced if a permanent geologic repository were finally licensed and began operating.<sup>15</sup> While Yucca Mountain was statutorily authorized to store 70,000 metric tons of high-level radioactive waste,<sup>16</sup> Holtec's initial license application requests permission to store up to 8,680 MTUs.<sup>17</sup> While the Yucca Mountain repository would be constructed at least 700 feet below the surface,<sup>18</sup> Holtec's license application contemplates a maximum excavation depth of 25 feet.<sup>19</sup> And all parts of the Holtec storage system — both for transportation and storage —

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<sup>10</sup> See Letter from Kimberly Manzione, Holtec Licensing Manager, to Michael Layton, Director, NRC Division of Spent Fuel Management, NMSS (Mar. 30, 2017) (ADAMS Accession No. ML17115A418).

<sup>11</sup> [Holtec] HI-STORE [CISF] Environmental Report, at 14 (rev. 5 Mar. 2019) [hereinafter ER]. The petitioners' originally-filed contentions in this proceeding are based on the earlier version of Holtec's Environmental Report. See [Holtec] HI-STORE [CISF] Environmental Report (rev. 1 Dec. 2017).

<sup>12</sup> See ER at 14.

<sup>13</sup> See Holtec International's HI-STORE Consolidated Interim Storage Facility for Interim Storage of Spent Nuclear Fuel, 83 Fed. Reg. 12,034 (Mar. 19, 2018).

<sup>14</sup> ER at 14.

<sup>15</sup> *Id.*

<sup>16</sup> 42 U.S.C. § 10134(d).

<sup>17</sup> ER at 14. Holtec's Environmental Report, however, analyzes the potential full 20-phase capacity of up to 100,000 MTUs.

<sup>18</sup> U.S. DOE, Office of Civilian Radioactive Waste Management, Final Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada at S-7 (June 2008).

<sup>19</sup> [Holtec] HI-STORE [CISF] Safety Analysis Report at 30 (rev. 0F Jan. 2019) [hereinafter SAR]. The petitioners' originally-filed contentions in this proceeding are based on the earlier version of Holtec's SAR. See [Holtec] HI-STORE [CISF] Safety Analysis Report (rev. 0A Oct. 2017).



would use canisters and casks that have been separately approved by the NRC, and hence are not part of Holtec's license application for the Lea County storage facility.<sup>20</sup>

On July 16, 2018, the NRC published notice in the *Federal Register* of an opportunity to request a hearing and petition to intervene by September 14, 2018.<sup>21</sup> On September 12, 2018, AFES filed its petition to intervene and request for a hearing.<sup>22</sup> On September 14, 2018, NAC, Joint Petitioners, Beyond Nuclear, and Sierra Club timely filed their petitions.<sup>23</sup> The NRC also received five petitions from local governmental bodies to participate in the proceeding.<sup>24</sup>

On September 14, 2018, the Commission received motions to dismiss the proceeding from Beyond Nuclear and Fasken.<sup>25</sup> On September 24, 2018, Holtec and the NRC Staff filed answers opposing both motions to dismiss.<sup>26</sup> Beyond

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<sup>20</sup> See 10 C.F.R. § 72.214 (Certificate Number 1040). Holtec's license application proposes the exclusive use of the HI-STORM UMAX canister storage system.

<sup>21</sup> Holtec International's HI-STORE Consolidated Interim Storage Facility for Interim Storage of Spent Nuclear Fuel, 83 Fed. Reg. 32,919, 32,919 (July 16, 2018) [hereinafter Notice of Opportunity to Request a Hearing].

<sup>22</sup> [AFES'] Petition to Intervene and Request for Hearing (Sept. 12, 2018) at 1 [hereinafter AFES Pet.].

<sup>23</sup> Petition to Intervene and Request for Hearing of NAC International, Inc. (Sept. 14, 2018) [hereinafter NAC Pet.]; [Joint Petitioners'] Petition to Intervene and Request for an Adjudicatory Hearing (Sept. 14, 2018) [hereinafter Joint Pet'rs Pet.]; Beyond Nuclear, Inc.'s Hearing Request and Petition to Intervene (Sept. 14, 2018) [hereinafter Beyond Nuclear Pet.]; Petition to Intervene and Request for Adjudicatory Hearing by Sierra Club (Sept. 14, 2018) [hereinafter Sierra Club Pet.].

<sup>24</sup> Petition by Eddy-Lea Energy Alliance to Participate as an Interested Local Governmental Body (Sept. 4, 2018) [hereinafter ELEA Pet.]; Corrected Petition by the Board of Commissioners for Lea County, New Mexico to Participate as an Interested Local Governmental Body (Sept. 12, 2018) [hereinafter Lea Cty. Pet.]; Petition by the City of Carlsbad, New Mexico to Participate as an Interested Local Governmental Body (Sept. 12, 2018) [hereinafter Carlsbad Pet.]; Petition by the City of Hobbs to Participate as an Interested Local Governmental Body (Sept. 13, 2018) [hereinafter Hobbs Pet.]; Petition by Eddy County to Participate as an Interested Local Governmental Body (Sept. 13, 2018) [hereinafter Eddy Cty. Pet.].

<sup>25</sup> Beyond Nuclear, Inc.'s Motion to Dismiss Licensing Proceedings for Hi-Store [CISF] and WCS [CISF] for Violation of the [NWPA] (Sept. 14, 2018) [hereinafter Beyond Nuclear Motion to Dismiss]; Motion of [Fasken] to Dismiss Licensing Proceedings for Hi-Store [CISF] and WCS [CISF] (Sept. 14, 2018) [hereinafter Fasken Motion to Dismiss].

<sup>26</sup> [Holtec's] Answer Opposing Beyond Nuclear Motion to Dismiss Licensing Proceeding for HI-STORE [CISF] (Sept. 24, 2018) [hereinafter Holtec Answer to Beyond Nuclear Motion to Dismiss]; [Holtec's] Answer Opposing [Fasken] Motion to Dismiss Licensing Proceeding for HI-STORE [CISF] (Sept. 24, 2018) [hereinafter Holtec Answer to Fasken Motion to Dismiss]; NRC Staff's Response to Motions to Dismiss Licensing Proceedings (Sept. 24, 2018) [hereinafter NRC Staff Response to Motions to Dismiss].

Nuclear and Fasken filed replies.<sup>27</sup> Although the Secretary of the Commission denied both motions on procedural grounds,<sup>28</sup> it observed that Beyond Nuclear's concurrently-filed petition incorporated arguments by reference contained in its motion to dismiss.<sup>29</sup> The Secretary, therefore, referred both Beyond Nuclear's and Fasken's motions to the Board to be considered under 10 C.F.R. § 2.309.<sup>30</sup>

On October 9, 2018, Holtec<sup>31</sup> and the NRC Staff<sup>32</sup> filed answers to the petitions. Holtec opposed the standing of all petitioners and the admission of all contentions. The NRC Staff supported the standing of two petitioners (Beyond Nuclear and Sierra Club) and the admissibility of four of their contentions (Beyond Nuclear's sole contention and Sierra Club Contentions 1, 4, and 8).<sup>33</sup> On October 16, 2018, petitioners AFES, Beyond Nuclear, Joint Petitioners, NAC, and Sierra Club filed replies.<sup>34</sup> On December 3, 2018, Holtec and the NRC

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<sup>27</sup> Beyond Nuclear's Reply to [Holtec], and NRC Staff Responses to Beyond Nuclear's Motion to Dismiss (Sept. 28, 2018) [hereinafter Beyond Nuclear Reply on Motion to Dismiss]; Reply of Movants Fasken and PBLRO to Staff's Response to Motions to Dismiss (Sept. 28, 2018) [hereinafter Fasken Reply to NRC Staff on Motion to Dismiss]; Reply of [Fasken] to [Holtec's] Response to Motion to Dismiss (Sept. 28, 2018) [hereinafter Fasken Reply to Holtec on Motion to Dismiss].

<sup>28</sup> Order of the Secretary, [Holtec] (HI-STORE [CISF]) [and] Interim Storage Partners LLC (WCS [CISF]) Docket Nos. 72-1051 & 72-1050 (Oct. 29, 2018) (unpublished) [hereinafter Order Denying Motions to Dismiss].

<sup>29</sup> *Id.* at 2.

<sup>30</sup> *Id.* at 2-3. On December 27, 2018, Beyond Nuclear petitioned the United States Court of Appeals for the District of Columbia Circuit to review the Secretary's Order, which denied Beyond Nuclear's Motion to Dismiss and referred it as a petition to this Board. That appeal remains pending, although Beyond Nuclear has requested it be held in abeyance pending the outcome of this proceeding. *See* Notice of Beyond Nuclear's Petition for Review of NRC Order in D.C. Circuit U.S. Court of Appeals, Docket Nos. 72-1050/1051 (Jan. 16, 2019).

<sup>31</sup> [Holtec's] Answer Opposing [AFES'] Petition to Intervene and Request for Adjudicatory Hearing on [Holtec's] HI-STORE [CISF] Application (Oct. 9, 2018) [hereinafter Holtec Answer to AFES]; [Holtec's] Answer Opposing Beyond Nuclear's Hearing Request and Petition to Intervene on [Holtec's] HI-STORE [CISF] Application (Oct. 9, 2018) [hereinafter Holtec Answer to Beyond Nuclear]; [Holtec's] Answer Opposing [NAC's] Petition to Intervene and Request for Hearing on [Holtec's] HI-STORE [CISF] Application (Oct. 9, 2018) [hereinafter Holtec Answer to NAC]; [Holtec's] Answer Opposing Sierra Club's Petition to Intervene and Request for Adjudicatory Hearing on [Holtec's] HI-STORE [CISF] Application (Oct. 9, 2018) [hereinafter Holtec Answer to Sierra Club]; [Holtec's] Answer Opposing [Joint Petitioners'] Petition to Intervene and Request for an Adjudicatory Hearing on [Holtec's] HI-STORE [CISF] Application (Oct. 9, 2018) [hereinafter Holtec Answer to Joint Pet'rs].

<sup>32</sup> NRC Staff Consol. Answer.

<sup>33</sup> The NRC Staff also did not oppose the admissibility of NAC Contention 3, but deemed it to be moot inasmuch as the Staff opposed NAC's standing.

<sup>34</sup> Consolidated Response by Petitioner [AFES] to Answers by [Holtec] and NRC Staff (Oct. 16, 2018) [hereinafter AFES Reply]; Beyond Nuclear's Reply to Oppositions to Hearing Request and Petition to Intervene (Oct. 16, 2018) [hereinafter Beyond Nuclear Reply]; Combined Reply of [Joint  
(Continued)

Staff filed supplemental responses opposing consideration of Fasken's motion to dismiss as a petition.<sup>35</sup> Fasken filed a reply on December 10, 2018.<sup>36</sup>

The Board heard oral argument on January 23 and 24, 2019 in Albuquerque, New Mexico. Numerous motions proffering new and amended contentions that were filed after oral argument are addressed *infra*.

## II. STANDING ANALYSIS

In a licensing proceeding such as this, the NRC must grant a hearing "upon the request of any person whose interest may be affected by the proceeding."<sup>37</sup> However, to determine whether a petitioner has a sufficient interest, the Commission applies contemporaneous judicial concepts of standing.<sup>38</sup> Although the Commission instructs us to construe the petition in favor of the petitioner when we determine standing,<sup>39</sup> it is nonetheless each petitioner's burden to demonstrate that standing requirements are met.<sup>40</sup> As relevant here, a petitioner may satisfy this burden in one of three ways.

First, a petitioner may show traditional standing. This requires a showing that a person or organization has suffered or might suffer a concrete and particularized injury that is: (1) fairly traceable to the challenged action; (2) likely redressable by a favorable decision; and (3) arguably within the zone of interests

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Petitioners] to Holtec and NRC Answers (Oct. 16, 2018) [hereinafter Joint Pet'rs Reply]; Reply in Support of Petition to Intervene and Request for Hearing of [NAC] (Oct. 16, 2018) [hereinafter NAC Reply]; Sierra Club's Reply to Answers Filed by [Holtec] and NRC Staff (Oct. 16, 2018) [hereinafter Sierra Club Reply].

<sup>35</sup> [Holtec's] Answer Opposing [Fasken's] Motion/Petition to Intervene on [Holtec's] HI-STORE [CISF] Application (Dec. 3, 2018) [hereinafter Holtec Supplemental Answer to Fasken Motion to Dismiss]; NRC Staff's Supplemental Response to Motion to Dismiss by [Fasken] (Dec. 3, 2018) [hereinafter NRC Staff Supplemental Answer to Fasken Motion to Dismiss].

<sup>36</sup> Reply of [Fasken] to Holtec's Answer Opposing Movants' Motion to Dismiss/Petition to Intervene (Dec. 10, 2018) [hereinafter Fasken Reply to Holtec]; Reply of [Fasken] to NRC Staff's Supplemental Response and Opposition to Motion to Dismiss (Dec. 10, 2018) [hereinafter Fasken Reply to NRC Staff].

<sup>37</sup> 42 U.S.C. § 2239(a)(1)(A).

<sup>38</sup> *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-15-25, 82 NRC 389, 394 (2015).

<sup>39</sup> *Id.*

<sup>40</sup> See *Commonwealth Edison Co.* (Zion Nuclear Power Station, Units 1 and 2), CLI-00-5, 51 NRC 90, 98 (2000). Section 2.309(d) of 10 C.F.R. specifies information that a petitioner should include in its petition to establish standing, but does not set the standard the Board must apply when deciding whether that information is sufficient.

protected by the governing statutes<sup>41</sup> — here primarily the Atomic Energy Act (AEA) and the National Environmental Policy Act (NEPA).<sup>42</sup>

Second, a petitioner may take advantage of proximity presumptions the Commission has created to simplify standing requirements for individuals who reside within, or have frequent contacts with, a geographic zone of potential harm. In proceedings that involve construction or operation of a nuclear power plant, the zone is deemed to be the area within a 50-mile radius of the site.<sup>43</sup> In other proceedings, such as this one, a “proximity plus” standard is applied on a “case-by-case basis, taking into account the nature of the proposed action and the significance of the radioactive source.”<sup>44</sup> The smaller the risk of offsite consequences, the closer a petitioner must be to be realistically threatened. Although the Commission has not established a clear standard, the relevant distance from a consolidated interim storage facility is likely less than 50 miles because such a storage facility “is essentially a passive structure rather than an operating facility, and . . . therefore [has] less chance of widespread radioactive release.”<sup>45</sup> If no “obvious potential” for harm exists,<sup>46</sup> the petitioner has the “burden to show . . . specific and plausible means” for how the proposed action will affect them.<sup>47</sup> “[C]onclusory allegations about potential radiological harm” are not sufficient.<sup>48</sup>

Third, like most petitioners here, an organization may try to establish representational standing based on the standing of one or more individual members. To establish representational standing, an organization must: (1) show that the interests it seeks to protect are germane to its own purpose; (2) identify at least one member who qualifies for standing in his or her own right; (3) show that it is authorized by that member to request a hearing on his or her behalf; and (4) show that neither the claim asserted nor the relief requested requires an individual member’s participation in the organization’s legal action.<sup>49</sup>

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<sup>41</sup> *Calvert Cliffs 3 Nuclear Project, LLC, and UniStar Nuclear Operating Services, LLC* (Calvert Cliffs Nuclear Power Plant, Unit 3), CLI-09-20, 70 NRC 911, 915 (2009).

<sup>42</sup> 42 U.S.C. §§ 2011-2297; *id.* §§ 4321-4347.

<sup>43</sup> *PPL Bell Bend, LLC* (Bell Bend Nuclear Power Plant), CLI-10-7, 71 NRC 133, 138-39 (2010).

<sup>44</sup> *Georgia Institute of Technology* (Georgia Tech Research Reactor, Atlanta, Georgia), CLI-95-12, 42 NRC 111, 116-17 (1995). See *Sequoyah Fuels Corp. and General Atomics* (Gore, Oklahoma Site), CLI-94-12, 40 NRC 64, 75 n.22 (1994) (“[A] presumption based on geographic proximity is not confined solely to Part 50 reactor licenses, but is also applicable to materials cases where the potential for offsite consequences is obvious.”).

<sup>45</sup> *Consumers Energy Co.* (Big Rock Point Independent Spent Fuel Storage Installation), CLI-07-19, 65 NRC 423, 426 (2007).

<sup>46</sup> See *Sequoyah Fuels*, CLI-94-12, 40 NRC at 75 n.22.

<sup>47</sup> *Nuclear Fuel Services, Inc.* (Erwin, Tennessee), CLI-04-13, 59 NRC 244, 248 (2004).

<sup>48</sup> *Id.*

<sup>49</sup> *Consumers Energy Co.* (Palisades Nuclear Plant), CLI-07-18, 65 NRC 399, 409 (2007).

## A. Beyond Nuclear

Beyond Nuclear states that it is “a nonprofit, nonpartisan membership organization that aims to educate and activate the public about the connections between nuclear power and nuclear weapons and the need to abolish both to protect public health and safety, prevent environmental harms, and safeguard our future.”<sup>50</sup> Of especial relevance, “Beyond Nuclear advocates for an end to the production of nuclear waste and for securing the existing reactor waste in hardened on-site storage until it can be permanently disposed of in a safe, sound, and suitable underground repository.”<sup>51</sup>

Beyond Nuclear claims standing on several different theories,<sup>52</sup> but we need consider only one. Beyond Nuclear submits the declarations of several members who live near the proposed facility and authorize Beyond Nuclear to represent them.<sup>53</sup> One such member — Keli Hatley — lives with her husband and small children just one mile away from the proposed facility.<sup>54</sup> Indeed, Ms. Hatley’s cattle currently range on the land where the facility would be constructed, and she rides there on horseback to manage them.<sup>55</sup> If the storage facility is built, Ms. Hatley expects she would have to ride along its fence line.<sup>56</sup>

The NRC Staff does not oppose Beyond Nuclear’s claim of standing,<sup>57</sup> and the Board agrees. Ms. Hatley’s residence is well within the distance that has been found sufficient in other proceedings that involved even smaller spent fuel facilities.<sup>58</sup>

Holtec opposes Beyond Nuclear’s standing<sup>59</sup> because, Holtec asserts, Be-

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<sup>50</sup> Beyond Nuclear Pet. at 2.

<sup>51</sup> *Id.*

<sup>52</sup> See Beyond Nuclear Pet. at 2-10.

<sup>53</sup> See *id.*, Ex. 01, Decl. of Daniel C. Berry, III (Sept. 14, 2018); *id.*, Ex. 03, Decl. of Keli Hatley; *id.*, Ex. 05, Decl. Margo Smith.

<sup>54</sup> See *id.*, Ex. 03, Decl. of Keli Hatley ¶ 3.

<sup>55</sup> *Id.* ¶ 5.

<sup>56</sup> *Id.*

<sup>57</sup> NRC Staff Consol. Answer at 8.

<sup>58</sup> See, e.g., *Pacific Gas and Electric Co.* (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), LBP-02-23, 56 NRC 413, 429 (2002) (ruling 17 miles sufficient and citing other NRC approvals of standing for petitioners within 10 miles of proposed spent fuel pool expansions); *Carolina Power & Light Co.* (Shearon Harris Nuclear Power Plant), LBP-99-25, 50 NRC 25, 29-31 (1999) (accord standing to a petitioner 17 miles from spent fuel pool); *Florida Power & Light Co.* (St. Lucie Nuclear Power Plant, Unit 1), LBP-88-10A, 27 NRC 452, 454-55 (1988), *aff’d*, ALAB-893, 27 NRC 627 (1988) (conceding standing of individual living within 10 miles of spent fuel pools); *Northeast Nuclear Energy Co.* (Millstone Nuclear Power Station, Unit 3), LBP-00-2, 51 NRC 25, 28 (2000) (granting standing to individual with part-time residence located 10 miles from spent fuel pool).

<sup>59</sup> Holtec Answer to Beyond Nuclear at 13-18.

yond Nuclear’s members have not provided “any plausible explanation of how radionuclides or radiation from inside sealed metal canisters emplaced below ground in steel and concrete storage vaults” could reach them.<sup>60</sup> But the purpose of proximity presumptions is to eliminate the need for such factual demonstrations: “When the presumption of having the requisite interest is applied, it becomes unnecessary to establish a causal relationship between the claimed injury and the requested action.”<sup>61</sup>

If Ms. Hatley lacks standing to challenge the storage of much of the nation’s spent nuclear fuel (potentially up to 100,000 metric tons) one mile from her home, one has difficulty imagining who would have standing. Indeed, at oral argument, Holtec’s counsel declined to speculate whether *anyone* might have standing to challenge its proposed storage facility under Holtec’s demanding interpretation of the requirements.<sup>62</sup>

Beyond Nuclear has demonstrated standing. However, because Beyond Nuclear has not proffered an admissible contention, as discussed *infra*, its request for an evidentiary hearing must nonetheless be denied.

## B. Sierra Club

Sierra Club claims to be the oldest and largest environmental organization in the United States, and to be especially concerned about the environmental consequences of nuclear power and nuclear waste.<sup>63</sup> Like Beyond Nuclear, Sierra Club submits supporting declarations from several members who live in the vicinity of the proposed facility.<sup>64</sup> One member — Danny Berry — states that he lives less than 10 miles away and owns and operates a ranch just three miles away.<sup>65</sup>

As discussed *supra*, these distances are well within the limits that have been found to confer standing to challenge much smaller storage facilities, and the NRC Staff agrees that Sierra Club has established standing.<sup>66</sup> And again, we are

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<sup>60</sup> *Id.* at 17.

<sup>61</sup> *Northern States Power Co.* (Pathfinder Atomic Plant), LBP-90-3, 31 NRC 40, 45 (1990); *see also Calvert Cliffs*, CLI-09-20, 70 NRC at 917 n.27.

<sup>62</sup> Tr. at 272-73.

<sup>63</sup> Tr. at 41.

<sup>64</sup> *See* Sierra Club Pet., Decl. of Danny Berry; *id.*, Decl. of Danielle Marie Dyer; *id.*, Decl. of Deanna Maria Dyer; *id.*, Decl. of Gordon Wayne Dyer; *id.*, Decl. of Martha A. Singleterry.

<sup>65</sup> *See* Sierra Club Pet., Decl. of Danny Berry ¶3. Because Mr. Berry submitted similar declarations on behalf of both Sierra Club and Beyond Nuclear, we consider his declaration only in connection with the standing of Sierra Club. *See Big Rock Point ISFSI*, CLI-07-19, 65 NRC at 426 (explaining that “multiple representations might lead to confusion”).

<sup>66</sup> NRC Staff Consol. Answer at 8.

not persuaded by Holtec's argument<sup>67</sup> that, even to commence a challenge, an individual who lives sufficiently close to a potentially massive facility for storing much of the nation's spent nuclear fuel must first demonstrate with specificity just how radiation might reach them.

Sierra Club has demonstrated standing. However, because Sierra Club has not proffered an admissible contention, as discussed *infra*, its request for an evidentiary hearing must nonetheless be denied.

### C. Joint Petitioners

Joint Petitioners are comprised of seven different organizations, each presenting a similar standing issue.<sup>68</sup> Although Public Citizen, Inc. and the Nuclear Issues Study Group have each submitted a declaration from a member who lives in New Mexico, neither lives anywhere near the proposed facility.<sup>69</sup> The other five organizations rely entirely on declarations from members who live in other states. All seven organizations, therefore, base their standing claims not on their members' proximity to the proposed facility, but on their proximity to potential transportation routes by which spent nuclear fuel might travel to the proposed facility.

This is too remote and speculative an interest on which to establish standing. As the Commission stated in 2004: "[M]ere geographical proximity to potential transportation routes is insufficient to confer standing."<sup>70</sup> Even before 2004, licensing boards rejected standing arguments based on proximity to likely transportation routes.<sup>71</sup> As the Commission observed in 2001, licensing boards

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<sup>67</sup> Holtec Answer to Sierra Club at 14-15.

<sup>68</sup> The seven organizations are: Don't Waste Michigan; Citizens for Alternatives to Chemical Contamination; Public Citizen, Inc.; San Luis Obispo Mothers for Peace; Nuclear Energy Information Service; Citizens' Environmental Coalition; and Nuclear Issues Study Group.

<sup>69</sup> Joint Pet'rs Pet., Decl. of Petuuche Gilbert. The Declaration of Petuuche Gilbert asserts that he is a member of Public Citizen, Inc. who lives in Pueblo of Acoma, New Mexico. *Id.*, Decl. of Leona Morgan. The declaration of Leona Morgan asserts that she is a member of the Nuclear Issues Study Group who lives in Albuquerque, New Mexico.

<sup>70</sup> *U.S. Department of Energy* (Plutonium Export License), CLI-04-17, 59 NRC 357, 364 n.11 (2004) (quoting *Diablo Canyon ISFSI*, LBP-02-23, 56 NRC at 434). *See also EnergySolutions, LLC* (Radioactive Waste Import/Export Licenses), CLI-11-3, 73 NRC 613, 623 (2011) (denying petitioners' standing claim for failing to show there would be any impact from the transport of radioactive materials to be imported).

<sup>71</sup> *See, e.g., Diablo Canyon ISFSI*, LBP-02-23, 56 NRC at 433-34; *Pathfinder*, LBP-90-3, 31 NRC at 43-44 (denying standing to petitioner who resided one mile from a likely transportation route and merely claimed that an accident along that route would cause an increased radiological dose); *accord Exxon Nuclear Co., Inc.* (Nuclear Fuel Recovery and Recycling Center), LBP-77-59, 6 NRC 518, 520 (1977) (finding that assertion of injury from spent fuel that would travel on railway track very near property was insufficient to establish standing).

have regularly declined to find that a mere increase in the traffic of radioactive materials near a petitioner's residence, without more, constitutes an injury traceable to a licensing decision "that primarily affects a site hundreds of miles away."<sup>72</sup>

Although Joint Petitioners cite one licensing board decision for the proposition that standing may be based on proximity to transportation routes,<sup>73</sup> we decline to follow it. In our view, either the result in *Duke Cogema* was influenced by what that Board characterized as the "unique circumstances"<sup>74</sup> surrounding transportation of mixed oxide fuel or, alternatively, the decision is simply an outlier that failed to anticipate the position of the Commission as expressed in later cases.<sup>75</sup> Regardless, it is not binding on this Board.

Moreover, other licensing boards have rejected petitioners' standing claims because the mere fact that additional radioactive waste will be transported if the NRC licenses a project "does not *ipso facto* establish that there is a reasonable opportunity for an accident to occur at [any location], or for the radioactive materials to escape because of accident or the nature of the substance being transported."<sup>76</sup> Here, although Joint Petitioners try to predict future transportation routes,<sup>77</sup> Holtec's proposed facility as yet has no customers, and the routes by which spent fuel might travel to Lea County, New Mexico from nuclear power plants around the country have not yet been established.<sup>78</sup> Joint Petitioners' standing claims are therefore even more speculative than the rejected claims of petitioners who could at least show a reasonable probability that the transportation routes they lived near would actually be used.<sup>79</sup>

None of the Joint Petitioners has demonstrated standing. Moreover, because Joint Petitioners have not proffered an admissible contention, as discussed *infra*, their request for an evidentiary hearing must be denied on that ground as well.

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<sup>72</sup> *International Uranium (USA) Corp.* (White Mesa Uranium Mill), CLI-01-18, 54 NRC 27, 32 (2001).

<sup>73</sup> See *Duke Cogema Stone & Webster* (Savannah River Mixed Oxide Fuel Fabrication Facility), LBP-01-35, 54 NRC 403 (2001), *rev'd in part on other grounds*, CLI-02-24, 56 NRC 335 (2002).

<sup>74</sup> *Id.* at 417.

<sup>75</sup> See *supra* note 70.

<sup>76</sup> *Pathfinder*, LBP-90-3, 31 NRC at 43.

<sup>77</sup> Joint Pet'rs Pet. at 11-13.

<sup>78</sup> Holtec Answer to Joint Pet'rs at 20.

<sup>79</sup> Cf. *International Uranium (USA) Corp.* (White Mesa Uranium Mill), LBP-01-8, 53 NRC 204, *aff'd*, CLI-01-18, 54 NRC 27 (2001) (denying standing where petitioner resided merely one block from route over which applicant proposed to transport radioactive materials); *Pathfinder*, LBP-90-3, 31 NRC at 43-44 (denying standing to petitioner who resided one mile from transportation route established with "reasonable likelihood").



#### D. Fasken

As set forth in the Declarations of Tommy E. Taylor,<sup>80</sup> Mr. Taylor is Vice President of Fasken Management, LLC, which is the general partner of Fasken Land and Minerals, Ltd.<sup>81</sup> Fasken is a member of the Permian Basin Land and Royalty Organization, which is an association of oil and gas producers and royalty owners formed specifically in response to Holtec's proposed facility.<sup>82</sup>

As stated in Mr. Taylor's initial Declaration, Fasken owns and/or leases property related to its oil and gas activities that is approximately two miles from the proposed Holtec site.<sup>83</sup> Although Mr. Taylor's initial Declaration focused on Fasken's economic interests, his supplemental Declaration clarified that he and other Fasken employees "routinely" go to this area for work-related purposes, such as checking on oil and gas production equipment, regular inspection and maintenance, and repairs as needed.<sup>84</sup> Accordingly, he is "concerned that the close proximity of Fasken's oil and gas properties and the necessity for Fasken's employees and myself to regularly attend to such will expose them and myself to radiation from the proposed [CISF]."<sup>85</sup>

Although Mr. Taylor and other Fasken employees do not live two miles from the Holtec site, we conclude that the extreme closeness of the Fasken site, coupled with a reasonable expectation of regular visits for work-related activities, are sufficient to justify a presumption of standing. In *Millstone*, by way of comparison, that licensing board found standing based on part-time residence, even though the part-time residence was five times as distant (10 miles) from the storage facility, and the facility itself was a small fraction of the size to which Holtec hopes its facility will grow.<sup>86</sup>

Fasken has demonstrated standing. However, as discussed *infra*, because

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<sup>80</sup> Mr. Taylor executed his initial Declaration on September 14, 2018. He executed a Supplemental Declaration on December 10, 2018, which was submitted with a motion of the same date, seeking permission to file it. The Commission allows a petitioner "some latitude to supplement or cure a standing showing in its reply pleading [so long as] any additional arguments [are] supported by . . . a supplemental affidavit." *Strata Energy, Inc.* (Ross In Situ Recovery Uranium Project), LBP-12-3, 75 NRC 164, 186 (2012) (citing *South Carolina Electric & Gas Co. and South Carolina Public Service Authority* (Virgil C. Summer Nuclear Station, Units 2 and 3), CLI-10-1, 71 NRC 1, 7 (2010)). Accordingly, the Board grants the motion and accepts Mr. Taylor's Supplemental Declaration.

<sup>81</sup> Motion for Permission to File Supplemental Standing Declaration of Tommy E. Taylor, Suppl. Decl. of Tommy Taylor ¶ 1 (Dec. 10, 2018) [hereinafter Suppl. Decl. of Tommy Taylor].

<sup>82</sup> See Fasken Motion to Dismiss, Decl. of Tommy Taylor ¶ 3 (Sept. 14, 2018).

<sup>83</sup> Suppl. Decl. of Tommy Taylor ¶ 3.

<sup>84</sup> *Id.* ¶ 4.

<sup>85</sup> *Id.* ¶ 5.

<sup>86</sup> *Millstone*, LBP-00-2, 51 NRC at 27-28.

Fasken has not proffered any contention of its own, much less an admissible contention, its request for an evidentiary hearing must nonetheless be denied.

#### E. AFES

AFES describes itself as an environmental group whose members are principally located in the area of Holtec's proposed storage facility.<sup>87</sup> It states that its members are working to oppose "the small group of economic elites ('the one percent'), who have gone unchallenged, as they seek to impose their personal economic agendas on the backs of the economically vulnerable people of Southern New Mexico."<sup>88</sup> Of especial relevance, AFES is "concerned about environmental and health issues related to oil, gas, uranium mining, radioactive waste transportation, disposal or storage and nuclear enrichment and processing."<sup>89</sup>

AFES submitted affidavits from four members, the closest of whom lives 35 miles from the proposed facility.<sup>90</sup> One member has worked for the past six months for an employer located 10 miles from the site, although it is unclear how much time she spends there, as she describes her job as including "driving around much of Eddy and Lea County."<sup>91</sup> All four members state that, on a regular basis, they use the main road between Hobbs and Carlsbad (US 62-180, which passes 0.52 miles from the Holtec site).<sup>92</sup>

We question whether these contacts are sufficient to establish standing. Although 35 miles is within the 50-mile proximity presumption that applies to licensing reactors, it is nearly twice the distance that any licensing board has found sufficient to support standing in a spent fuel storage case.<sup>93</sup> Having an employer located 10 miles from the site does suggest some similarity to the facts in *Millstone*, where a part-time residence at that distance from a storage facility was found sufficient.<sup>94</sup> However, the record suggests that the pertinent AFES member might not actually spend her work day at that location and does

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<sup>87</sup> AFES Pet. at 1.

<sup>88</sup> *Id.* at 2.

<sup>89</sup> *Id.*

<sup>90</sup> See AFES Pet., Ex. 5, Aff. of Nicholas R. Maxwell ¶5 (Sept. 12, 2018) [hereinafter Aff. of Nicholas R. Maxwell].

<sup>91</sup> *Id.*, Ex. 3, Aff. of Lorraine Villegas ¶6 (Sept. 12, 2018) [hereinafter Aff. of Lorraine Villegas].

<sup>92</sup> Aff. of Nicholas R. Maxwell ¶6; Aff. of Lorraine Villegas ¶7; AFES Pet., Ex. 2, Aff. of Roase Gardner ¶9 (Sept. 12, 2018); *id.*, Ex. 4, Aff. of Noel V. Marquez ¶9 (Sept. 12, 2018).

<sup>93</sup> See *Diablo Canyon ISFSI*, LBP-02-23, 56 NRC at 428-29 (ruling 17 miles sufficient for standing).

<sup>94</sup> See *Millstone*, LBP-00-2, 51 NRC at 27-28.

not reflect for how long she expects her six-month employment to continue.<sup>95</sup> Finally, we do not find that necessarily fleeting contacts with land near the proposed facility by using a highway that passes a half mile away are sufficient to qualify.

On the other hand, the proposed Holtec facility is envisioned as potentially much larger than any previous spent fuel storage facility. In this uncharted area, we are reluctant to rule unnecessarily on what geographic distance might or might not be sufficient for a presumption of standing. Because AFES plainly has not submitted an admissible contention, as discussed *infra*, we deny its request for an evidentiary hearing on that ground alone and make no determination of its standing.

#### F. NAC

NAC describes itself as a “leading nuclear fuel cycle technology company that provides storage systems for [spent nuclear fuel].”<sup>96</sup> According to NAC, much of the design information for its canisters is proprietary, and because NAC has not licensed or authorized anyone to furnish its proprietary design information to Holtec this information is not available to Holtec.<sup>97</sup>

NAC therefore claims that it will be harmed if NAC’s canisters are placed in Holtec’s storage facility. Specifically, NAC claims that, lacking NAC’s proprietary information, Holtec would be unable to adequately evaluate or respond to events that affect NAC canisters stored in Holtec’s facility.<sup>98</sup> As a result, NAC alleges, it would likely (1) be urged to provide its proprietary information to Holtec; (2) be harmed in its reputation for safety and reliability; (3) be subject to harm to its proprietary interest in its own NRC Certificates of Compliance for spent fuel storage systems approved under Part 72; and/or (4) be subject to third-party claims of financial responsibility.<sup>99</sup>

NAC claims standing on the basis of these alleged injuries. Alternatively, NAC asks the Board to grant it discretionary intervention under 10 C.F.R. § 2.309(e).

The difficulty with NAC’s standing claim is that it has nothing at stake at the present time. Holtec’s present application, if granted, would not allow storage of NAC canisters at the proposed facility. On the contrary, the application’s proposed License Condition 9 would authorize storage only in casks designated in

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<sup>95</sup> Aff. of Lorraine Villegas ¶ 6.

<sup>96</sup> NAC Pet. at 4.

<sup>97</sup> *Id.*

<sup>98</sup> *See id.*

<sup>99</sup> *Id.* at 5.

accordance with the Certificate of Compliance for Holtec's HI-STORM UMAX storage system.<sup>100</sup> That Certificate, in turn, only allows storage of two specific types of Holtec canisters — not NAC's or anyone else's canisters.<sup>101</sup>

When and if, at some future time, Holtec wants NRC authorization to store NAC canisters at Holtec's facility, then both Holtec's Certificate of Compliance and facility license would need to be amended, and NAC could seek to participate in proceedings concerning those amendments. NAC's counsel creatively posits various reasons why NAC might find those alternatives less satisfactory,<sup>102</sup> but the unavoidable reality is that NAC has not suffered and cannot suffer any injury that entitles it to standing in the present proceeding.

NAC has not demonstrated standing. Moreover, because NAC has not proffered an admissible contention, as discussed *infra*, its request for an evidentiary hearing must be denied on that ground as well.

For similar reasons, the Board denies NAC's alternative request for discretionary intervention. NAC's further participation would significantly and improperly broaden the scope of this proceeding, contrary to 10 C.F.R. § 2.309(e)(2), because NAC seeks to address concerns that will not be affected by whether or not the NRC grants the license Holtec is seeking.

### III. CONTENTION ADMISSIBILITY STANDARDS

#### A. Legal Standards Governing Contention Admissibility

For its hearing request to be granted, in addition to demonstrating standing, a petitioner must proffer at least one admissible contention.<sup>103</sup>

An admissible contention must: (1) state the specific legal or factual issue to be raised or controverted; (2) provide a brief explanation for the basis of the contention; (3) demonstrate that the issue raised in the contention is within the scope of the proceeding; (4) demonstrate that the issue raised in the contention is material to the findings the NRC must make to support the action that is involved in the proceeding; (5) concisely state the alleged facts or expert opinions that support the petitioner's position and on which the petitioner intends to rely at an evidentiary hearing, including references to the specific sources and documents on which the petitioner intends to rely; and (6) show that a genuine dispute

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<sup>100</sup> See Proposed License for Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste (ADAMS Accession No. ML17310A223) [hereinafter Holtec Proposed License].

<sup>101</sup> See HI-STORM UMAX Certificate of Compliance No. 1040, Appendix B, Amend. No. 2, Approved Contents and Design Features for the HI-STORM UMAX Canister Storage System (ADAMS Accession No. ML16341B107).

<sup>102</sup> Tr. at 179-209.

<sup>103</sup> 10 C.F.R. § 2.309(a).

exists on a material issue of law or fact by referring to specific portions of the application that the petitioner disputes or, if the application is alleged to be deficient, by identifying such deficiencies and the supporting reasons for this allegation.<sup>104</sup>

A further requirement applies to several contentions addressed *infra*. No NRC rule or regulation may be challenged in a contention unless the petitioner seeks and obtains a waiver from the Commission in accordance with 10 C.F.R. § 2.335. No petitioner in this proceeding has sought such a waiver.

The contention admissibility rules are “strict by design.”<sup>105</sup> The Commission has observed that they “properly ‘reserve our hearing process for genuine, material controversies between knowledgeable litigants.’”<sup>106</sup> Failure to satisfy even one of the requirements requires the Board to reject the contention.<sup>107</sup>

This six-factor standard resulted from the Commission’s effort to “raise the threshold bar for an admissible contention.”<sup>108</sup> Previously, licensing boards would sometimes admit contentions “that appeared to be based on little more than speculation[,]” and petitioners would try to “unearth” admissible contentions “through cross-examination.”<sup>109</sup> Rather than expend agency time and resources on vague and unsupported claims,<sup>110</sup> the Commission strengthened the contention admissibility standards to what they are today — standards that afford evidentiary hearings only to those who “proffer at least some minimal factual and legal foundation in support of their contentions.”<sup>111</sup>

Therefore, although a petitioner need not prove its contention at this stage, mere notice pleading of proffered contentions is insufficient.<sup>112</sup> Rather, the NRC requires a petitioner to read the pertinent portions of the license application, including the Safety Analysis Report and the Environmental Report, state the

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<sup>104</sup> *Id.* § 2.309(f)(i)-(vi).

<sup>105</sup> *Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Units 2 and 3), CLI-01-24, 54 NRC 349, 358 (2001).

<sup>106</sup> *FirstEnergy Nuclear Operating Co.* (Davis-Besse Nuclear Power Station, Unit 1), CLI-12-8, 75 NRC 393, 396 (2012) (quoting *Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Unit 2), CLI-03-14, 58 NRC 207, 219 (2003)).

<sup>107</sup> See *Entergy Nuclear Operations, Inc.* (Indian Point, Unit 2), CLI-16-5, 83 NRC 131, 136 (2016).

<sup>108</sup> *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), CLI-99-11, 49 NRC 328, 334 (1999).

<sup>109</sup> *Id.*

<sup>110</sup> See Changes to the Adjudicatory Process, 69 Fed. Reg. 2182, 2202 (Jan. 14, 2004).

<sup>111</sup> *Oconee*, CLI-99-11, 49 NRC at 334.

<sup>112</sup> *Fansteel, Inc.* (Muskogee, Oklahoma Site), CLI-03-13, 58 NRC 195, 203 (2003).

applicant's position and the petitioner's opposing view, and explain why it disagrees with the applicant.<sup>113</sup>

## B. Late-Filed Contentions

As some petitioners have filed motions to either amend their contentions or file new contentions, an explanation of the rules for amended or late-filed contentions is necessary.<sup>114</sup>

Because the initial deadline for filing contentions was September 14, 2018,<sup>115</sup> petitioners seeking to amend their original contentions or proffer new ones after that date must meet the "good cause" standard in 10 C.F.R. § 2.309(c)(1).<sup>116</sup> "Good cause" exists if the petitioner can show (1) the information upon which the amended or new contention is based was not previously available; (2) the information upon which the filing is based is materially different from information previously available;<sup>117</sup> and (3) the filing has been submitted in a timely fashion based on the availability of the subsequent information.<sup>118</sup> Previously available information that is newly acquired by the petitioner does not constitute good cause,<sup>119</sup> as "new and amended contentions must be *based on new facts* not previously available."<sup>120</sup>

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<sup>113</sup> Rules of Practice for Domestic Licensing Proceedings — Procedural Changes in the Hearing Process, 54 Fed. Reg. 33,168, 33,170-71 (Aug. 11, 1989).

<sup>114</sup> Motion by [Joint Petitioners] to File a New Contention (Jan. 17, 2019); Sierra Club's Motion to File a New Late-Filed Contention (Jan. 17, 2019); Motion of [Joint Petitioners] to Amend Their Contentions 4 and 7 Regarding Holtec's Decision to Have No Dry Transfer System Capability and Holtec's Policy of Returning Leaking, Externally Contaminated or Defective Casks and/or Canisters to Originating Reactor Sites (Feb. 18, 2019) [hereinafter Joint Pet'rs Motion to Amend Contentions 4 & 7]; Sierra Club's Additional Contentions in Support of Petition to Intervene and Request for Adjudicatory Hearing (Feb. 25, 2019) [hereinafter Sierra Club Contentions 27, 28, 29]; Sierra Club's Motion to File New Late-Filed Contentions 27, 28, and 29 (Feb. 25, 2019) [hereinafter Sierra Club's Motion to File New Late-Filed Contentions 27, 28, and 29].

<sup>115</sup> See Notice of Opportunity to Request a Hearing, 83 Fed. Reg. at 32,919.

<sup>116</sup> See 10 C.F.R. § 2.309(b); see also *id.* § 2.309(f)(2).

<sup>117</sup> "Materially different" in this context concerns the "type or degree of difference between the new information and previously available information." *Florida Power & Light Co.* (Turkey Point Units 6 and 7), LBP-17-6, 86 NRC 37, 48, *aff'd*, CLI-17-12, 86 NRC 215 (2017).

<sup>118</sup> 10 C.F.R. § 2.309(c)(1). See also *Shaw AREVA MOX Services* (Mixed Oxide Fuel Fabrication Facility), LBP-08-11, 67 NRC 460, 493 (2008) (observing that many licensing boards have found 30 days from a triggering event for proffering a new or amended contention to be timely).

<sup>119</sup> *Kansas Gas & Electric Co.* (Wolf Creek Generating Station, Unit 1), LBP-84-17, 19 NRC 878, 886 (1984).

<sup>120</sup> *Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-12-10, 75 NRC 479, 493 n.70 (2012) (emphasis in original).

### C. NEPA Legal Standards

NEPA mandates that federal agencies prepare an environmental impact statement (EIS) before undertaking any “major Federal actions significantly affecting the quality of the human environment.”<sup>121</sup> The preparation of an EIS is meant to ensure that federal agencies “will not act on incomplete information, only to regret [their] decision after it is too late to correct.”<sup>122</sup> NEPA requires agencies to take a “hard look at environmental consequences” of the proposed action,<sup>123</sup> and imposes a duty upon the agency to both “consider every significant aspect of the environmental impact of a proposed action” and “inform the public” of its analysis and conclusion.<sup>124</sup>

NEPA’s “hard look” mandate notwithstanding, the agency is not obligated to analyze every conceivable aspect of the project before it.<sup>125</sup> Instead, this “hard look” is subject to a “rule of reason,”<sup>126</sup> meaning that the agency need not perform analyses concerning events that would be considered “worst case” scenarios involving the project,<sup>127</sup> or those considered “remote and highly speculative.”<sup>128</sup> NEPA does not necessitate “certainty or precision” nor does it mandate particular results from the agency.<sup>129</sup> Rather, NEPA requires “an *estimate* of anticipated (not unduly speculative) impacts” from the agency.<sup>130</sup> The statutory obligations seek to “guarantee process, not specific outcomes.”<sup>131</sup>

At this stage of the proceeding, the NRC Staff has not issued an EIS for the proposed Holtec facility. NRC regulations nonetheless require petitioners to file environmental contentions “based on documents or other information at the time the petition is to be filed,” i.e., the applicant’s Environmental Report.<sup>132</sup> Although it is the NRC Staff’s responsibility to comply with NEPA in its later-

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<sup>121</sup> See 42 U.S.C. § 4332(2)(C); see also *Nat. Res. Def. Council v. NRC*, 823 F.3d 641, 643 (D.C. Cir. 2016).

<sup>122</sup> *Marsh v. Or. Nat. Res. Council*, 490 U.S. 360, 371 (1989).

<sup>123</sup> *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989) (quoting *Kleppe v. Sierra Club*, 427 U.S. 390, 410 n.21 (1976)).

<sup>124</sup> *Balt. Gas & Elec. Co. v. Nat. Res. Def. Council, Inc.*, 462 U.S. 87, 97, 103 (1983) (quoting *Vermont Yankee Nuclear Power Corp. v. Nat. Res. Def. Council*, 435 U.S. 519, 553 (1978)).

<sup>125</sup> *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-02-25, 56 NRC 340, 349 (2002).

<sup>126</sup> *Nat. Res. Def. Council v. Morton*, 458 F.2d 827, 834 (D.C. Cir. 1972).

<sup>127</sup> *Private Fuel Storage, L.L.C.*, CLI-02-25, 56 NRC at 352.

<sup>128</sup> *Limerick Ecology Action, Inc. v. NRC*, 869 F.2d 719, 754-55 (3d Cir. 1989).

<sup>129</sup> *Louisiana Energy Services, L.P.* (National Enrichment Facility), CLI-05-20, 62 NRC 523, 536 (2005).

<sup>130</sup> *Id.* (emphasis in original).

<sup>131</sup> *Massachusetts v. NRC*, 708 F.3d 63, 67 (1st Cir. 2013).

<sup>132</sup> 10 C.F.R. § 2.309(f)(2). See also *Powertech (USA), Inc.* (Dewey-Burdock In Situ Uranium Recovery Facility), CLI-16-20, 84 NRC 219, 231 (2016).

issued EIS,<sup>133</sup> we analyze contentions challenging the Environmental Report now as if those contentions will migrate as challenges to the Staff's later-issued EIS.<sup>134</sup>

#### IV. CONTENTION ANALYSIS

##### A. Beyond Nuclear

Understanding Beyond Nuclear's sole contention (as well as some of the contentions proffered by other petitioners<sup>135</sup>) requires further explanation of the statutory scheme that was established by the NWPAA. As discussed *supra*, Congress contemplated that DOE would build a national nuclear waste repository, but that the nuclear power companies would help pay for it. Under section 302 of the NWPAA, power reactor licensees were required to pay into a Nuclear Waste Fund for construction of the repository.<sup>136</sup> In exchange, section 302(a)(5)(B) committed DOE to begin disposing of the nuclear power plants' spent fuel no later than January 31, 1998. When a permanent repository failed to materialize, the power plant licensees sued and began to recover from the federal government substantial damages to cover the cost of continuing to store spent fuel at their reactor sites.<sup>137</sup> Contract damage lawsuits under the NWPAA are now commonplace, and the federal government pays out damages to power reactor licensees on a regular basis.<sup>138</sup>

Thus, both DOE and the nuclear power plant owners potentially have an interest in contracting to use Holtec's proposed interim storage facility. DOE might want to take responsibility for the nuclear plants' spent fuel, pay Holtec to store it, and stop paying out damages. The nuclear plant owners, on the other hand, might be willing to apply their ongoing damage payments toward paying Holtec to store their spent fuel, so that it would be off their sites and no longer their responsibility to keep secure. Because the NWPAA was drafted on the assumption that DOE would not accept title to spent nuclear fuel until

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<sup>133</sup> 42 U.S.C. §§ 4321 *et seq.*

<sup>134</sup> See *Powertech*, CLI-16-20, 84 NRC at 231; see also *Crow Butte Resources, Inc.* (In Situ Leach Facility, Crawford, Nebraska), CLI-15-17, 82 NRC 33, 42 n.58 (2015) (“[A] contention ‘migrates’ when a licensing board construes a contention challenging [an Environmental Report] . . . as a challenge to a subsequently issued Staff NEPA document without the petitioner amending the contention.”).

<sup>135</sup> See, e.g., Sierra Club Contention 1 and Joint Petitioners Contention 2, discussed *infra*.

<sup>136</sup> 42 U.S.C. § 10222.

<sup>137</sup> See, e.g., *Nat'l Ass'n of Regulatory Util. Comm'rs v. U.S. Dep't of Energy*, 736 F.3d 517, 520 (D.C. Cir. 2013); *Me. Yankee Atomic Power Co. v. United States*, 225 F.3d 1336, 1341-42 (Fed. Cir. 2000); *Ind. Mich. Power Co. v. U.S. Dep't of Energy*, 88 F.3d 1272, 1276-77 (D.C. Cir. 1996).

<sup>138</sup> See, e.g., *Nat'l Ass'n of Regulatory Util. Comm'rs*, 736 F.3d at 520.



a permanent repository becomes operational, however, it appears (as discussed *infra*) that in general only the second possibility would be consistent with the terms of the statute.

Beyond Nuclear's contention, as originally proffered in its hearing petition, therefore stated:

The NRC must dismiss Holtec's license application and terminate this proceeding because the application violates the NWPA. The proceeding must be dismissed because the central premise of Holtec's application — that the U.S. Department of Energy ("DOE") will be responsible for the spent fuel that is transported to and stored at the proposed interim facilities — violates the NWPA. Under the NWPA, the DOE is precluded from taking title to spent fuel unless and until a permanent repository has opened. 42 U.S.C. §§ 10222(a)(5)(A), 10143.<sup>139</sup>

In other words, initially Beyond Nuclear assumed that the "central premise" of Holtec's application was that Holtec would contract with DOE to store nuclear power companies' spent fuel. This would be unlawful under the NWPA, Beyond Nuclear contended.

After Holtec conceded that (with limited exceptions) such contracts would indeed be unlawful at the present time,<sup>140</sup> Beyond Nuclear moved to amend its contention to add the following statement:

Language in Rev. 3 of Holtec's Environmental Report, which presents federal ownership as a possible alternative to private ownership of spent fuel, does not render the application lawful. As long as the federal government is listed as a potential owner of the spent fuel, the application violates the NWPA.<sup>141</sup>

As discussed *infra*, the Board grants Beyond Nuclear's motion to amend its contention, in order to allege that even presenting federal ownership as a possible alternative to private ownership of spent fuel violates the NWPA.

As events have unfolded, therefore, Beyond Nuclear's contention now raises this fundamental question: May the NRC license Holtec's storage facility to enter into lawful contracts with potential customers, including those that may later become lawful? Or, if Congress were to expand the category of lawful contracts (specifically, to include most contracts with DOE), would it be necessary (as Beyond Nuclear claims) for Holtec to re-submit its license application

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<sup>139</sup> Beyond Nuclear Pet. at 10.

<sup>140</sup> Tr. at 250-52.

<sup>141</sup> Motion by Petitioners Beyond Nuclear and Fasken to Amend Their Contentions Regarding Federal Ownership of Spent Fuel to Address [Holtec's] Revised License Application (Feb. 6, 2019) at 8 [hereinafter Beyond Nuclear and Fasken Motion to Amend].

and for the NRC to re-notice a new opportunity for a hearing?<sup>142</sup> We conclude that, to implement the will of Congress in such circumstances, the NRC need not require Holtec to begin the licensing process all over again.

As explained *supra*, initially Beyond Nuclear filed with the Commission a motion to dismiss the Holtec licensing proceeding as violating the NWPAs.<sup>143</sup> At the same time, out of an abundance of caution, Beyond Nuclear also filed essentially the same claim in the form of a hearing request and contention.<sup>144</sup> The Secretary of the Commission denied Beyond Nuclear's motion to dismiss on procedural grounds, without prejudice to its underlying arguments, and directed that the matter should proceed before a licensing board on the basis of Beyond Nuclear's hearing petition.<sup>145</sup>

In support of its contention, Beyond Nuclear incorporated by reference portions of its motion to dismiss.<sup>146</sup> Beyond Nuclear identified language in Holtec's Environmental Report that said Holtec would enter into a contract with DOE by which DOE will take title to spent fuel and be responsible for transporting it to the site.<sup>147</sup> It also identified language in Holtec's Safety Analysis Report that said Holtec might *either* contract with DOE or with nuclear plant owners themselves, leading to an inconsistency in the application documents.<sup>148</sup>

Beyond Nuclear contended that the first scenario (that is, Holtec's contracting with DOE) would be unlawful under the NWPAs. As Beyond Nuclear pointed out, the NWPAs provides that until a permanent waste repository (such as Yucca Mountain) opens, "the generators and owners of high-level radioactive waste and spent nuclear fuel have the primary responsibility to provide for, and the responsibility to pay the costs of, the interim storage of such waste and spent fuel."<sup>149</sup> For this reason, Beyond Nuclear argued, the NWPAs states that DOE will take title to spent fuel only "following commencement of operation of a repository."<sup>150</sup> It is undisputed that no such repository has been licensed or constructed, much less become operational.

The NRC Staff agreed that Beyond Nuclear's contention should be admitted to the extent it challenged the inconsistency between Holtec's Environmental

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<sup>142</sup> See *id.* at 11 n.5.

<sup>143</sup> Beyond Nuclear Motion to Dismiss at 1.

<sup>144</sup> Beyond Nuclear Pet.

<sup>145</sup> Order Denying Motions to Dismiss at 2.

<sup>146</sup> Beyond Nuclear Pet. at 10.

<sup>147</sup> Beyond Nuclear Motion to Dismiss at 16 (citing ER, rev. 0 at 1-1, 3-104).

<sup>148</sup> *Id.* at 16 n.4 (emphasis added).

<sup>149</sup> 42 U.S.C. § 10131.

<sup>150</sup> *Id.* § 10222(a)(5)(A). See also *id.* § 10143 ("Delivery, and acceptance by the Secretary [of Energy], of any high-level radioactive waste or spent nuclear fuel *for a repository* . . . shall constitute a transfer to the Secretary of title to such waste or spent fuel.") (emphasis added).

Report and its Safety Analysis Report.<sup>151</sup> The Staff, however, deemed it “premature to take a position on how the applicant will address the inconsistency.”<sup>152</sup>

Holtec, for its part, contended that the inconsistencies were a mistake, that its actual intent is to contract either with DOE or with nuclear plant owners, and that the inconsistencies were “in the process of being revised to eliminate any confusion.”<sup>153</sup> Holtec also suggested it “worth noting that Petitioner’s claims of current NWPAs restrictions may well be superseded by Congress.”<sup>154</sup> But Holtec did not initially concede in its response that contracting for DOE to take title to nuclear power companies’ spent fuel would necessarily be unlawful under the NWPAs as currently in effect.

The Board, therefore, was inclined to agree with the NRC Staff that Beyond Nuclear’s contention was admissible, but to admit it as a legal issue contention for a broader purpose: that is, to determine whether or not Holtec could lawfully contract directly with DOE to take title to power companies’ spent nuclear fuel. At the very least, the Board tentatively concluded, Beyond Nuclear had set forth a plausible case that Holtec could not lawfully elect this option, consistent with the NWPAs.<sup>155</sup>

At oral argument, however, Holtec’s counsel conceded that, with very limited exceptions, it would violate the NWPAs as currently in effect for DOE to take title to nuclear plant owners’ spent fuel. He stated:

I will agree with you that, on their current legislation, DOE cannot take title to spent nuclear fuel from commercial nuclear power plants, under the current statement of facts, but that could change, depending on what Congress does.<sup>156</sup>

Holtec’s counsel committed, however, that Holtec has no intention of contracting with DOE to accept most nuclear power plants’ spent fuel unless and

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<sup>151</sup> NRC Staff Consol. Answer at 66.

<sup>152</sup> *Id.* at 66 n.296.

<sup>153</sup> Holtec Answer to Beyond Nuclear at 20.

<sup>154</sup> *Id.* at 21 (citing proposed but unenacted amendments to the NWPAs).

<sup>155</sup> A contention may state an “issue of law or fact.” 10 C.F.R. § 2.309(f)(1)(i). As should be obvious, a legal issue contention need not necessarily address every requirement of section 2.309(f)(1), such as the requirement to provide “a concise statement of the alleged facts or expert opinions which support the requestor’s/petitioner’s position on the issue.” *Id.* § 2.309(f)(1)(v). See *U.S. Department of Energy* (High-Level Waste Repository), CLI-09-14, 69 NRC 580, 588-91 (2009) (“We agree, for example, with the Boards’ view in this proceeding that requiring a petitioner to allege ‘facts’ under section 2.309(f)(1)(v) or to provide an affidavit that sets out the ‘factual and/or technical bases’ under section 51.109(a)(2) in support of a *legal* contention — as opposed to a *factual* contention — is not necessary.”).

<sup>156</sup> Tr. at 250. See also Tr. at 251-52.

until Congress amends the NWPAs to make that lawful.<sup>157</sup> Meanwhile, Holtec represented, it has every intention of proceeding with the project on the assumption it will contract directly with the nuclear plant owners themselves.<sup>158</sup> Finally, Holtec has, in fact, revised its Environmental Report to say that the proposed facility's customers could be either DOE or the nuclear power plant owners.<sup>159</sup>

In the aftermath of these developments, Beyond Nuclear moved to amend its contention to add the statement set forth above. In essence, Beyond Nuclear now claims that reference to the mere possibility of contracting directly with DOE must be expunged from Holtec's application — regardless of Holtec's intentions and regardless of whether Congress might amend the NWPAs.

Because Beyond Nuclear seeks to amend its contention after the deadline for filing petitions, we must first consider whether its motion to file the contention satisfies the three-prong test in 10 C.F.R. § 2.309(c)(1)(i)-(iii). Although Holtec argues to the contrary,<sup>160</sup> we conclude that it does. Holtec's revised Environmental Report (Rev. 3) was not available until January 17, 2019. Its revised Environmental Report is materially different from Holtec's original license application because it replaces unequivocal language regarding DOE ownership of spent fuel with language stating that either DOE or private entities will own the spent fuel. Beyond Nuclear's motion to amend was timely filed less than three weeks after the availability of Holtec's revised Report — well within the 30 days in which licensing boards have generally allowed petitioners to respond to new information.<sup>161</sup> We therefore grant Beyond Nuclear's motion to amend.

Turning to the amended contention itself, however, we conclude that Beyond Nuclear no longer identifies a genuine dispute with Holtec's license application. The inconsistency between Holtec's Environmental Report and its Safety Analysis Report has been fixed: Holtec's application now consistently says that its customers will be either DOE or the nuclear power plant owners. As Holtec's proposed License Condition 17 states, it will undertake construction only after it has established "a definitive agreement with the prospective user/payer for storing the used fuel (USDOE and/or a nuclear plant owner)."<sup>162</sup> At the same time, Beyond Nuclear, Holtec, and this Board all agree that, with limited excep-

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<sup>157</sup> Tr. at 248.

<sup>158</sup> *Id.*

<sup>159</sup> See ER at 3-117.

<sup>160</sup> Holtec Opposition to Beyond Nuclear and Fasken Motion to Amend Their Contentions Regarding Federal Ownership of Spent Fuel to Address [Holtec's] Revised License Application (Feb. 19, 2019) at 2-6 [hereinafter Holtec Opposition to Beyond Nuclear and Fasken Motion]. The NRC Staff response addresses the admissibility of the amended contention without considering its timeliness. See NRC Staff Answer to Beyond Nuclear and Fasken Motion.

<sup>161</sup> See *Shaw AREVA MOX Servs.*, LBP-08-11, 67 NRC at 493.

<sup>162</sup> Holtec Proposed License at 2.

tions, DOE may not lawfully take title to spent nuclear waste under the NWPA as currently in effect.<sup>163</sup>

Beyond Nuclear claims that the mere mention of DOE renders Holtec's license application unlawful. But that is not so. First, DOE does, in fact, already hold title to a relatively small amount of spent nuclear fuel from commercial reactors that could lawfully be stored at Holtec's facility in the future without violating the NWPA.<sup>164</sup> Second, the Board assumes Holtec will honor its commitment not to contract unlawfully with DOE to store any other spent nuclear fuel (that is, the vast majority of spent fuel from commercial reactors, which is currently owned by the nuclear power companies). Likewise, we assume DOE would not be complicit in any such unlawful contracts.

Holtec represents that it is committed to going forward with the project by contracting directly with nuclear plant owners that currently hold title to their spent fuel.<sup>165</sup> Whether Holtec will find that alternative commercially viable is not an issue before the Board, because the business decision of whether to use a license has no bearing on a licensee's ability to safely conduct the activities the license authorizes. As the Commission instructs us, "the NRC is not in the business of regulating the market strategies of licensees or determining whether market strategies warrant commencing operations."<sup>166</sup>

Holtec readily acknowledges that it hopes Congress will change the law and allow it in most instances to contract directly with DOE to store spent nuclear fuel.<sup>167</sup> Meanwhile, we assume that Holtec — having acknowledged on the record that (with limited exceptions) it would be unlawful to contract with DOE under the NWPA as currently in effect — will not try to do just that. Nor

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<sup>163</sup> Although Beyond Nuclear, Holtec, and the Board are all in agreement, the NRC Staff has not taken a position, despite having multiple opportunities to do so. *See* NRC Staff Answer to Beyond Nuclear and Fasken Motion. Accordingly, the Staff would find Beyond Nuclear's amended contention admissible "specifically as a challenge to whether the application may propose a license condition that includes the potential for DOE ownership of spent fuel to be stored at the Holtec facility." *Id.* at 2. The Staff cautions, however, that "in agreeing that the contention is admissible in part, the Staff takes no position on the underlying merits of the contention." *Id.* As best we can tell, the Staff would prefer the Board address the issue as a legal issue contention, precipitating yet another round of briefing and perhaps another oral argument. After thus far receiving well over a thousand pages of briefs and conducting two days of oral argument, the Board is prepared to address this legal issue in the context of deciding contention admissibility.

<sup>164</sup> Tr. at 237, 249-50.

<sup>165</sup> Tr. at 248.

<sup>166</sup> *Louisiana Energy Services* (National Enrichment Facility), CLI-05-28, 62 NRC 721, 726 (2005) (quoting *Hydro Resources, Inc.* (P.O. Box 15910, Rio Rancho, NM 87174), CLI-01-4, 53 NRC 31, 48-49 (2001)).

<sup>167</sup> Tr. at 248, 250.

may we assume that DOE would be complicit in a violation of the NWPA.<sup>168</sup> On the contrary, DOE has also taken the position publicly that it may not take title to most private plant companies' spent nuclear fuel without violating the NWPA as currently in effect.<sup>169</sup>

Neither the facts nor the law, therefore, remain in dispute. Holtec seeks a license that would allow it to enter into lawful customer contracts today, but also permit it to enter into additional customer contracts if and when they become lawful in the future. If Congress decides to amend the NWPA to allow DOE to take title to spent nuclear fuel before a national nuclear waste repository becomes operational, the only difference would be that DOE could then lawfully contract with Holtec to store the same spent fuel that presently belongs to the nuclear power plant owners. The NRC Staff assures us that it is reviewing Holtec's application in light of both possibilities: "[T]he Staff bases its safety and environmental reviews on the application as presented, which seeks a license on the basis that either DOE or private entities may hold title to the waste."<sup>170</sup>

We see no discernable purpose that would be served, in such circumstances, by requiring Holtec to file a new or amended license application for its storage facility or by the NRC entertaining a fresh opportunity to request a hearing. Beyond Nuclear correctly points out that the Administrative Procedure Act (APA) requires federal agencies to follow the law,<sup>171</sup> but we do not interpret either the APA or NWPA to require the NRC to perform a useless act.

Beyond Nuclear's contention, as amended, is not admitted.<sup>172</sup>

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<sup>168</sup> A presumption of regularity applies to federal agencies, which should be assumed to act properly in the absence of evidence to the contrary. *See, e.g., United States v. Armstrong*, 517 U.S. 456, 464 (1996); *United States v. Chem. Found., Inc.*, 272 U.S. 1, 14-15 (1926).

<sup>169</sup> *See, e.g.,* Final Interpretation of Nuclear Waste Acceptance Issues, 60 Fed. Reg. 21,793, 21,793-94, 21,797 (1995); *N. States Power Co. v. U.S. Dep't of Energy*, 128 F.3d 754, 756 (D.C. Cir. 1997) ("The Department also took the position that 'it lacks statutory authority under the Act to provide interim storage.'") (quoting 60 Fed. Reg. at 21,794); *Ind. Mich. Power Co. v. U.S. Dep't of Energy*, 88 F.3d 1272, 1274 (D.C. Cir. 1996) ("The [DOE] also determined that it had no authority under the NWPA to provide interim storage in the absence of a facility that has been authorized, constructed and licensed in accordance with the NWPA.").

<sup>170</sup> NRC Staff's Consolidated Response to [Joint Petitioner's] and Sierra Club's Motions to File New Contentions (Feb. 19, 2019) at 9 [hereinafter NRC Staff Response to Joint Pet'rs and Sierra Club Motions].

<sup>171</sup> Beyond Nuclear Motion to Dismiss at 12.

<sup>172</sup> Although Fasken purports to join in Beyond Nuclear's motion to amend, it may not properly do so. As explained *infra*, Fasken did not initially submit an admissible contention of its own, and its hearing request must therefore be denied. In any event, the procedural point is moot, because the Board rules that Beyond Nuclear's contention, as amended, is not admissible.

## **B. Sierra Club**

### **1. Sierra Club Contention 1**

Sierra Club's Contention 1 originally stated:

The NRC has no authority to license the Holtec CIS facility under the NWPA nor the AEA. Holtec has said that DOE must take title to the waste, but the NWPA does not authorize DOE to take title to spent fuel in an interim storage facility. The AEA has no provision for licensing a CISF.<sup>173</sup>

On the same day Beyond Nuclear moved to amend its contention, Sierra Club moved to amend Sierra Club Contention 1 to add exactly the same statement:

Language in Rev. 3 of Holtec's Environmental Report, which presents federal ownership as a possible alternative to private ownership of spent fuel, does not render the application lawful. As long as the federal government is listed as a potential owner of the spent fuel, the application violates the NWPA.<sup>174</sup>

Insofar as Sierra Club Contention 1 now asserts that reference to the mere possibility of contracting with DOE must be expunged from Holtec's application, it is substantially similar to Beyond Nuclear's amended contention, addressed *supra*. We therefore likewise grant Sierra Club's motion to amend Contention 1, but rule it is not admissible for the same reasons that Beyond Nuclear's amended contention is not admissible.

Insofar as Sierra Club Contention 1 also asserts that any away-from-reactor interim storage facility is necessarily unlawful under the AEA and/or the NWPA, it is not admissible for other reasons. NRC regulations expressly allow licensing of such facilities.<sup>175</sup> Therefore, this argument constitutes an impermissible challenge to NRC regulations that is precluded by 10 C.F.R. § 2.335. Moreover, the United States Court of Appeals for the District of Columbia Circuit has rejected this aspect of Sierra Club Contention 1 — ruling that the NRC has authority under the AEA to license such privately owned facilities, and that the NWPA did not repeal or supersede that authority.<sup>176</sup>

Sierra Club Contention 1, as amended, is not admitted.

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<sup>173</sup> Sierra Club Pet. at 10-11.

<sup>174</sup> Sierra Club's Motion to Amend Contention 1 (Feb. 6, 2019) at 11 [hereinafter Sierra Club Motion to Amend Contention 1].

<sup>175</sup> See generally 10 C.F.R. Part 72; see also *id.* §§ 72.32(a) & 72.46(d) (referring to requirements pertaining to interim storage facilities not co-located with a power plant).

<sup>176</sup> *Bullcreek v. NRC*, 359 F.3d 536, 538, 543 (D.C. Cir. 2004).

## 2. *Sierra Club Contention 2*

Sierra Club Contention 2 states:

The Holtec Environmental Report, in attempting to describe the purpose and need for this project, claims that [consolidated interim storage] is safer and more secure than storing the waste at the reactor site. However, the environmental report cites no evidence or data to support this assertion. An agency cannot rely on self-serving statements, especially ones with no supporting data, from the prime beneficiary of the project.<sup>177</sup>

Sierra Club relies on a 2003 report by Dr. Gordon Thompson, who is asserted to be an expert in technical and policy analyses in the fields of energy and environment.<sup>178</sup> According to Sierra Club, Dr. Thompson's report "documents the benefits of HOSS [hardened on-site storage]," and further claims that the "[Environmental Report] and subsequent EIS must examine the relative safety of HOSS at reactor sites."<sup>179</sup>

Although Sierra Club disputes one sentence, Holtec's Environmental Report's purpose and need statement lists multiple reasons to support licensing the proposed facility. For example, decommissioned plants may become greenfields rather than storage facilities, and utilities may eliminate costs and liability by relinquishing responsibility for spent fuel stored on-site.<sup>180</sup> Sierra Club only disputes the safety and security reason, and does not explain how Holtec's assertion of safety and security compromises the application in a material way.

Furthermore, as the NRC Staff points out,<sup>181</sup> Sierra Club fails to show that an analysis of HOSS at reactor sites is material to the environmental review required by NEPA or the Agency's corresponding regulations.

Sierra Club Contention 2 is not admitted.

## 3. *Sierra Club Contention 3*

Sierra Club Contention 3 states:

The statement in the [Environmental Report] that [consolidated interim storage] is safer and more secure than storage at a reactor site contradicts the NRC's

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<sup>177</sup> Sierra Club Pet. at 17.

<sup>178</sup> *Id.* at 19-20 (citing Gordon Thompson, Robust Storage of Spent Nuclear Fuel: A Neglected Issue of Homeland Security (2003)). For Dr. Thompson's credentials, see Sierra Club's Motion to Amend Contention 16, attach., Curriculum Vitae for Gordon R. Thompson (Feb. 18, 2019).

<sup>179</sup> Sierra Club Pet. at 19-20.

<sup>180</sup> ER at 1-6.

<sup>181</sup> NRC Staff Consol. Answer at 70.



Continued Storage Rule, which concludes that spent radioactive fuel can be safely stored at a reactor site indefinitely. Therefore, there is no basis for accepting the statement in the [Environmental Report], and there is no purpose and need for the Holtec project.<sup>182</sup>

Similar to Sierra Club Contention 2, this contention also challenges the “safer and more secure” language in the purpose and need section of Holtec’s Environmental Report. Here, Sierra Club disputes that there is a purpose or need for the proposed facility, because the NRC’s Continued Storage Rule and Continued Storage Generic EIS (GEIS) determined that at-reactor storage for an indefinite period would generally result in only “small” environmental impacts.<sup>183</sup> Sierra Club further alleges that the proposed facility would cause increased risks “due to the risks of transporting the waste to the [consolidated interim storage] site and the increased risk of so much waste being stored in one place.”<sup>184</sup> Finally, Sierra Club incorporates all of its allegations from Contention 2 in support of this contention.<sup>185</sup>

We agree with the NRC Staff<sup>186</sup> and Holtec<sup>187</sup> that Sierra Club fails to raise a genuine dispute with the application, because it does not show an actual contradiction between the Environmental Report and the Continued Storage Rule/GEIS. Although the Continued Storage GEIS did find that spent fuel may be stored on-site with minimal environmental impact, it did not endorse any particular storage method or perform any qualitative analysis of the safety benefits of at-reactor storage vs. away-from-reactor consolidated storage. It also found that any “additional accumulated impacts from transportation of the entire inventory of spent fuel from multiple reactors to an away-from-reactor ISFSI would be . . . minor.”<sup>188</sup>

Regarding Sierra Club’s assertion that there is no purpose and need “if spent fuel can be safely stored at the reactor site indefinitely,” Sierra Club does not dispute or even acknowledge the separate reasons for the proposed facility listed in Holtec’s Environmental Report. As explained in our discussion of Sierra Club Contention 2, the purpose and need statement also describes how decommissioned plants may become greenfields rather than storage facilities, as well as

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<sup>182</sup> Sierra Club Pet. at 21.

<sup>183</sup> *Id.* at 22. See 10 C.F.R. § 51.23 [hereinafter Continued Storage Rule]; see also 1 NMSS, [GEIS] for Continued Storage of Spent Nuclear Fuel, NUREG-2157, at 5-48 (Sept. 2014) (ADAMS Accession No. ML14196A105) [hereinafter Continued Storage GEIS].

<sup>184</sup> Sierra Club Pet. at 22.

<sup>185</sup> *Id.*

<sup>186</sup> NRC Staff Consol. Answer at 70-72.

<sup>187</sup> Holtec Answer to Sierra Club at 25-27.

<sup>188</sup> Continued Storage GEIS at 5-52.

how utilities can eliminate costs and liability by relinquishing responsibility for spent fuel stored on-site.<sup>189</sup> Sierra Club only disputes the safety and security reason, and does not explain how Holtec's assertion of safety and security compromises the application in a material way.

Sierra Club Contention 3 is not admitted.

#### **4. *Sierra Club Contention 4***

Sierra Club Contention 4 states:

Operation of the [consolidated interim storage] site as proposed by Holtec would necessitate the transportation of the radioactive waste from reactor sites to the [consolidated interim storage] facility. Transportation from the reactors to the [consolidated interim storage] site carries substantial risks. These risks must be evaluated in the [Environmental Report].<sup>190</sup>

On its face, Sierra Club Contention 4 appears to be a contention of omission — claiming that Holtec's Environmental Report does not evaluate transportation risks. In its basis for the contention, however, Sierra Club clarifies that its claim is actually that the Environmental Report “does not adequately address these risks.”<sup>191</sup> Specifically, it asserts that the Environmental Report underestimates both (1) the consequences of severe rail accidents involving shipments of radioactive waste;<sup>192</sup> and (2) the likelihood of such accidents.<sup>193</sup> Sierra Club relies on the accompanying declaration of Dr. Marvin Resnikoff.<sup>194</sup>

Although the NRC Staff would admit the contention insofar as it addresses the potential consequences of rail accidents,<sup>195</sup> the Board disagrees. The centerpiece of Sierra Club's argument on this point is a 2001 report by Matthew Lamb and Dr. Resnikoff that evaluated the radiologic consequences of the 2001 Baltimore Tunnel Fire if it had involved spent nuclear fuel.<sup>196</sup> The Lamb and Resnikoff report provides a substantially higher estimate of the impacts of a transportation accident than does Holtec's Environmental Report.<sup>197</sup> However, Sierra Club fails

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<sup>189</sup> ER at 1-6.

<sup>190</sup> Sierra Club Pet. at 22.

<sup>191</sup> *Id.* at 23.

<sup>192</sup> *Id.* at 24-25.

<sup>193</sup> *Id.* at 25-27.

<sup>194</sup> See Sierra Club Pet. Decl. of Marvin Resnikoff (Sept. 14, 2018).

<sup>195</sup> NRC Staff Consol. Answer at 72-73.

<sup>196</sup> Sierra Club Pet. at 24-26.

<sup>197</sup> Sierra Club also alleges more generally that the Environmental Report must address risks of

*(Continued)*

to acknowledge that Holtec's analysis took into account the Lamb and Resnikoff estimates, which were deemed unrealistic for reasons that Sierra Club does not address or dispute.

Specifically, the evaluation in Holtec's Environmental Report is based on the DOE's Final Supplemental Environmental Impact Statement (DOE FSEIS) for Yucca Mountain.<sup>198</sup> Although the State of Nevada had urged DOE to estimate the consequences of a rail accident in an urban area by using Lamb and Resnikoff's report, DOE declined to do so. On the contrary, DOE concluded that relying on the Lamb and Resnikoff report would result in using "parameters that would be at or near their maximum values," whereas "DOE guidance for the evaluation of accidents in environmental impact statements . . . specifically cautions against the evaluation of scenarios for which conservative (or bounding) values are selected for multiple parameters because the approach yields unrealistically high results."<sup>199</sup> Accordingly, DOE concluded that "the State of Nevada estimates [relying on the Lamb and Resnikoff estimates] are unrealistic and . . . do not represent the reasonably foreseeable consequences of severe transportation accidents."<sup>200</sup>

Holtec's Environmental Report relies on and prominently references the DOE FSEIS in its evaluation of the probable consequences of an accident.<sup>201</sup> Dr. Resnikoff is Sierra Club's expert on Contention 4, and surely can be charged with being familiar with DOE's criticism of his own work. By not addressing or disputing the criticisms of the Lamb and Resnikoff study contained in the DOE FSEIS (on which Holtec's Environmental Report relies), Sierra Club fails to demonstrate a genuine dispute with the application and Contention 4 is inadmissible under 10 C.F.R. § 2.309(f)(1)(vi) for that reason alone.

Moreover, at the very least the unanswered criticisms of Lamb and Resnikoff in the DOE FSEIS require us to conclude that Lamb and Resnikoff's estimates represent a "worst case" analysis. As Holtec's counsel emphasized at oral argument, the intensity of the 2001 Baltimore Tunnel Fire arose from the flammable contents of the railroad cars.<sup>202</sup> Because Holtec will ship spent fuel by dedicated

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radiation emissions during shipment that may occur other than from accidents. But the impact of dose along transportation routes from exposure from incident-free transportation is addressed in ER, Rev. 3, § 4.9.3.1 and tbl. 4.9.1, which Sierra Club fails to acknowledge.

<sup>198</sup> DOE, [FSEIS] for a Geologic Repository for the Disposal of Spent Nuclear Waste at Yucca Mountain, Nye County, Nevada (2008) (ADAMS Accession No. ML081750191) [hereinafter DOE FSEIS].

<sup>199</sup> DOE FSEIS, Vol. III at CR 271 (ADAMS Accession No. ML081750218).

<sup>200</sup> *Id.*

<sup>201</sup> ER, Rev. 3 at 4-34.

<sup>202</sup> Tr. at 256.

trains, they will contain no such contents.<sup>203</sup> Furthermore, because the Federal Railway Administration (FRA) reviews such routes, Holtec would use a route that went through the Baltimore tunnel only if the FRA deemed it appropriate.<sup>204</sup> In short, a scenario similar to the 2001 Baltimore Tunnel Fire would be extraordinarily unlikely.

NEPA (and the NRC's implementing regulations<sup>205</sup>) require only a discussion of reasonably foreseeable impacts. NEPA does not require a "worst case" analysis, which "creates a distorted picture of a project's impacts and wastes agency resources."<sup>206</sup> Rather, the purpose of the NRC's environmental review "is to inform the decisionmaking agency and the public of a broad range of environmental impacts that will result, with a fair degree of likelihood, from a proposed project, rather than to speculate about 'worst case' scenarios and how to prevent them."<sup>207</sup>

As to the second prong of Sierra Club Contention 4 — concerning the likelihood of rail accidents — we agree with both Holtec and the NRC Staff that it is not admissible. The Sierra Club has proffered no facts or expert opinions to support its assertion that Holtec relies on data that "does not incorporate recent information about rail fires and expanded traffic of oil tankers,"<sup>208</sup> and therefore again fails to demonstrate a genuine dispute.

Sierra Club Contention 4 is not admitted.

##### 5. *Sierra Club Contention 5*

Sierra Club Contention 5 states:

The [Environmental Report] states that waste would be stored at the [consolidated interim storage] facility for up to 120 years until a permanent repository is found. The [Environmental Report] and the subsequent EIS must address the purpose and need and the environmental impacts if a permanent repository is not found, and the Holtec facility becomes a de facto permanent repository.<sup>209</sup>

Sierra Club relies on *New York v. NRC*, 681 F.3d 471, 478 (D.C. Cir. 2012)

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<sup>203</sup> *Id.* at 256-57.

<sup>204</sup> *Id.* at 257.

<sup>205</sup> 10 C.F.R. §§ 51.45, 51.61.

<sup>206</sup> *Private Fuel Storage*, CLI-02-25, 56 NRC at 352.

<sup>207</sup> *Id.* at 347.

<sup>208</sup> Sierra Club Pet. at 25-26.

<sup>209</sup> *Id.* at 27.

to support its conclusion that an agency “must address the alternative of a permanent repository never being developed.”<sup>210</sup>

As Holtec<sup>211</sup> and the NRC Staff<sup>212</sup> explain in their responses, Sierra Club is incorrect as a matter of law. Although *New York v. NRC* did hold that the NRC inadequately performed its NEPA evaluation by not considering the “environmental effects of failing to secure permanent storage,” the NRC developed its Continued Storage Rule and Generic Environmental Impact Statement (GEIS) as a response to the ruling.<sup>213</sup> The Continued Storage Rule addresses Sierra Club’s concern directly: “The Environmental Reports . . . are not required to discuss the environmental impacts of spent nuclear fuel storage in . . . an [Independent Spent Fuel Storage Installation (ISFSI)] for the period following the term of the . . . ISFSI license.”<sup>214</sup> The Continued Storage Rule incorporates the impact determinations from the Continued Storage GEIS, which considers the environmental impacts of short-term storage (60 years beyond license), long-term storage (100 years beyond license), and indefinite storage.<sup>215</sup> NRC regulations bar challenges to the Continued Storage Rule, unless the petitioner obtains a waiver from the Commission.<sup>216</sup> Sierra Club has not petitioned for a waiver, and therefore this contention is outside the scope of this proceeding.

Sierra Club Contention 5 is not admitted.

## 6. *Sierra Club Contention 6*

Sierra Club Contention 6 states:

An [Environmental Report] is required to discuss alternatives to the proposed action. Pursuant to NEPA, this includes an examination of the no-action alternative. The discussion of the no-action alternative in the Holtec [Environmental Report] is deficient because it does not discuss safer storage methods at the reactor sites, such as HOSS, nor does it acknowledge the NRC’s Continued Storage Rule that concludes that waste can be safely stored at the reactor site indefinitely. Furthermore, the [Environmental Report] states that the no-action alternative is a reasonable alternative that would satisfy the purpose and need for the project.<sup>217</sup>

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<sup>210</sup> *Id.* at 28.

<sup>211</sup> Holtec Answer to Sierra Club at 35-37.

<sup>212</sup> NRC Staff Consol. Answer at 74-75.

<sup>213</sup> *New York v. NRC*, 681 F.3d 471, 473 (D.C. Cir. 2012). See Final Rule, Continued Storage of Spent Nuclear Fuel, 79 Fed. Reg. 56,238, 56,241 (Sept. 19, 2014).

<sup>214</sup> 10 C.F.R. § 51.23(b).

<sup>215</sup> Continued Storage GEIS at 1-13 to -15, 5-4 to -5.

<sup>216</sup> See 10 C.F.R. § 2.335(a), (b).

<sup>217</sup> Sierra Club Pet. at 29-30.

Sierra Club asserts that NEPA requires “substantial treatment of each alternative,” rather than what it characterizes as a “no-action alternative . . . blandly dismissed with unsupportive statements.”<sup>218</sup> Framed as a contention of omission, Sierra Club challenges the no-action alternative analysis in section 2.1 of Holtec’s Environmental Report as deficient because it provides “no discussion of the relative benefits and costs of leaving the waste at the reactor site compared to the benefits and costs of sending waste from many reactors to the Holtec site.”<sup>219</sup>

Contrary to Sierra Club’s assertions, Holtec’s Environmental Report does discuss the relative benefits and costs of maintaining the status quo (leaving the waste at the reactor site) and implementing the proposed action. As Holtec<sup>220</sup> and the NRC Staff<sup>221</sup> explain, table 2.5 and section 4.14 of the Environmental Report compare the environmental impacts of the project with those of the no-action alternative. Likewise section 9.2.1, section 9.2.2, and tables 9.2.1 through 9.2.5 of the Environmental Report compare the no-action alternative’s costs to those of the proposed action. Sierra Club’s contention does not demonstrate a genuine dispute with the application, because it challenges section 2.1 without acknowledging that other sections of the Environmental Report contain the allegedly missing analysis.

Regarding Sierra Club’s concern that the no-action alternative discussion in the Environmental Report does not acknowledge the NRC’s Continued Storage Rule, section 2.1 specifically says that the “No Action Alternative would not be supportive of the [NRC’s] rulemaking on the Continued Storage of [spent nuclear fuel].”<sup>222</sup> Additionally, table 2.5.1 and section 4.14 summarize the short- and long-term impacts of at-reactor storage, as adopted from the Continued Storage GEIS.<sup>223</sup> Not only does Sierra Club ignore this discussion, but it incorrectly states that the Continued Storage Rule “concludes that waste can be safely stored at the reactor site indefinitely.”<sup>224</sup> The Continued Storage Rule incorporates the impact determinations from the Continued Storage GEIS, which merely analyzes the environmental impacts of storing waste at the reactor site after the end of a license. It did not include an analysis of safety benefits or advocate for a particular storage method. This part of the contention does not raise a genuine dispute with the application.

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<sup>218</sup> *Id.* at 31.

<sup>219</sup> *Id.*

<sup>220</sup> Holtec Answer to Sierra Club at 40.

<sup>221</sup> NRC Staff Consol. Answer at 76.

<sup>222</sup> ER at 2-1.

<sup>223</sup> *Id.* at 2-21 to -24, 4-63 to -65.

<sup>224</sup> Sierra Club Pet. at 30, 32. *See also* Sierra Club Reply at 25 (“[T]he Continued Storage Rule determined that storage at the reactor site is safe.”).

Regarding Sierra Club's assertion that the Environmental Report is deficient because it lacks a discussion of "safer storage methods . . . such as HOSS," we agree with the NRC Staff<sup>225</sup> and Holtec<sup>226</sup> that Sierra Club fails to demonstrate how such a discussion would be material to the no-action alternative analysis. HOSS is a method of storage that has not been licensed, must less implemented at any reactor site. The Environmental Report is only required to analyze a no-action alternative of maintaining the status quo. Sierra Club does not explain why analyzing the unused HOSS method is necessary to analyzing the status quo.

Sierra Club Contention 6 is not admitted.

#### **7. *Sierra Club Contention 7***

Sierra Club Contention 7 states:

Holtec relies heavily on the assertion that the Blue Ribbon Commission on America's Nuclear Future (BRC) has recommended [consolidated interim storage] as the answer to the country's nuclear waste problem. On the contrary, the BRC report should not be viewed uncritically and does not necessarily deserve blind support in assessing the Holtec application. Holtec's [Environmental Report] therefore mischaracterizes both the BRC report's conclusions and the relative risks of [consolidated interim storage] versus onsite storage. The EIS must therefore independently and fully address the relative risks and benefits of both storage options.<sup>227</sup>

Sierra Club asserts that Holtec's proposed storage facility "is dictated to a great extent by the BRC report."<sup>228</sup> Sierra Club then further alleges that Holtec's Environmental Report mischaracterizes "both the BRC report's conclusions and the relative risks of [consolidated interim storage] versus onsite storage."<sup>229</sup> Sierra Club claims that Holtec's Environmental Report and the NRC's subsequent EIS must independently compare the risks and benefits of Holtec's proposed interim storage facility with the risks and benefits of storing spent fuel at the reactor sites where it was generated.

Sierra Club Contention 7 fails to raise a genuine dispute with Holtec's application, as required by 10 C.F.R. § 2.309(f)(1)(vi). Holtec's Environmental

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<sup>225</sup> NRC Staff Consol. Answer at 77.

<sup>226</sup> Holtec Answer to Sierra Club at 38.

<sup>227</sup> Sierra Club Pet. at 32.

<sup>228</sup> *Id.*

<sup>229</sup> *Id.* at 34-35.

Report contains precisely the risk/benefit analysis that Sierra Club seeks,<sup>230</sup> and Sierra Club does not challenge it.

Section 1.1 of Holtec's Environmental Report does discuss the history and background of the nation's spent fuel dilemma, including enactment of the NWPA, suspension of the Yucca Mountain project, and the 2012 BRC report. And both Sections 1 and 2 suggest that Holtec's proposed facility would better advance the preference in the BRC report for a consent-based approach to siting spent nuclear fuel. But, regardless of whether that is correct, Sierra Club fails to show how that position at all affects the analysis of options that is actually undertaken in Holtec's Environmental Report.

Sierra Club Contention 7 is not admitted.

#### **8. *Sierra Club Contention 8***

Sierra Club Contention 8 states:

10 C.F.R. § 72.30 establishes requirements for decommissioning interim storage facilities. An application for licensing a [consolidated interim storage] facility must contain a decommissioning plan explaining how the plan will satisfy the requirements in the regulation. The application for the Holtec [consolidated interim storage] facility does not comply with these requirements because the amount of funds Holtec says it will collect over the anticipated life of the project fall way short of what Holtec says are necessary for decommissioning.<sup>231</sup>

Sierra Club Contention 8 challenges whether Holtec's decommissioning plan provides reasonable assurance that funds will be available to decommission the proposed facility, as required by 10 C.F.R. § 72.30. Initially, the contention appeared admissible insofar as it identified an inconsistency in Holtec's calculation of how a decommissioning fund would be established.

Specifically, in its application Holtec commits that a "decommissioning fund will be established by setting aside \$840 per MTU stored at the HI-STORE facility."<sup>232</sup> Holtec then calculates its initial fund contribution by multiplying \$840 by the maximum amount that may be possessed under its proposed license: 8,680 MTUs (500 loaded canisters).<sup>233</sup> As Sierra Club pointed out, however,

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<sup>230</sup> ER Ch. 9; *id.* tbl. 2.5.1.

<sup>231</sup> Sierra Club Pet. at 35.

<sup>232</sup> [Holtec] & [ELEA] Underground CISF - Financial Assurance & Project Life Cycle Cost Estimates at 5 (ADAMS Accession No. ML18058A608) [hereinafter Holtec Financial Assurance Estimates].

<sup>233</sup> Holtec Proposed License at 1 (Item 8 of the proposed license) and App. A (Technical Specifications), § 4.2.2 at 4-1. *See also* SAR at 1-4 ("Each stage is envisaged to have 8,680 MTUs.").



section 1.3 of Holtec’s Environmental Report initially estimated storing only 5,000 MTUs during the first year of operation.<sup>234</sup>

Acknowledging the disparity to be a mistake, Holtec has corrected its Environmental Report to conform to the 8,680 MTU figure used in its application.<sup>235</sup> As Holtec has explained, its Environmental Report “used an early, approximate value.”<sup>236</sup> Holtec represents that “[w]hile this may have misled the Sierra Club, the decommissioning funding calculation is, and should be, based on the limits of licensed material that will be permitted under the initial license.”<sup>237</sup> Accordingly, the Board determines that Sierra Club Contention 8 no longer raises a genuine dispute that warrants an evidentiary hearing.<sup>238</sup>

Additionally, Sierra Club Contention 8 is not admissible insofar as it attempts to challenge other aspects of Holtec’s decommissioning plan. For example, Sierra Club’s claim that the fund would be “completely inadequate”<sup>239</sup> is premised on an analysis that simply overlooks Holtec’s assumption that its annual payments would earn a reasonable rate of return: “These funds, plus earnings on such funds calculated at not greater than a 3 percent real rate of return over the 40-year license life of the facility, will cover the estimated cost to complete decommissioning.”<sup>240</sup> Likewise, Sierra Club’s charge that “the decommissioning costs are calculated for only the first phase of the project,”<sup>241</sup> overlooks the fact that the pending application only covers the first phase of the project. Holtec will be required to update its decommissioning plan in response to any “changes in the authorized possession limits.”<sup>242</sup>

Finally, we find unpersuasive two arguments that Sierra Club advances belatedly in its reply. First, having initially overlooked Holtec’s stated intention to rely in part on projected earnings on decommissioning fund assets, Sierra Club now dismisses Holtec’s reliance on “the magic of compound interest” and claims “there is no assurance that the fund would earn 3% interest.”<sup>243</sup> But, other than its own speculation, Sierra Club offers no evidence that a 3 percent annual

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<sup>234</sup> Sierra Club Pet. at 36 (citing [Holtec] HI-STORE CIS Facility Environmental Report, at 1-6 (rev. 1 Dec. 2017)).

<sup>235</sup> HI-STORE CIS Facility Environmental Report, at 1-7 (rev. 3 Nov. 2018).

<sup>236</sup> Holtec Answer to Sierra Club at 45 n.93.

<sup>237</sup> *Id.*

<sup>238</sup> The NRC Staff initially deemed the contention admissible in part. *See* NRC Staff Consol. Answer at 79. However, in light of the amended Environmental Report, the Staff stated at oral argument that it no longer takes a position on the admissibility of Sierra Club Contention 8. Tr. at 334-35.

<sup>239</sup> Sierra Club Pet. at 36.

<sup>240</sup> Holtec Financial Assurance Estimates at 5.

<sup>241</sup> Sierra Club Pet. at 36.

<sup>242</sup> 10 C.F.R. § 72.30(c)(3).

<sup>243</sup> Sierra Club Reply at 28.

rate of return over 40 years is unrealistic. Second, having likewise initially overlooked the reference to a surety method in Holtec's application,<sup>244</sup> Sierra Club now challenges Holtec's failure to provide more specificity.<sup>245</sup> Again, Sierra Club merely speculates that "it is doubtful that a surety company would issue a bond for this project" because "[s]urety companies only issue surety bonds when there is no possibility of risk."<sup>246</sup> Even if these two arguments were not impermissibly late, we would reject them as lacking any supporting facts or expert opinions.<sup>247</sup>

Sierra Club Contention 8 is not admitted.

### 9. *Sierra Club Contention 9*

Sierra Club Contention 9 states:

The containers in which the waste will be transported to and stored at the Holtec [consolidated interim storage] site are designated for a design life of 60 years and a service life of 100 years and may present an unacceptable danger of radioactive release if they are required to remain after the end of their designated service life. Therefore, the [Environmental Report] must examine the environmental impact of the containers being used beyond their approved service life.<sup>248</sup>

Citing *New York v. NRC*, Sierra Club asserts that the Environmental Report "must consider all potential impacts if the [consolidated interim storage] ultimately continues to operate beyond the design life and service life."<sup>249</sup> Sierra Club also would have Holtec's Safety Analysis Report (SAR) "analyze and evaluate the design and performance of structures, systems, and components important to safety from operation of the . . . facility . . . [p]ursuant to 10 C.F.R. § 72.45(d)."<sup>250</sup>

In addition to concerns about the impacts of container use beyond certified service life, Sierra Club also expresses the safety concern that "[n]either Holtec nor the source of the waste has a plan in place to deal with leaking or cracking containers."<sup>251</sup> Sierra Club references a video of Holtec's chief executive saying

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<sup>244</sup> Holtec Financial Assurance Estimates at 5.

<sup>245</sup> Sierra Club Reply at 29-30.

<sup>246</sup> *Id.* at 29.

<sup>247</sup> As set forth *infra*, the Board therefore denies as moot Holtec's motion to strike these arguments from Sierra Club's reply. See [Holtec's] Motion to Strike Portions of Replies of [AFES], [Joint Petitioners], [NAC], and Sierra Club (Oct. 26, 2018) at 10-11 [hereinafter Holtec Motion to Strike].

<sup>248</sup> Sierra Club Pet. at 38.

<sup>249</sup> *Id.* at 40 (citing *New York v. NRC*, 681 F.3d 471 (D.C. Cir. 2012)).

<sup>250</sup> *Id.* (internal quotations omitted).

<sup>251</sup> *Id.* at 41-42.

that he believes it is impractical to repair a canister, as support for its claim that “Holtec canisters cannot be inspected, repaired or repackaged.”<sup>252</sup> According to Sierra Club, this presents a problem not addressed by the Continued Storage GEIS, which “assumes that there will be a dry transfer system (DTS) that would retrieve waste from the casks for inspection and repackaging in new containers.”<sup>253</sup> Sierra Club also describes Holtec’s “return to sender” proposal as one that “must be evaluated,” in light of an NRC Staff public meeting summary in which, Sierra Club claims, the NRC Staff “admitted that once a crack starts in a canister, it can grow through the wall in 16 years,”<sup>254</sup> and a Nuclear Waste Technical Review Board study about geologic repositories.<sup>255</sup>

Regarding the environmental aspects of this contention, the Continued Storage Rule explicitly states that an applicant’s Environmental Report is not required to discuss impacts following the proposed license term.<sup>256</sup> Holtec’s application seeks a license for 40 years. It is not relevant to this proceeding that the HI-STORM UMAX system has a 60-year design life and a 100-year service life, or that subsequent license extensions are possible. Therefore, we agree with Holtec<sup>257</sup> and the NRC Staff<sup>258</sup> that Sierra Club impermissibly challenges the Continued Storage Rule and the impact evaluations contained in the Continued Storage GEIS. Because Sierra Club has not requested a waiver to challenge the GEIS, the environmental aspects of Sierra Club Contention 9 are outside the scope of this proceeding.

Regarding the safety aspects of this contention, Sierra Club has not pointed to deficient parts of the SAR and thus has not demonstrated a genuine dispute with Holtec’s application. Rather, Sierra Club ignores the SAR’s discussion of retrievability, inspection, and maintenance activities,<sup>259</sup> and instead challenges statements made by other sources outside of the application.<sup>260</sup>

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<sup>252</sup> *Id.* at 41.

<sup>253</sup> *Id.* at 40-41.

<sup>254</sup> *Id.* at 40 (citing Memorandum to Anthony Hsia, Deputy Director, Division of Spent Fuel Storage and Transportation, NMSS, Summary of August 5, 2014, Public Meeting with the Nuclear Energy Institute on Chloride Induced Stress Corrosion Cracking Regulatory Issue Resolution Protocol (Sept. 9, 2014)).

<sup>255</sup> *Id.* at 42 (citing Nuclear Waste Technical Review Board, *Geologic Repositories: Performance Monitoring and Retrievability of Emplaced High-Level Radioactive Waste and Spent Nuclear Fuel* (May 2018)).

<sup>256</sup> 10 C.F.R. § 51.23(b).

<sup>257</sup> See Holtec Answer to Sierra Club at 47-48.

<sup>258</sup> See NRC Staff Consol. Answer at 80.

<sup>259</sup> SAR at 1-39, 10-18 to -19, 15-3, 18-29 to -30.

<sup>260</sup> For example, Sierra Club invokes statements allegedly made by NRC Staff members at an unrelated Nuclear Energy Institute public meeting in 2014 — several years before Holtec’s application was filed. Sierra Club Pet. at 41.

Sierra Club Contention 9 is not admitted.

#### **10. Sierra Club Contention 10**

Sierra Club Contention 10 states:

The proposed Holtec [consolidated interim storage] facility will accept Greater Than Class C (GTCC) waste. NRC regulations specify that GTCC waste must be disposed of in a geologic repository licensed by the NRC, unless the Commission approves an alternative land-based disposal. The Holtec facility will not be a geologic repository. The NRC has not established regulations for approving land-based disposal of GTCC waste. The proposed Holtec [consolidated interim storage] facility does not comply with the requirement for a geologic repository or land-based disposal for GTCC waste. Therefore, a license cannot be issued for this facility.<sup>261</sup>

To support its contention, Sierra Club cites 10 C.F.R. § 61.55(a)(2)(iv), which it contends “specifies that GTCC waste must be disposed of in a geologic repository licensed by the NRC unless the Commission approves an alternative land disposal proposal.”<sup>262</sup> According to Sierra Club, the fact that the NRC initiated a rulemaking to develop regulations for land disposal amounts to an admission that the NRC “has no legal or technical basis for approving a land-based disposal alternative for GTCC waste.”<sup>263</sup>

We agree with the NRC Staff<sup>264</sup> and Holtec<sup>265</sup> that Sierra Club Contention 10 fundamentally misconstrues the nature of Holtec’s application. Rather than *disposing* of GTCC waste under 10 C.F.R. Part 61, Holtec seeks to temporarily *store* reactor-related GTCC waste under Part 72.<sup>266</sup> Specifically, Holtec seeks a license for “a complex designed and constructed for the interim storage of spent nuclear fuel.”<sup>267</sup> Sierra Club, therefore, fails to raise a dispute that is material to the license Holtec seeks.

Sierra Club Contention 10 is not admitted.

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<sup>261</sup> Sierra Club Pet. at 42.

<sup>262</sup> *Id.* at 43.

<sup>263</sup> *Id.* at 44.

<sup>264</sup> See NRC Staff Consol. Answer at 82.

<sup>265</sup> See Holtec Answer to Sierra Club at 55-56.

<sup>266</sup> See Notice of Opportunity to Request a Hearing, 83 Fed. Reg. at 32,920 (“The NRC received an application from Holtec for a specific license pursuant to part 72 of title 10 of the *Code of Federal Regulations* (10 CFR), ‘Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste.’”).

<sup>267</sup> 10 C.F.R. § 72.3 (defining “independent spent fuel storage installation or ISFSI”).

## 11. *Sierra Club Contention 11*

Sierra Club Contention 11 states:

The [Environmental Report] and the subsequent EIS must evaluate the potential for earthquakes at the Holtec site and the environmental impact of earthquakes. Likewise, the Safety Analysis Report (SAR) must adequately evaluate the earthquake potential of the proposed site. Both the [Environmental Report] and SAR are inadequate in this respect.<sup>268</sup>

Sierra Club submits a map to purportedly support its allegation of “intense drilling in the area” around the proposed Holtec facility that would possibly cause earthquakes.<sup>269</sup> Sierra Club also points to a 2018 geology article<sup>270</sup> (the Stanford Report) that Sierra Club alleges stands for the proposition that “researchers [have] documented the existence of prior earthquakes in southeast New Mexico, and more importantly, the existence of numerous faults in the area in and around the proposed Holtec site.”<sup>271</sup> Sierra Club’s Contention 11 therefore asserts both a challenge to the Environmental Report and a challenge to the SAR.

Sierra Club challenges Environmental Report section 3.3.2 by stating that the Environmental Report gives “fairly short shrift” to earthquake analysis around the proposed project site<sup>272</sup> and “essentially dismisses the likelihood of earthquakes in the area and does not mention any environmental impacts from earthquakes.”<sup>273</sup> Sierra Club’s “main problem” with the Environmental Report’s earthquake data is that they are “historical” and allegedly do not take into account recent fracking activity around the proposed project site.<sup>274</sup>

Sierra Club similarly challenges SAR section 2.6, claiming that its seismic information “is historical data that does not take into account the recent increase in drilling for oil and natural gas in the area,” which allegedly induces regional earthquakes.<sup>275</sup> Citing 10 C.F.R. § 72.103(f) (which, among other things, provides seismic rules for ISFSIs built west of the Rocky Mountains) and to the Stanford Report, Sierra Club again argues that (1) the SAR relies on faulty

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<sup>268</sup> Sierra Club Pet. at 44.

<sup>269</sup> *Id.*; *id.*, Ex. 5.

<sup>270</sup> *Id.*, Ex. 6, Jens-Erik Lund Snee & Mark D. Zoback, *State of Stress in the Permian Basin, Texas and New Mexico: Implications for Induced Seismicity*, The Leading Edge (Feb. 2018) [hereinafter Stanford Report].

<sup>271</sup> *Id.* at 44-45.

<sup>272</sup> *Id.* at 47.

<sup>273</sup> *Id.* at 45.

<sup>274</sup> *Id.* at 47, 48.

<sup>275</sup> *Id.* at 45-46.

earthquake data because the data are historical and do not account for recent fracking;<sup>276</sup> and (2) the Stanford Report directly contradicts section 2.6.3 of the SAR's assertion "that there are no surface faults at the Holtec site."<sup>277</sup>

We agree with Holtec and the NRC Staff that this contention is inadmissible because Sierra Club fails to show a genuine dispute with the application on a material issue of fact, contrary to 10 C.F.R. § 2.309(f)(1)(vi).<sup>278</sup> Regarding the use of "historical" seismic data from 2016, Sierra Club fails to explain how or where the use of 2016 United States Geologic Survey (USGS) data in the Environmental Report section 3.3.2.1<sup>279</sup> and figure 3.3.4 does not account for recent fracking activity around the proposed storage facility.<sup>280</sup> Section 3.3.2.1 specifically discusses the seismic events southeast of the site in west Texas that may be due to "fluid pressure build-up from fluid injection" (i.e., fracking) as well as recent seismic activity from the late 1990s to the mid-2000s fifty miles west of the site from DOE's Waste Isolation Pilot Plant due to "injection of waste water from natural gas production" (i.e., fracking).<sup>281</sup>

In other words, Holtec used the most current information available when it filed its application in 2017, and its analysis did evaluate seismic events related to fracking. Sierra Club has not put forth any information that fracking has caused significant seismic events around the proposed project site in the years since the 2016 USGS report. Therefore, Sierra Club's claim challenging the Environmental Report fails.<sup>282</sup> And Sierra Club's challenge to SAR section 2.6.2's use of USGS 2016 "historical" data and its claims of noncompliance with 10 C.F.R. § 72.103(f)(1) fails for the same reason.<sup>283</sup>

Finally, Sierra Club's claim that the Stanford Report contradicts the SAR's assertion "that there are no surface faults at the Holtec site" is also without merit. We agree with Holtec that there is no dispute between the Stanford Report and the SAR's seismic analyses.<sup>284</sup> When identifying the proposed storage facility's location on Figure 1 of the Stanford Report, it shows that the nearest

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<sup>276</sup> *Id.* at 47-48 (citing *id.*, Ex. 7, Letter from Tommy E. Taylor, Director of [Fasken] Oil and Gas Development, to Michael Layton, Director, NMSS (July 30, 2018) (PBRLO Scoping Comments)).

<sup>277</sup> *Id.* at 47.

<sup>278</sup> Holtec Answer to Sierra Club at 56; NRC Staff Consol. Answer at 86.

<sup>279</sup> ER at 3-17.

<sup>280</sup> *Id.* at 3-24.

<sup>281</sup> *Id.* at 3-17.

<sup>282</sup> As to the claim that Holtec does not address "environmental impacts from earthquakes" in the Environmental Report, Sierra Club Pet. at 45, Holtec's Environmental Report does analyze the HI-STORM UMAX system against credible seismic activity in the region, *see* ER at 4-61 to -65, and concludes that the environmental impact of an earthquake involving storage of spent fuel is small. *Id.* at 4-65, 6-6.

<sup>283</sup> SAR at 2-108 to -109.

<sup>284</sup> Holtec Answer to Sierra Club at 63.

Quaternary fault is approximately 75 miles from the project site.<sup>285</sup> Moreover, Figure 3 of the Stanford Report shows that the nearest fault of any kind is approximately 40 miles from the site. Although the petitioner need not prove its case at the contention admissibility stage, it must present a genuine dispute with the application on a material fact. Sierra Club has not.<sup>286</sup>

Sierra Club Contention 11 is not admitted.

## 12. *Sierra Club Contention 12*

Sierra Club Contention 12 states:

The dunes sagebrush lizard, a/k/a sand dune lizard, is an endangered species pursuant to New Mexico state law and regulation. The lizard has a limited range and is specifically adapted to sand dune areas with shinnery oak. The site of the Holtec project is within the lizard's habitat range. The [Environmental Report] submitted by Holtec claims that the lizard is not present in the area of the Holtec site, but that assertion is contrary to the scientific evidence. The [Environmental Report] and the subsequent EIS must evaluate the impact of the Holtec project on the dunes sagebrush lizard and its habitat.<sup>287</sup>

Sierra Club challenges sections 3.4.3, 4.4.3, and 4.4.4 of the Environmental Report, questioning the result of surveys that “make no mention of the impact of the project on the lizard or its habitat.”<sup>288</sup> Sierra Club also questions the results of a 2016 survey, which refers to a 2007 survey of the same area, both finding “no reptiles in the area of the Holtec site.”<sup>289</sup> Sierra Club questions the 2016 survey's methodology, asserting that the length of the 2016 survey was too short (one day), completed at the wrong time (the time of year the lizard allegedly hibernates),<sup>290</sup> and that the survey was based on “casual observation.”<sup>291</sup> Sierra Club also states that the 2007 survey results are suspect, as the Eddy-Lea Energy Alliance (ELEA), a vocal supporter of the Holtec project, paid for the 2007

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<sup>285</sup> Compare Stanford Report Fig. 1, with Holtec Answer to Sierra Club at 65 (republishing Stanford Report Fig. 1 but marking location of Holtec CISF).

<sup>286</sup> Sierra Club's reference to Sierra Club Ex. 7 (PBRLO Scoping Comments) does not raise a genuine dispute with the application on a material issue of fact, because the comments constitute only speculation that fracking will be allowed near and/or immediately beneath the HI-STORE interim storage site.

<sup>287</sup> Sierra Club Pet. at 48.

<sup>288</sup> *Id.* at 49.

<sup>289</sup> *Id.*

<sup>290</sup> *Id.* at 51.

<sup>291</sup> *Id.* at 50.

survey, from which Sierra Club infers a conflict of interest.<sup>292</sup> Sierra Club summarizes that Contention 12's "point is that the Holtec site is within the general range of the dunes sagebrush lizard such that the [Environmental Report] should have made a more thorough evaluation of the lizard's presence and the impacts to [it] from the Holtec project."<sup>293</sup> Sierra Club submits two maps in support of Contention 12, which purport to show that the proposed fuel storage facility "is likely habitat for the dunes sagebrush lizard."<sup>294</sup>

We agree with Holtec<sup>295</sup> and the NRC Staff<sup>296</sup> that Sierra Club's two maps offered to support Sierra Club Contention 12 do not in fact support Sierra Club's assertion that the sagebrush lizard's habitat is located at the proposed HI-STORE interim storage site. Although the maps roughly show the lizard's habitat in the greater southwestern United States, the maps lack sufficient detail to demonstrate that the sagebrush lizard makes its home at the site of the proposed facility. As Sierra Club's maps do not support what Sierra Club asserts,<sup>297</sup> this aspect of the contention is inadmissible.

Sierra Club's challenges to the methodology of the 2007 and 2016 surveys are not supported by any information that genuinely disputes their sufficiency. Sierra Club's broad, unsupported speculations do not meet the Commission's contention admissibility criteria.<sup>298</sup>

Sierra Club Contention 12 is not admitted.

### **13. Sierra Club Contention 13**

Sierra Club Contention 13 states:

As shown in previous contentions, the Holtec [Environmental Report] is replete with errors, omissions, and blatantly incorrect statements and information. Further, Chapter 12 of the [Environmental Report] shows that a company called Tetra Tech, was the primary preparer of the [Environmental Report]. The only other preparer listed was a subcontracting company that conducted the cultural resource evaluation. Tetra Tech was accused of engaging in widespread fraud with respect to its contract with the United States Navy to clean up radioactive materials at the Hunter's Point Naval Shipyard in San Francisco, California. As such, Tetra

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<sup>292</sup> *Id.*

<sup>293</sup> Sierra Club Reply at 33-34.

<sup>294</sup> Sierra Club Pet. at 51; *id.* Exs. 8 (Dunes Sagebrush Lizard Habitat Map), 9 (Dunes Sagebrush Lizard Suitable Habitat Expanded Map).

<sup>295</sup> Holtec Answer to Sierra Club at 66.

<sup>296</sup> NRC Staff Consol. Answer at 89-90.

<sup>297</sup> *Yankee Atomic Electric Co.* (Yankee Nuclear Power Station), LBP-96-2, 43 NRC 61, 90, *rev'd in part on other grounds*, CLI-96-7, 43 NRC 235 (1996).

<sup>298</sup> 10 C.F.R. § 2.309(f)(1)(v).



Tech's credibility is in question and the credibility of the [Environmental Report] prepared by Tetra Tech likewise is in question.<sup>299</sup>

Sierra Club Contention 13 challenges the credibility of Tetra Tech, the firm that Holtec used to prepare its Environmental Report. In support, Sierra Club submits an affidavit from an attorney who filed a 10 C.F.R. § 2.206 enforcement petition alleging Tetra Tech's malperformance at Hunter's Point Naval Yard,<sup>300</sup> and also cites its challenges to specific aspects of Holtec's Environmental Report that are proffered as other contentions in this proceeding, *viz.* Sierra Club Contentions 2, 3, 5, 7, 9, 10, 11, and 12.<sup>301</sup>

The proffered contention is inadmissible as it fails to show a genuine dispute with the licensee on a material issue of law or fact.<sup>302</sup> The Commission expects that a dispute regarding character or integrity must raise issues "*directly germane to the challenged licensing action.*"<sup>303</sup> Sierra Club has not put forth any information that suggests impropriety regarding Tetra Tech's work on the Holtec Environmental Report. Nor has Sierra Club asserted that any Tetra Tech employees involved in the Hunter's Point case were also involved in compiling Holtec's Environmental Report.

Contention 13 is not admitted.

#### **14. Sierra Club Contention 14**

Sierra Club Contention 14 states:

An accurate thermal evaluation of the HI-STORM UMAX system is imperative to ensure that temperatures within the system will not be conducive to corrosion, cladding and other conditions that would adversely impact the safety of the system. The HI-STORM UMAX system is unique, with both air intake and exhaust vents at the top of the containment cask. The SAR for the Holtec [consolidated interim storage] facility does not provide adequate information to determine if the thermal parameters for the HI-STORM system at the Holtec [consolidated interim storage] facility will provide for adequate safety.<sup>304</sup>

Sierra Club claims that, although SAR Chapter 6 purports to discuss thermal

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<sup>299</sup> Sierra Club Pet. at 51-52.

<sup>300</sup> *See id.*, Ex. 10, Decl. of Steven J. Castleman (June 26, 2018). *See also* 10 C.F.R. § 2.206 Petition to Revoke Materials License No. 29-31396-01, *Greenaction for Health & Envtl. Justice v. Tetra Tech EC, Inc.* (June 28, 2018) (ADAMS Accession No. ML18178A067).

<sup>301</sup> As to those issues cited by Sierra Club, we analyze those separately *supra*.

<sup>302</sup> 10 C.F.R. § 2.309(f)(1)(vi).

<sup>303</sup> *Millstone*, CLI-01-24, 54 NRC at 366-67 (emphasis added).

<sup>304</sup> Sierra Club Pet. at 56.

evaluations for the UMAX system, it “does not address the problems presented by the fact that the UMAX cask is unique, in that the air intake and exhaust vents are at the top of the cask.”<sup>305</sup> Sierra Club claims there is no assurance that “entering and exiting air flows [will] not mix” such that the canister would heat up and degrade the canister’s internal cladding.<sup>306</sup> Sierra Club further questions the safety of Holtec’s redesign of the UMAX canister shims; the SAR’s reliance on the computer code in its thermal calculations; the amount of high burnup fuel that would be stored at the facility and its impact on canister cladding; and Holtec’s “recent announcement” that it can place spent fuel in a UMAX canister after being cooled in a spent fuel pool “for only 2.5 years.”<sup>307</sup>

The contention is inadmissible as it does not show a genuine dispute exists with the Holtec application on a material issue of law or fact.<sup>308</sup> First, even with Sierra Club’s clarification that it seeks to challenge “the discussion in the SAR to determine if the thermal parameters for the HI-STORM system at the Holtec facility will provide for adequate safety,”<sup>309</sup> it is barred from doing so by Commission rules.<sup>310</sup> SAR Chapter 6 fully incorporates by reference the HI-STORM UMAX design and thermal analyses conducted in the HI-STORM UMAX’s own Final Safety Analysis Report (FSAR).<sup>311</sup> The HI-STORM UMAX system was added to the list of approved spent fuel storage casks in a March 2015 final rule,<sup>312</sup> and has been subsequently amended by further rulemaking.<sup>313</sup> Therefore, any challenge to the HI-STORM UMAX system design characteristics that are already deemed compliant with Part 72, including those Sierra Club designates in its Contention 14 (i.e., cooling system, thermal evaluations through use of software, and canister shim designs) are barred in this proceeding by sections 2.335 and 72.46(e).

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<sup>305</sup> *Id.* at 57.

<sup>306</sup> *Id.* at 57-58.

<sup>307</sup> *Id.* at 58-60.

<sup>308</sup> 10 C.F.R. § 2.309(f)(1)(vi).

<sup>309</sup> Sierra Club Reply at 37.

<sup>310</sup> *See* 10 C.F.R. § 2.335(a); *id.* § 72.46(e).

<sup>311</sup> *See* SAR ch. 6 (incorporating by reference Docket 72-1040, Certificate of Compliance No. 1040, “[FSAR] on the HI-STORM UMAX Canister Storage System” (June 2018) (ADAMS Accession No. ML16193A336)).

<sup>312</sup> List of Approved Spent Fuel Storage Casks: [Holtec] HI-STORM [UMAX] Canister Storage System, Certificate of Compliance No. 1040, 80 Fed. Reg. 12,073, 12,073-78 (Mar. 6, 2015).

<sup>313</sup> 10 C.F.R. § 72.214 Certificate Number 1040. *See* Direct Final Rule, List of Approved Spent Fuel Storage Casks: Holtec International HI-STORM UMAX Canister Storage System, Certificate of Compliance No. 1040, Amendment No. 1, 80 Fed. Reg. 53,691 (Sept. 8, 2015); Direct Final Rule, List of Approved Spent Fuel Storage Casks: Holtec International HI-STORM UMAX Canister Storage System; Certificate of Compliance No. 1040, Amendment No. 2, 82 Fed. Reg. 8805 (Jan. 31, 2017).

Sierra Club's assertion regarding high burnup fuel also does not raise a genuine dispute with the application, as the SAR clearly states that the multi-purpose canisters to be "stored at [the facility] are limited to those included in the HI-STORM UMAX FSAR."<sup>314</sup> The HI-STORM UMAX FSAR Chapter 4, in turn, prescribes the permissible heat load per storage cell for the allowed canisters at the UMAX (the MPC-37 and MPC-89).<sup>315</sup>

Finally, Sierra Club's passing reference that Holtec will be storing fuel in UMAX canisters that have been cooled less than three years also does not establish a genuine dispute with the application. First, Sierra Club does not offer any evidence of this statement by Holtec. Second, UMAX FSAR table 2.1.1, which is incorporated by reference into the proposed facility's SAR, states a minimum cooling time of three years for both MPC-37 and MPC-89 canisters.<sup>316</sup> Finally, any change to its three year cooling requirements would require Holtec to request an amendment to the Certificate of Compliance, which Holtec has not done.<sup>317</sup> Thus, there is no genuine dispute with the application.<sup>318</sup>

Sierra Club Contention 14 is not admitted.

#### **15. Sierra Club Contention 15**

Sierra Club Contention 15 states:

The [Environmental Report] fails to adequately determine whether shallow groundwater exists at the site of the proposed [consolidated interim storage] facility. It is important to make this determination in order to assess the impact of a radioactive leak from the [consolidated interim storage] facility on the groundwater.<sup>319</sup>

Sierra Club bases this contention on the first of five comments in the dec-

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<sup>314</sup> SAR at 4-5.

<sup>315</sup> See, e.g., FSAR on the HI-STORM UMAX Canister Storage System, Rev. 3 at 4-31 (June 29, 2016) (ADAMS Accession No. ML16193A339) [hereinafter UMAX FSAR].

<sup>316</sup> See UMAX FSAR tbl. 2.1.1 at 2-25.

<sup>317</sup> See 10 C.F.R. § 72.244 (application for amendment of a certificate of compliance).

<sup>318</sup> Sierra Club also asserted that it should be "allowed to intervene and conduct discovery," Sierra Club Pet. at 59, because the Commission's "SUNSI procedure is onerous, burdensome, lengthy and expensive." Sierra Club Reply at 37. All petitioners in this proceeding were afforded extra time to request the SUNSI (sensitive unclassified non-safeguards) information. See Notice of Opportunity to Request a Hearing, 83 Fed. Reg. at 32,922; Order Denying Motions to Dismiss. If counsel for Sierra Club seeks to change the Commission's SUNSI rules, this proceeding is not the forum in which to do so.

<sup>319</sup> Sierra Club Pet. at 60.

laration of George Rice, a groundwater hydrologist.<sup>320</sup> His comment disputes Holtec’s finding that no shallow groundwater exists at the proposed site. Mr. Rice explains that Holtec installed five wells on the site: four in the Dockum (the shale, siltstone, and sandstone layer of earth) and one in the alluvial/Dockum interface (where the alluvial layer of earth meets the lower Dockum layer).<sup>321</sup> Although no water or saturated conditions were encountered at the alluvium/Dockum well, Mr. Rice claims that well “represents only one point in the 1040 acre site” and that groundwater could still be present despite the materials appearing unsaturated.<sup>322</sup> He asserts that the alluvium/Dockum well “has not been checked for the presence of water since 2007,” which is “significant since shallow aquifers may be intermittently saturated.”<sup>323</sup> Mr. Rice explains Sierra Club’s main concern: “If contaminants leak from the facility, they could be transported by shallow groundwater underlying the site.”<sup>324</sup>

Holtec’s Environmental Report concludes that “[i]mpacts to groundwater would not be expected, due to the depth of groundwater and the fact that the CIS Facility would not release pollutants, including radionuclides, during normal operations.”<sup>325</sup> Nor would a release of radioactive material occur, Holtec’s Environmental Report asserts, during any credible off-normal event<sup>326</sup> or accident.<sup>327</sup> Sierra Club disputes the first conclusion — that impacts to groundwater would not be expected due to depth. However, Sierra Club offers no support for its challenge to Holtec’s second conclusion — that, in any event, the facility would not release pollutants into groundwater during any credible event.

In its reply, Sierra Club points to its Contentions 9, 14, 20, and 23 as examples of “issues that create a risk of leaks during storage.”<sup>328</sup> As discussed elsewhere, we do not admit those contentions, and do not find them to be adequate support for Sierra Club Contention 15. Sierra Club fails to explain why the Environmental Report is wrong to conclude that “[t]here is no potential for a liquid pathway because the [spent nuclear fuel] contains no liquid component

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<sup>320</sup> See *id.*, Decl. of George Rice, Comments on Proposed Facility (Sept. 6, 2018) [hereinafter Rice Decl.].

<sup>321</sup> *Id.* at 2-3.

<sup>322</sup> *Id.*

<sup>323</sup> *Id.* at 2.

<sup>324</sup> *Id.* at 1.

<sup>325</sup> ER at 4-13.

<sup>326</sup> *Id.* at 4-56.

<sup>327</sup> *Id.* at 4-57. Additionally, the HI-STORM UMAX FSAR concludes in section 2.0.6 that “[t]he MPC provides for confinement of all radioactive materials for all design basis normal, off-normal, and postulated accident conditions. As discussed in Chapter 7 of the HI-STORM [flood and wind], [multi-purpose canister] design meets the guidance in the Interim Staff Guidance (ISG)-18 so that leakage of radiological matter from the confinement boundary is non-credible.”

<sup>328</sup> Sierra Club Reply at 38.

and the casks are sealed to prevent any liquids from contacting the [spent nuclear fuel] assemblies”<sup>329</sup> and the interim storage facility’s HI-STORM UMAX system would not release any radioactive material even when subjected to “the effects of all credible and hypothetical accident conditions and natural phenomena.”<sup>330</sup> As the Commission explained in *Private Fuel Storage*, “[t]o show a genuine material dispute, [a petitioner’s] contention would have to give the Board reason to believe that contamination from a defective canister could find its way outside of the cask.”<sup>331</sup> Sierra Club has not done this.

Sierra Club Contention 15 is not admitted.

## 16. *Sierra Club Contention 16*

Sierra Club’s originally-filed Contention 16 stated:

The [Environmental Report] does not contain any information as to whether brine continues to flow in the subsurface under the Holtec site.<sup>332</sup>

On February 18, 2019, Sierra Club filed a motion to amend Contention 16 to address Requests for Additional Information (RAI) submitted by NRC Staff to Holtec and Holtec’s Responses.<sup>333</sup> Sierra Club’s amended contention would add two more sentences:

Holtec has not properly accounted for mechanisms that could allow corrosive material to reach cavity enclosure containers (CECs) and/or spent fuel canisters. Holtec’s Aging Management Program would be insufficient to address the problem of groundwater impacting the integrity of the spent fuel containers.<sup>334</sup>

On March 11 and 15, 2019, Holtec and the NRC Staff, respectively, filed responses in opposition to Sierra Club’s motion to amend Contention 16.<sup>335</sup> In its motion, Sierra Club claims that “NRC Staff perspective set forth in RAIs 17-12 and 17-14 presents a context for the Holtec documentation that is materially different than the context in which Holtec had previously presented the

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<sup>329</sup> ER at 1-8.

<sup>330</sup> *Id.* at 4-62.

<sup>331</sup> *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-04-22, 60 NRC 125, 138-39 (2004).

<sup>332</sup> Sierra Club Pet. at 62.

<sup>333</sup> Sierra Club’s Motion to Amend Contention 16 (Feb. 18, 2019) [hereinafter Sierra Club Motion to Amend Contention 16].

<sup>334</sup> *Id.* at 9.

<sup>335</sup> See [Holtec’s] Opposition to Motion by Sierra Club to Amend Contention 16 (Mar. 11, 2019); NRC Staff Response to Sierra Club Motion to Amend Contention 16 (Mar. 15, 2019).

discussion of groundwater and its effect on the containers in the CIS facility.”<sup>336</sup> Sierra Club points to Holtec’s response about brine in RAI 17-12 and about CEC wall thinning in RAI 17-14.<sup>337</sup> According to Sierra Club, because Holtec did not provide this information in its answers to Sierra Club’s petition, the information qualifies as new.<sup>338</sup> Sierra Club bases its amended contention on Holtec’s responses to the RAIs and on the declaration of Dr. Gordon Thompson, who also supports Sierra Club Contention 2.<sup>339</sup>

For both its original and amended contention, Sierra Club also relies on the second of five comments in George Rice’s declaration. This comment explains that “[t]wo brine disposal facilities once operated in the northeast portion of the [proposed] site” and in 2007 a water sample from a spring flowing in that area tested as brine.<sup>340</sup> Mr. Rice then asks the applicant: “Do the springs/seeps that were flowing in 2007 continue to flow? Is brine moving along perched zones in the alluvial materials, or along the alluvium/Dockum interface? Could the brine come into contact with the canisters?”<sup>341</sup>

As described *supra*, the Board will consider an amended contention filed after the original deadline only if the petitioner demonstrates good cause under the three-pronged test of 10 C.F.R. § 2.309(c)(1). Here, we agree with the NRC Staff and Holtec that Joint Petitioners have failed to demonstrate good cause, because the information upon which they base their amended contention was previously available. As the NRC Staff correctly argues: “The legal standard is not whether Holtec’s RAI responses differ from the arguments it raised in its Answer to the Petition, but whether the factual information underpinning Holtec’s RAI responses was previously available — for example, in the SAR or [Environmental Report].”<sup>342</sup>

We conclude that Sierra Club has not shown any materially different or new information in Holtec’s RAI responses. Dr. Thompson’s report primarily restates Holtec’s RAI responses verbatim. His substantive comments do not engage with the responses, other than to claim that they “exhibit unwarranted optimism.”<sup>343</sup> Rather, he focuses on Holtec’s alleged failure to analyze climate change<sup>344</sup> and alleged lack of capability to perform credible inspections of spent fuel canisters

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<sup>336</sup> Sierra Club Motion to Amend Contention 16, at 6.

<sup>337</sup> *Id.* at 6-7.

<sup>338</sup> *Id.*

<sup>339</sup> *Id.* at 9.

<sup>340</sup> Rice Decl. at 6.

<sup>341</sup> *Id.*

<sup>342</sup> NRC Staff Response to Sierra Club Motion to Amend Contention 16, at 6.

<sup>343</sup> Dr. Gordon R. Thompson Decl. for Sierra Club (Feb. 12, 2019) at 22, 23, 25.

<sup>344</sup> *Id.* at 22-23.

or CECs.<sup>345</sup> Both of these critiques could have been made at the outset of this proceeding based solely on the SAR. The same is true for Mr. Rice's second comment, because Sierra Club cites the exact same comment as a basis for its originally-filed Contention 16.<sup>346</sup> And pointing to the RAI responses, without more, will rarely provide sufficient support for an admissible contention.<sup>347</sup>

Because Sierra Club has failed to meet the good cause standard under 10 C.F.R. § 2.309(c)(1), we deny Sierra Club's motion to amend Contention 16. Accordingly, we consider Sierra Club Contention 16 as originally filed.

We conclude that Sierra Club does not provide an adequate basis for its single-sentence Contention 16. As Holtec points out, Mr. Rice's Figure 1 and detailed subsurface profiles in the Environmental Report show that the proposed facility would be located above the interface between the alluvium/Dockum, where Mr. Rice suggests that shallow groundwater may exist.<sup>348</sup> Furthermore, the SAR describes how the spent nuclear fuel will be contained in a steel canister within a steel CEC and concludes that "the CEC is a closed bottom, open top, thick walled cylindrical vessel that has no penetrations or openings. Thus, groundwater has no path for intrusion into the interior space of the CEC."<sup>349</sup> Sierra Club does not dispute these conclusions or provide any other reason for how brine could affect the canisters. "[N]either mere speculation nor bare or conclusory assertions, even by an expert, alleging that a matter should be considered will suffice to allow the admission of a proffered contention."<sup>350</sup>

Sierra Club Contention 16 is not admitted.

## **17. Sierra Club Contention 17**

Sierra Club Contention 17 states:

The [Environmental Report] and SAR do not discuss the presence and implications of fractured rock beneath the Holtec site. These fractures could allow radioactive leaks from the [consolidated interim storage] facility to enter groundwater or for the brine described in Contention 16 to corrode the containers contain[ing] the radioactive material.<sup>351</sup>

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<sup>345</sup> *Id.* at 25.

<sup>346</sup> Sierra Club Pet. at 63.

<sup>347</sup> See *PPL Susquehanna, LLC* (Susquehanna Steam Electric Station, Units 1 and 2), CLI-15-8, 81 NRC 500, 506 (2015).

<sup>348</sup> Holtec Answer to Sierra Club at 85-86.

<sup>349</sup> SAR at 1-14; *id.* at 1-24 (Fig. 1.2.2(a)).

<sup>350</sup> *Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), LBP-07-3, 65 NRC 237, 253 (2007) (citing *Fansteel*, CLI-03-13, 58 NRC at 203).

<sup>351</sup> Sierra Club Pet. at 63-64.

Sierra Club bases this contention on the third of five comments in the declaration of George Rice.<sup>352</sup> Mr. Rice claims that “[f]ractures are common at the site” and that “[s]ome portions of both [the Santa Rosa and Chinle] formations are described as *highly fractured*[ ] . . . in the logs of monitor wells.”<sup>353</sup> He asserts that these fractures “could rapidly convey contaminants to underlying groundwater.”<sup>354</sup>

As in its Contentions 15 and 16, Sierra Club does not provide adequate support for its contention. Holtec’s Environmental Report concludes: “Impacts to groundwater would not be expected, due to the depth of groundwater and the fact that the CIS Facility would not release pollutants, including radionuclides, during normal operations.”<sup>355</sup> Nor would a release of radioactive material occur, Holtec’s Environmental Report asserts, during any credible off-normal event<sup>356</sup> or accident.<sup>357</sup>

It also states that “[t]here is no potential for a liquid pathway because the spent fuel contains no liquid component and the casks are sealed to prevent any liquids from contacting the spent fuel assemblies.”<sup>358</sup> Holtec’s SAR concludes that “the CEC is a closed bottom, open top, thick walled cylindrical vessel that has no penetrations or openings. Thus, groundwater has no path for intrusion into the interior space of the CEC.”<sup>359</sup> Sierra Club does not explain why these conclusions are false or questionable, such that contaminants could be conveyed to underlying groundwater. In its reply, Sierra Club does not elaborate on a rationale for its contention except to offer the conclusory statement that “[t]here is sufficient information to raise the specter of leaks from the casks into the groundwater.”<sup>360</sup> “[N]either mere speculation nor bare or conclusory assertions, even by an expert, alleging that a matter should be considered will suffice to allow the admission of a proffered contention.”<sup>361</sup>

Sierra Club Contention 17 is not admitted.

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<sup>352</sup> See Rice Decl. at 6.

<sup>353</sup> *Id.*

<sup>354</sup> *Id.*

<sup>355</sup> ER at 4-13.

<sup>356</sup> *Id.* at 4-56.

<sup>357</sup> *Id.* at 4-57. Additionally, as discussed *supra*, the HI-STORM UMAX FSAR concludes in section 2.0.6 that “[t]he MPC provides for confinement of all radioactive materials for all design basis normal, off-normal, and postulated accident conditions. As discussed in Chapter 7 of the HI-STORM [flood and wind], [multi-purpose canister] design meets the guidance in the Interim Staff Guidance (ISG)-18 so that leakage of radiological matter from the confinement boundary is non-credible.”

<sup>358</sup> *Id.* at 7-1.

<sup>359</sup> SAR at 1-14; *id.* at 1-24 (Fig. 1.2.2(a)).

<sup>360</sup> Sierra Club Reply at 39.

<sup>361</sup> *Vogtle*, LBP-07-3, 65 NRC at 253 (citing *Fansteel*, CLI-03-13, 58 NRC at 203).



## 18. *Sierra Club Contention 18*

Sierra Club Contention 18 states:

The Santa Rosa Formation is an important aquifer in the area of the Holtec site. It is used for domestic water supply, stock watering and irrigation. The Holtec [Environmental Report] has not adequately determined and discussed the possibility that waste-contaminated groundwater could reach the Santa Rosa Formation.<sup>362</sup>

Sierra Club bases this contention on the fourth comment in the declaration of George Rice.<sup>363</sup> His fourth comment states that “the top of the Santa Rosa [Formation] is approximately 215 feet below land surface.”<sup>364</sup> It also describes how Holtec’s monitor well B101 is located in the Santa Rosa Formation, and “the depth to water in the well is about 250 feet. The quality of this water has not been determined.”<sup>365</sup> Mr. Rice claims that “the possibility that waste-contaminated groundwater could reach the Santa Rosa Formation cannot be dismissed.”<sup>366</sup>

We agree with Holtec that Sierra Club has put “forth an unsupported hypothetical and demand[ed] that the applicant prove the negative.”<sup>367</sup> While it may be true that the Santa Rosa Formation is an important source of groundwater located in Lea County,<sup>368</sup> Sierra Club has not demonstrated any support for its claim that waste-contaminated groundwater from the proposed facility could reach that formation. As explained *supra*, Holtec’s Environmental Report concludes: “Impacts to groundwater would not be expected, due to the depth of groundwater and the fact that the CIS Facility would not release pollutants, including radionuclides, during normal operations”<sup>369</sup> or during any credible off-normal event<sup>370</sup> or accident.<sup>371</sup>

Sierra Club appears to implicitly dispute the second conclusion — that the proposed facility would not release pollutants into groundwater. However, Sierra Club does not provide any rationale to support its expert’s conclusory statements or explain why the Environmental Report is wrong to conclude that “[t]here is

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<sup>362</sup> Sierra Club Pet. at 65.

<sup>363</sup> Rice Decl. at 7.

<sup>364</sup> *Id.* (citing GEI Consultants, HI-STORE CISF Phase 1 Site Characterization, Lea County, New Mexico at 80 (Dec. 2017) [hereinafter GEI]).

<sup>365</sup> *Id.* (citing GEI at 36).

<sup>366</sup> *Id.*

<sup>367</sup> Holtec Answer to Sierra Club at 89.

<sup>368</sup> ER at 3-59 to -60.

<sup>369</sup> *Id.* at 4-13.

<sup>370</sup> *Id.* at 4-56.

<sup>371</sup> *Id.* at 4-57.

no potential for a liquid pathway because the spent fuel contains no liquid component and the casks are sealed to prevent any liquids from contacting the spent fuel assemblies.”<sup>372</sup>

Sierra Club Contention 18 is not admitted.

### **19. Sierra Club Contention 19**

Sierra Club Contention 19 states:

Holtec performed two sets of packer tests in the Santa Rosa Formation to estimate the hydraulic conductivity (permeability) of the formation. These tests were conducted in conjunction with the preparation of the [Environmental Report]. It does not appear from the report of Holtec’s consultant that these tests were conducted properly. Therefore, the [Environmental Report] has not presented an adequate evaluation of the affected environment.<sup>373</sup>

Sierra Club bases this contention on the fifth and final comment in the declaration of George Rice. His comment describes how Holtec performed two sets of packer tests in the Santa Rosa.<sup>374</sup> He claims that Holtec allegedly did not follow three of the recommendations in the U.S. Bureau of Reclamation’s Field Manual: (1) “the applicant does not appear to have cleaned the hole before conducting packer tests;” (2) “there is no description of the water used in the tests;” and (3) “the test duration appears to be too short.”<sup>375</sup> Accordingly, Sierra Club claims that “the results of the packer tests are unreliable and do not satisfy the requirements of 10 C.F.R. § 51.45.”<sup>376</sup>

We agree with the NRC Staff<sup>377</sup> and Holtec<sup>378</sup> that Sierra Club fails to show how this contention is material, because it has failed to show how the results of the packer tests would make a difference in the outcome of the licensing proceeding. Mr. Rice admitted in his declaration that “even when the tests are done properly, the values obtained are only semi-quantitative — within an order of magnitude of the actual value.”<sup>379</sup> Although Sierra Club asserts that “[t]he permeability of the site is certainly important to assessing whether the site is

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<sup>372</sup> *Id.* at 7-1.

<sup>373</sup> Sierra Club Pet. at 66.

<sup>374</sup> Rice Decl. at 8.

<sup>375</sup> *Id.* (citing 2 U.S. Bureau of Reclamation, Engineering Geology Field Manual, ch. 17 (2d ed. 2001)).

<sup>376</sup> Sierra Club Pet. at 67.

<sup>377</sup> NRC Staff Consol. Answer at 106-07.

<sup>378</sup> Holtec Answer to Sierra Club at 90-91.

<sup>379</sup> Rice Decl. at 8.

appropriate for the proposed CIS facility,”<sup>380</sup> Sierra Club does not describe how the permeability is material or how the asserted departures from the U.S. Bureau of Reclamation’s recommendations would have significance for any analysis or conclusion in the Environmental Report. Presumably, Sierra Club is implicitly expressing the same concern as Contentions 15 through 18 — that groundwater may become contaminated — but, as we explained *supra*, Sierra Club never links its concern about groundwater with an explanation for how groundwater could possibly come into contact with any contaminant from the storage facility. Mr. Rice merely speculates that the acceptable guidance may not have been followed.<sup>381</sup> Again, speculation, even by an expert, fails to provide the requisite support for an admissible contention.<sup>382</sup>

Sierra Club Contention 19 is not admitted.

## **20. Sierra Club Contention 20**

Sierra Club Contention 20 states:

Since the 1990’s almost all spent nuclear fuel being generated is high burnup fuel (HBF). HBF causes the cladding to become thinner, creating a higher risk of release of radioactive material. The cladding also becomes more brittle, with additional cracks. This situation causes risks to short-term and long-term dry storage. This issue is not adequately addressed in the SAR and high burnup fuel does not appear to be addressed in the [Environmental Report] at all. Cladding failure due to high burnup fuel is an issue that must be adequately addressed.<sup>383</sup>

Sierra Club’s Contentions 20 through 24 concerning high burnup fuel are supported by Dr. Marvin Resnikoff, who asserts expertise in radioactive waste.<sup>384</sup>

Sierra Club proffers Contention 20 based on the assertion that, because “[h]igh burnup fuel causes the cladding around the fuel to become thinner and more brittle, inducing cracking,” high burnup fuel containers are “more likely to leak radioactive material.”<sup>385</sup> Arguing that high burnup fuel is “dangerously unpredictable and unstable in storage,” Sierra Club cites a 2013 DOE report that suggests outstanding issues regarding cladding and high burnup fuel should be

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<sup>380</sup> Sierra Club Pet. at 66.

<sup>381</sup> Rice Decl. at 8 (“[T]he applicant *does not appear* to have followed several of the recommendations in the manual.”) (emphasis added).

<sup>382</sup> *Vogtle*, LBP-07-3, 65 NRC at 253 (citing *Fansteel*, CLI-03-13, 58 NRC at 203).

<sup>383</sup> Sierra Club Pet. at 67.

<sup>384</sup> *See id.*, Resnikoff Aff. ¶ 3.

<sup>385</sup> Sierra Club Pet. at 67-68.

resolved before this fuel type can be safely loaded, transported, and stored.<sup>386</sup> Citing a 2010 study by the U.S. Nuclear Waste Technical Review Board,<sup>387</sup> Sierra Club claims that zirconium cladding experiences a twelve percent thinning due to the effects of high burnup, and “the likelihood of cladding defects increase” when storing high burnup fuel.<sup>388</sup> In sum, Sierra Club argues the Environmental Report and SAR must “discuss and evaluate the risks of transporting and storing [high burnup fuel].”<sup>389</sup>

To the extent Sierra Club Contention 20 raises safety claims concerning transportation and storage, it is inadmissible because it fails to raise a genuine dispute with the application on a material issue of law or fact. First, Part 71 and U.S. Department of Transportation regulations establish the standards for transporting spent nuclear fuel — not for storing fuel at an interim storage facility. This aspect of the contention does not raise a genuine dispute with Holtec’s Part 72 license application. Moreover, regarding storage of high burnup fuel (and consistent with our conclusion in connection with Sierra Club’s related Contention 14 *supra*), the analyses and bounding technical specifications are contained in HI-STORM UMAX’s FSAR and Certificate of Compliance, which is incorporated by reference into the HI-STORE facility’s SAR.<sup>390</sup> As Commission regulation bars any admitted contention based on an NRC-approved storage cask design incorporated by reference in an ISFSI application,<sup>391</sup> this facet of Sierra Club Contention 20 is inadmissible.

The claim that Holtec’s Environmental Report fails to address high burnup fuel in transport also does not raise a genuine dispute because it ignores the application. Environmental Report section 4.9<sup>392</sup> provides the results of a RADTRAN analysis that evaluated the incident-free radiological transportation impacts assuming the maximum dose rate allowed for exclusive use shipments under NRC regulation 10 C.F.R. § 71.47(b)(3). This would encompass spent fuel of any burnup, including high burnup fuel. With respect to potential impacts to transportation workers and the radiological transportation impacts that could potentially occur during accidents, ER section 4.9 bases its analyses on DOE calculations concerning incident-free and accident radiological impacts

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<sup>386</sup> *Id.* at 68-69 (citing DOE, *A Project Concept for Nuclear Fuels Storage and Transportation, Fuel Cycle Research & Development*, (rev. 1 June 2013)).

<sup>387</sup> U.S. Nuclear Waste Transp. Review Bd., *Evaluation of the Technical Basis for Extended Dry Storage and Transportation of Used Nuclear Fuel* (Dec. 2010).

<sup>388</sup> Sierra Club Pet. at 70.

<sup>389</sup> *Id.*

<sup>390</sup> *See, e.g.*, SAR at 16-1.

<sup>391</sup> *See* 10 C.F.R. § 72.46(e).

<sup>392</sup> ER at 4-30.

in the Yucca Mountain final supplemental EIS,<sup>393</sup> which in turn addresses the transportation of high burnup fuel.

Finally, the claim that storage of high burnup fuel is omitted from Holtec's Environmental Report also raises no genuine dispute. Sections 4.12 and 4.13 of the Environmental Report, which concern public and occupational health from normal operations and off-normal operations and accidents, speak to the storage of high burnup fuel.<sup>394</sup> As there are no separate regulatory requirements regarding high burnup fuel, section 4.12 relies on the Continued Storage GEIS in its analyses of dose to the public and its workers.<sup>395</sup> Section 4.13 specifically incorporates by reference the UMAX FSAR, which addresses credible accidents and high burnup fuel.<sup>396</sup> Therefore, to the extent the contention asserts that Holtec omitted discussion of high burnup fuel storage, it is inaccurate. A contention of omission must be summarily rejected if "the topic that allegedly is omitted is, in fact, included with the application."<sup>397</sup>

Sierra Club Contention 20 is not admitted.

## **21. Sierra Club Contention 21**

Sierra Club Contention 21 states:

There is no experimental support for the safe transportation and storage of [High Burnup Fuel]. Holtec must show that safety is assured not only for hypothetical accident conditions, but also for real life accident conditions. Holtec has not done that in this case.<sup>398</sup>

Sierra Club argues that, under section 72.108, "the transportation of [high burnup fuel] especially must be addressed in the [Environmental Report]."<sup>399</sup> Sierra Club's basis for the contention is that there is a lack of data concerning high burnup fuel transportation guidance for applicants to meet certain Part 71 requirements.<sup>400</sup> Citing NRC Interim Staff Guidance 11 (ISG-11)<sup>401</sup> in which

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<sup>393</sup> DOE, Final Supplemental EIS for a Geological Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada, DOE/EIS-0250F-S-1, at G-34 (June 2008).

<sup>394</sup> ER 4-16 to -17, 4-46 to -48.

<sup>395</sup> *Id.* at 4-48.

<sup>396</sup> *Id.* at 4-61.

<sup>397</sup> *USEC Inc.* (American Centrifuge Plant), CLI-06-10, 63 NRC 451, 456 (2006).

<sup>398</sup> Sierra Club Pet. at 70.

<sup>399</sup> *Id.* at 71.

<sup>400</sup> *Id.* at 70.

<sup>401</sup> Spent Fuel Project Office, NMSS, Interim Staff Guidance, Cladding Considerations for the Storage and Transportation of Spent Fuel (Nov. 17, 2003).

the NRC Staff sets a “case-by-case” standard for the transportation of high burnup fuel, Sierra Club broadly claims that Holtec “has not met this test.”<sup>402</sup> Sierra Club then points out issues with the ISG-11 document itself, stating that, although the Staff is still reviewing data on high burnup fuel and cladding issues vis-à-vis transportation, there is a question concerning what exactly the Staff’s methodology is.<sup>403</sup> Ultimately, Sierra Club wants Holtec’s Environmental Report to “address real life accident conditions based on the specific facts of this case.”<sup>404</sup>

Although the wording of Contention 21 mentions “safe transportation and storage,” none of the supporting bases or facts on which Sierra Club relies address storage at all. Thus, the storage portion of Contention 21 is inadmissible for failure to cite any alleged facts or expert opinion on which Sierra Club would rely at an evidentiary hearing.<sup>405</sup>

The remainder of the contention is inadmissible because it fails to raise a genuine dispute on a material issue with Holtec’s application for a consolidated interim storage facility. Again, Sierra Club declines to grapple with the application at hand — Holtec’s HI-STORE application to store spent fuel under Part 72 — and instead it broadly asserts that Holtec does not meet a “case-by-case” transportation standard for high burnup fuel transportation (as set forth in an NRC non-binding guidance document). Sierra Club also fails to specifically explain how Holtec fails to meet this standard. Bald assertions that an application is insufficient or inadequate, without more, do not meet the Commission’s contention admissibility standard.<sup>406</sup>

Sierra Club Contention 21 is not admitted.

## 22. *Sierra Club Contention 22*

Sierra Club Contention 22 states:

With high burnup fuel hydrogen absorption into the Zircaloy metal can lead to hydrogen embrittlement (loss of cladding ductility) of the cladding. Vibrations during transport will lead to further degradation of the cladding. Nothing in the Holtec documentation shows that Holtec has addressed this issue in this case.<sup>407</sup>

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<sup>402</sup> Sierra Club Pet. at 71-72.

<sup>403</sup> *Id.* at 71.

<sup>404</sup> *Id.* at 72.

<sup>405</sup> 10 C.F.R. § 2.309(f)(1)(v).

<sup>406</sup> *Nuclear Management Co.* (Palisades Nuclear Plant), LBP-06-10, 63 NRC 314, 341, *aff’d*, CLI-06-17, 63 NRC 727 (2006).

<sup>407</sup> Sierra Club Pet. at 72.

Reflecting its continuing concern with the transport of high burnup fuel, Sierra Club alleges that Holtec's Environmental Report "has not adequately made the evaluation of the loss of ductility on the fuel rods due to the [high burnup fuel] and the likelihood of material strength and a release of radioactive material" in accordance with 10 C.F.R. § 72.108.<sup>408</sup> Arguing that hydrogen absorption into the zircaloy cladding (hydrides) can lead to cladding embrittlement, Sierra Club claims that this ultimately could "lead to delayed hydride cracking."<sup>409</sup> Finally, Sierra Club reasserts its claim from Contention 21 that Holtec does not meet the spent fuel transportation "case-by-case" test set forth in ISG-11, and that the Environmental Report must address "real life accident conditions."<sup>410</sup>

As with Contention 21, Sierra Club Contention 22 is inadmissible for failure to raise a genuine dispute with the application on a material issue of law or fact. We agree with the NRC Staff's assessment that, while section 72.108 requires the applicant to consider impacts from transportation in the Environmental Report, "it does not require that the environmental report prove the safety of transportation packages."<sup>411</sup> Moreover, the Commission's Part 71 regulations already address and preempt the issues Sierra Club seeks to litigate in this contention.<sup>412</sup> And Sierra Club's identical argument concerning the "case-by-case" test in ISG-11 is inadmissible for the same reason we found it inadmissible in Contention 21.

Sierra Club Contention 22 is not admitted.

### **23. *Sierra Club Contention 23***

Sierra Club Contention 23 states:

Spent fuel cladding must be protected during storage against degradation that leads to gross ruptures in the fuel or the fuel must be otherwise confined such that the degradation of the fuel during storage will not pose operational safety problems with respect to its removal from storage. It is the responsibility of the licensee to ensure that fuel placed in dry storage meets the design-basis conditions. If [high burnup fuel] develops gross cladding defects during transportation, Holtec has not described how such defects could be detected. If [high burnup fuel] develops gross

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<sup>408</sup> *Id.* at 72-73.

<sup>409</sup> *Id.* at 73 (quoting Chan, *An Assessment of Delayed Hydride Cracking in Zirconium Alloy Cladding Tubes Under Stress Transients* (2006)).

<sup>410</sup> *Id.*

<sup>411</sup> NRC Staff Consol. Answer at 116.

<sup>412</sup> See 10 C.F.R. § 71.71(c)(1)(5) (vibration incident to transport of spent fuel); *id.* § 71.73 (analyses of required transport accident conditions).

cladding defects and the fuel cannot be accepted at a waste repository, the fuel will remain at the proposed [consolidated interim storage] facility indefinitely.<sup>413</sup>

Citing 10 C.F.R. § 72.122(h)(1), Sierra Club argues that Holtec must protect the spent fuel cladding “against degradation that leads to gross ruptures in the fuel or the fuel must be otherwise confined such that the degradation of the fuel during storage will not pose operational safety problems” when the fuel is retrieved from storage.<sup>414</sup> Sierra Club then asserts that Holtec “has not specified how it will address the safety issues inherent in the gross cladding defects due to [high burnup fuel].”<sup>415</sup> Sierra Club also claims that Holtec has not described how either of these defects will be detected if they occur during transportation or how the high burnup fuel will be managed once that fuel is “transported to a repository.”<sup>416</sup>

Contention 23 cannot be admitted because it fails to show that a genuine dispute exists with the Holtec application on a material issue of law or fact. First, Sierra Club does not identify which part of the application it disputes, as specifically required.<sup>417</sup> Second, Sierra Club does not address the analyses that support Holtec’s claim that it does comply with section 72.122(h)(1), which are provided in the FSAR for the HI-STORM UMAX system and incorporated by reference in Holtec’s SAR.<sup>418</sup> And as Holtec points out, the HI-STORM UMAX system has already been certified by the NRC through its independent analyses and publication of its own Safety Evaluation Report (SER).<sup>419</sup> Indeed, the NRC Staff in 2015 concluded that fuel stored in the UMAX system would be maintained at a temperature below ISG-11 Revision 3 standards (i.e., below 400°C) and accordingly determined that the system complied with section 72.122(h)(1) as it relates “to thermal analysis, fuel cladding integrity and fuel retrievability.”<sup>420</sup> As the HI-STORE UMAX canister system has already been certified

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<sup>413</sup> Sierra Club Pet. at 73-74.

<sup>414</sup> *Id.* at 74.

<sup>415</sup> *Id.*

<sup>416</sup> *Id.* at 75.

<sup>417</sup> 10 C.F.R. § 2.309(f)(1)(vi).

<sup>418</sup> *See, e.g.*, SAR Ch. 6 (incorporating by reference Docket No. 72-1040, Certificate of Compliance No. 1040, “[FSAR] on The HI-STORM UMAX Canister Storage System” (June 2018) (ADAMS Accession No. ML16193A336)).

<sup>419</sup> Holtec Answer to Sierra Club at 113-14 (citing SER, Docket No. 72-1040, HI-STORM UMAX Canister Storage System, Holtec, Certificate of Compliance No. 1040, at 15 (Apr. 2015) (ADAMS Accession No. ML15093A510) [hereinafter HI-STORM UMAX SER]).

<sup>420</sup> HI-STORM UMAX SER at 4-5, -19, -22 to -23, -37.



compliant by the NRC,<sup>421</sup> a petitioner is barred by regulation from challenging either the Staff's SER or the UMAX SAR analyses in an adjudication.<sup>422</sup>

Sierra Club Contention 23 is not admitted.

#### **24. Sierra Club Contention 24**

Sierra Club Contention 24 states:

Because of the high heat output of fuel within MPC-37 canisters, there is a long decay time before shipments to the Holtec [consolidated interim storage] facility can occur. The loading of the MPC-37 is quite complicated. It is unclear when reactors will be allowed to ship the MPC-37 to the Holtec facility. There is a serious risk of radioactive contamination if the radioactive waste is shipped too soon. Information that would inform the public and analysts has been withheld as being proprietary information. Neither the Holtec [Environmental Report] or SAR contain sufficient information to assess the risk of shipping the MPC-37 canisters.<sup>423</sup>

Sierra Club claims that "Holtec has not provided sufficient information in the [Environmental Report] or SAR to make an accurate assessment of the safety of the [MPC-37 canisters for high burnup fuel]."<sup>424</sup> Sierra Club also contends that it was not permitted to access information about the MPC-37 canister or the HI-TRAC CS cask because Holtec withheld the information as proprietary.<sup>425</sup>

As emphasized throughout this Memorandum and Order, Holtec has applied for a license to construct and operate a Holtec HI-STORE UMAX spent fuel storage installation — not a license for it to transport canisters or casks. Nor is Holtec applying for permission to use or certify Holtec canisters or casks for transport, as those proposed for use at the HI-STORE facility have already been reviewed by the NRC and have been issued certificates of compliance. Thus, a contention challenging any aspect of an NRC-approved canister or cask is outside the scope of this proceeding under 10 C.F.R. § 2.309(f)(1)(iii), and would be an impermissible attack on the Commission's regulations absent a waiver under section 2.335.

As to Sierra Club's claim that proprietary information was withheld that prejudiced petitioners, the claim is not an admissible contention under any standard. We again observe that the *Federal Register* notice announcing the opportunity

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<sup>421</sup> 10 C.F.R. § 72.214 (Certificate Number 1040).

<sup>422</sup> *Id.* § 72.46(e).

<sup>423</sup> Sierra Club Pet. at 75-76.

<sup>424</sup> *Id.* at 76.

<sup>425</sup> *Id.* at 76, 80.

to petition for a hearing in this proceeding set forth a procedure for petitioners to obtain proprietary information.<sup>426</sup> The Secretary of the Commission also granted an extension of time for petitioners to do so,<sup>427</sup> but Sierra Club still did not avail itself of the procedure.

Sierra Club Contention 24 is not admitted.

## **25. *Sierra Club Contention 25***

Sierra Club's Contention 25 states:

Sierra Club adopts all contentions presented by Don't Waste Michigan, Citizens Against Chemical Contamination, Public Citizen, San Luis Obispo Mothers for Peace, Nuclear Energy Information Service, Citizens' Environmental Coalition, and Environmentalists, Inc. in their Petition to Intervene in this proceeding.<sup>428</sup>

To adopt a contention, a participant must (1) have demonstrated standing in their own right; and (2) have proffered an admissible contention itself.<sup>429</sup> Because Sierra Club has not proffered an admissible contention itself, it cannot adopt any of Joint Petitioners' contentions.

Sierra Club Contention 25 is not admitted.

## **26. *Sierra Club Contention 26***

Sierra Club Contention 26 states:

Section 186 of the Atomic Energy Act (AEA) (42 U.S.C. § 2236) provides that a license issued by the NRC may be revoked for any material false statement in the license application. Holtec has made a material false statement in its license application in this case by stating repeatedly that title to the waste to be stored at the [consolidated interim storage] facility would be held by DOE and/or the nuclear plant owners. This false statement was repeated in Holtec's Answers to Sierra Club's Contention 1 and [Joint Petitioners'] Contention 2.

The statement that nuclear plant owners might retain title to the waste is shown to be false by a January 2, 2019, e-mail message from Holtec to the public titled "Reprising 2018[.]" "Reprising 2018" states, "While we endeavor to create a

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<sup>426</sup> See Notice of Opportunity to Request a Hearing, 83 Fed. Reg. at 32,919.

<sup>427</sup> See Order of the Secretary (Aug. 20, 2018) (extending petitioners' requests to access SUNSI to August 30, 2018).

<sup>428</sup> Sierra Club Pet. at 82.

<sup>429</sup> See *Consolidated Edison Co. of New York* (Indian Point, Units 1 and 2), CLI-01-19, 54 NRC 109, 132-33 (2001).

national monitored retrievable storage location for aggregating used nuclear fuel at reactor sites across the U.S. into one (HI-STORE CISF) to maximize safety and security, its deployment will ultimately depend on the DOE and the U.S. Congress.”

Thus, if a false statement such as Holtec has made in its filing in this case is grounds for revoking a license, it is grounds for not issuing the license in the first instance.<sup>430</sup>

On January 17, 2019, Sierra Club filed a motion to submit this new contention.<sup>431</sup> Because Sierra Club Contention 26 was submitted after the deadline for filing petitions,<sup>432</sup> we must first consider whether Sierra Club’s motion to file the contention satisfies the three-prong test in 10 C.F.R. § 2.309(c)(1)(i)–(iii). Although Holtec argues to the contrary,<sup>433</sup> the contention clearly satisfies two of them. It is undisputed that the e-mail on which the contention relies was not publicly available until January 2, 2019.<sup>434</sup> Likewise there is no dispute that Sierra Club timely submitted Contention 26 on January 17, 2019 — just 15 days later.<sup>435</sup>

Less clear is whether Contention 26 relies on information that is “materially different from information previously available.”<sup>436</sup> Both Holtec and the NRC Staff argue it is not.<sup>437</sup> Holtec goes one step further and asks us to refuse even to consider the admissibility of Sierra Club Contention 26 because, Holtec argues, “Petitioners[’] gross mischaracterizations of the statement in the Holtec article belie any finding of good cause under the late-filing requirements in 10 C.F.R. § 2.309(c).”<sup>438</sup>

Both Holtec and the NRC Staff, in our view, wrongly conflate the “materially different” requirement of 10 C.F.R. § 2.309(c)(1)(ii) (necessary to file

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<sup>430</sup> Sierra Club’s Motion to File a New Late-Filed Contention (Jan. 17, 2019) [hereinafter Sierra Club’s Late-Filed Contention 26 Motion]; Sierra Club Contention 26 (Jan. 17, 2019) [hereinafter Sierra Club Contention 26].

<sup>431</sup> Sierra Club’s Late-Filed Contention 26 Motion; *see* Sierra Club Contention 26.

<sup>432</sup> *See* Notice of Opportunity to Request a Hearing, 83 Fed. Reg. at 32,919 (establishing September 14, 2018 as the deadline for hearing requests and petitions to intervene).

<sup>433</sup> *See* Holtec Opposition to Late-Filed Sierra Club Contention 26 and [Joint Petitioners] Contention 14 (Feb. 19, 2019) at 2-6 [hereinafter Holtec Opp. to Late-Filed Contentions].

<sup>434</sup> *See* Sierra Club’s Motion to File a New Late-Filed Contention (Jan. 17, 2019), attach. Ex. 11, *Holtec Highlights*, Holtec Reprising 2018 (Jan. 2, 2019) [hereinafter Reprising 2018 E-mail].

<sup>435</sup> *See* *Shaw AREVA MOX Servs.*, LBP-08-11, 67 NRC at 493 (30 days deemed timely).

<sup>436</sup> 10 C.F.R. § 2.309(c)(1)(ii).

<sup>437</sup> Holtec Opp. to Late-Filed Contentions at 4-6; NRC Staff’s Consolidated Response to [Joint Petitioners], and the Sierra Club’s Motions to File New Contentions (Feb. 19, 2019) at 7-8 [hereinafter NRC Staff Response to Late-Filed Contentions].

<sup>438</sup> Holtec Opp. to Late-Filed Contentions at 4.

a contention after the initial deadline) with the “material to the findings the NRC must make” requirement of 10 C.F.R. § 2.309(f)(1)(iv) (necessary to admit a contention). As frequently stated, the NRC’s pleading requirements differ markedly from those in most courts because “notice pleadings” are not permitted.<sup>439</sup> Rather, the scope of a contention is limited to issues of law and fact pled with particularity,<sup>440</sup> unless the contention is properly amended in accordance with the NRC’s rules.

A corollary to the NRC’s strict pleading requirements, however, is that the Agency may place petitioners in a quandary: What new information requires amending a contention or pleading a new one, on the one hand, and what merely constitutes new evidence that may be introduced in support of an existing contention? A petitioner who guesses wrong may find its evidence or its line of argument excluded from an evidentiary hearing.

Accordingly, in deciding whether to permit a contention to be filed after the initial deadline, we interpret “materially different” new information from the standpoint of a reasonable petitioner. Holtec’s statement in “Reprising 2018” concerning the role of DOE and the Congress in deployment of the proposed facility meets this standard because it appears to contradict information in the application. We do not demand that a petitioner establish the admissibility (much less the merits) of a contention before allowing it to be filed. Sierra Club’s motion to file Contention 26 is granted for cause.

That said, we agree with Holtec and the NRC Staff that Sierra Club Contention 26 is not admissible.<sup>441</sup>

Holtec’s “Reprising 2018” e-mail message stated that deployment of the planned facility “will ultimately depend on the DOE and the U.S. Congress.”<sup>442</sup> Contention 26, therefore, claims Holtec made a material false statement in its license application when it said title to the spent fuel stored in the facility would be held either by DOE or by the nuclear plant owners.<sup>443</sup> Holtec’s statement in “Reprising 2018,” Sierra Club contends, is an admission that Holtec really has no intention of contracting with nuclear plant owners. Rather, Sierra Club asserts, Holtec intends to go forward with the project only if it can contract with

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<sup>439</sup> *North Atlantic Energy Service Corp.* (Seabrook Station, Unit 1), CLI-99-6, 49 NRC 201, 219 (1999).

<sup>440</sup> *Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-15, 71 NRC 479, 482 (2010).

<sup>441</sup> See Holtec Opp. to Late-Filed Contentions at 6-13; NRC Staff Response to Late-Filed Contentions at 8-11.

<sup>442</sup> Reprising 2018 E-mail at 1.

<sup>443</sup> See Sierra Club Contention 26 at unnumbered p. 1.

DOE (which, both Holtec and Sierra Club agree, with limited exceptions would currently be unlawful).<sup>444</sup>

Consequently, Contention 26 asserts, Holtec's license application should be denied. Because section 186 of the AEA<sup>445</sup> provides that an NRC license may be revoked for a material false statement in the license application, Sierra Club argues, it likewise should be grounds for not issuing a license in the first place.

Assuming section 186 of the AEA applies,<sup>446</sup> however, Contention 26 does not set out a possible violation. Contrary to Sierra Club's arguments, a violation of section 186 requires a willful misrepresentation.<sup>447</sup> Nothing in "Reprising 2018" demonstrates a misrepresentation in Holtec's license application, willful or otherwise.

On the contrary, Holtec's revised application unambiguously states that construction will be undertaken only after it has established "a definitive agreement with the prospective user/payer for storing the used fuel (USDOE and/or a nuclear plant owner)."<sup>448</sup> Sierra Club claims, and Holtec agrees, that with certain limited exceptions DOE may not lawfully take title to spent nuclear fuel under current law.<sup>449</sup> Therefore, Holtec's application describes two alternative types of customers: DOE and the nuclear plant owners themselves.

Holtec readily acknowledges that it hopes Congress will change the law, and allow it in most instances to contract directly with DOE to store spent fuel.<sup>450</sup> Additionally, as Holtec points out, the eventual development of a permanent national nuclear waste repository, as contemplated by the NWPA, might eliminate the need for some or all of the planned stages of Holtec's proposed interim storage facility.<sup>451</sup> Nothing in "Reprising 2018" is inconsistent with this state of affairs.

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<sup>444</sup> See *supra* discussion at Sierra Club Contention 1.

<sup>445</sup> 42 U.S.C. § 2236.

<sup>446</sup> Holtec contends that, prior to the issuance of a license, only section 182 of the AEA (42 U.S.C. § 2232) should apply, rather than section 186. See Holtec Opp. to Late-Filed Contentions at 12-13. The NRC Staff's response does not address the issue. For purposes of determining whether Contention 26 is admissible, we assume *arguendo* that Sierra Club properly invokes section 186.

<sup>447</sup> Before 1987, the Commission used the standard set forth in the pre-1987 cases on which the Sierra Club relies. See Sierra Club Contention 26 at unnumbered pp. 7-8. But, in a 1987 rulemaking, the Commission reversed its prior policy. Whereas previously a material false statement under section 186 could be "unintended and inadvertent," the Commission determined in 1987 to limit the term to "egregious situations" involving an element of intent. Completeness and Accuracy of Information, 52 Fed. Reg. 49,362, 49,363-65 (Dec. 31, 1987).

<sup>448</sup> SAR at 1-6. (As discussed *supra*, Holtec has corrected an erroneous inconsistency that initially appeared in Revision 1 of its Environmental Report).

<sup>449</sup> See *supra* Section IV.B.1.

<sup>450</sup> Tr. at 250.

<sup>451</sup> Tr. at 246.

Meanwhile, Holtec represents that it is committed to going forward with the project by contracting directly with nuclear plant owners that currently hold title to their spent fuel.<sup>452</sup> We have no reason to assume that, having acknowledged on the record that (with limited exceptions) it would be unlawful to contract directly with DOE under the NWPA as currently in effect, Holtec will nonetheless try to do just that.<sup>453</sup> Nor may we assume that DOE would be complicit in a violation of the NWPA.<sup>454</sup>

Whether Holtec will find the alternative of contracting with the nuclear plant owners to be commercially viable is not an issue before the Board, because the business decision of whether to use a license has no bearing on a licensee's ability to safely conduct the activities the license authorizes. As the Commission instructs us, "the NRC is not in the business of regulating the market strategies of licensees or determining whether market conditions warrant commencing operations."<sup>455</sup>

Sierra Club Contention 26 is not admitted.

## 27. *Sierra Club Contention 27*

Sierra Club Contention 27 states:

During the hearing before the ASLB in this case that occurred on January 23 and 24, 2019, Holtec relied on its purported Aging Management Program, SAR Chapter 18, to support its claim that there is no issue with high burnup fuel, as set forth in Sierra Club Contentions 14 and 20–23. Holtec had not replied upon, or even mentioned, the Aging Management Program in its Answer to Contentions 14 and 20–23, which raise issues regarding high burnup fuel. This is new information that was not available to Sierra Club until Holtec relied upon the Aging Management Program at the ASLB hearing.

Holtec's Aging Management Program, SAR Chapter 18, only mentions high burnup fuel once, in Section 18.3. The Aging Management Program does not explain how the impact to the containers from high burnup fuel will be addressed. The reference simply refers to Appendix D of NUREG-1927, which provides a process for experimental demonstration for time periods beyond a 20-year licensing period.

The ER does not mention the Aging Management Program at all.

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<sup>452</sup> Tr. at 248.

<sup>453</sup> See, e.g., *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-01-9, 53 NRC 232, 235 (2001) ("Further, in the absence of evidence to the contrary, the NRC does not presume that a licensee will violate agency regulations wherever the opportunity arises.").

<sup>454</sup> See, e.g., *Chemical Foundation*, 272 U.S. at 14-15; *Armstrong*, 517 U.S. at 464.

<sup>455</sup> *Nat'l Enrichment Facility*, CLI-05-28, 62 NRC at 726 (internal quotation marks omitted).

Since the Holtec [consolidated interim storage] facility is expected to be in operation well beyond the 40-year licensing period, the Aging Management Program in the SAR, if it proposes to comply with Appendix D, must set out in detail how it will do so.<sup>456</sup>

Sierra Club relies on three documents to support its point that an “aging management program must be based on more tha[n] hope and a promise.”<sup>457</sup> First is DOE guidance entitled “Managing Aging Effects on Dry Cask Storage Systems for Extended Long-Term Storage and Transportation of Used Fuel-Revision 2,” which refers to four types of aging management programs and ten elements that should be included in the programs.<sup>458</sup> Second is a portion of NRC guidance document, NUREG-1748, which describes what mitigation measures an applicant should describe in an environmental report.<sup>459</sup> Third is a report by Robert Alvarez that describes the alleged difficulty of monitoring decay heat from high burnup fuel.<sup>460</sup> Sierra Club also disputes Holtec’s assertion at oral argument that its aging management program is not voluntary, since Holtec “apparently gets to fashion its own program” and “there is no indication that there will be any NRC oversight of Holtec’s execution of the program.”<sup>461</sup>

Because this contention was submitted after the original deadline, we first determine whether the contention satisfies 10 C.F.R. § 2.309(c). As explained *supra*, the Board will consider a new or amended contention filed after the deadline only if the petitioner demonstrates good cause under the three-pronged test of 10 C.F.R. § 2.309(c)(1). We agree with the NRC Staff and Holtec that Sierra Club’s Contention 27 fails to meet the first prong,<sup>462</sup> and conclude that Sierra Club could have made this challenge to the aging management program in its initial petition. Sierra Club does not assert that the information about Holtec’s aging management program is new or materially different than the information in Holtec’s application, only that it has been used in a new way

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<sup>456</sup> Sierra Club’s Additional Contentions in Support of Petition to Intervene and Request for Adjudicatory Hearing (Feb. 25, 2019) at 1 [hereinafter Sierra Club Additional Contentions]; *see also* Sierra Club’s Motion to File New Late-Filed Contentions 27, 28, and 29.

<sup>457</sup> Sierra Club Additional Contentions at 4.

<sup>458</sup> *Id.*

<sup>459</sup> *Id.* at 7.

<sup>460</sup> *Id.*; *see also id.*, attach., Expert Report and *Curriculum Vitae* of Robert Alvarez (Feb. 25, 2019). As noted *infra*, Mr. Alvarez purports to have significant experience in the areas of nuclear materials and policy development.

<sup>461</sup> Sierra Club Additional Contentions at 6.

<sup>462</sup> *See* NRC Staff Response to Sierra Club’s Motion to Admit Contentions 27, 28, and 29 (Mar. 22, 2019) at 6-9 [hereinafter NRC Staff Answer to Sierra Club New Contentions]; Holtec Opposition to Late-Filed Sierra Club Contentions 27, 28, and 29 (Mar. 21, 2019) at 5-11 [hereinafter Holtec Opp. to Sierra Club New Contentions].

that Sierra Club did not anticipate. The DOE and NRC guidance documents upon which Sierra Club relies as the basis for this contention were available at the time that Sierra Club filed its initial petition. We agree with the NRC Staff's comment that this contention is "solely related to the adequacy of the [aging management program] as it already existed in the application."<sup>463</sup> As explained *supra*, previously available information that is newly interpreted by the petitioner does not constitute good cause to file a new contention.<sup>464</sup>

Sierra Club Contention 27 is not admitted.

## 28. *Sierra Club Contention 28*

Sierra Club Contention 28 states:

During the hearing before the ASLB in this case that occurred on January 23 and 24, 2019, Holtec relied on its purported Aging Management Program, SAR Chapter 18, to support its claim that there is no issue with impacts to or from the groundwater, as set forth in Sierra Club Contentions 15-19. Holtec had not relied upon, or even mentioned, the Aging Management Program in its Answer to Contentions 15-19, which raise issues regarding the presence and location of and impacts from groundwater. This is new information that was not available to Sierra Club until Holtec relied upon the Aging Management Program at the ASLB hearing.

Holtec's Aging Management Program, SAR Chapter 18, only mentions groundwater testing or monitoring in connection with concrete structures, in Section 18.8. The Aging Management Program does not explain how the impact to the containers from groundwater or impacts to the groundwater from leaking containers will be addressed. The reference simply refers to Appendix D of NUREG-1927, which provides a process for experimental demonstration for time periods beyond a 20-year licensing period.

The ER does not mention the aging management program at all.

Since the Holtec [consolidated interim storage] facility is expected to be in operation well beyond the 40-year licensing period, the Aging Management Program in the SAR, if it proposes to comply with accepted guidance, must set out in detail how it will do so.<sup>465</sup>

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<sup>463</sup> NRC Staff Response to Sierra Club New Contentions at 8.

<sup>464</sup> *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), LBP-90-5, 31 NRC 73, 79 (1990) (finding no "good cause" exists for late-filed safety concerns when petitioner "had yet to put the pieces of [the] safety puzzle together" despite previous availability of the information).

<sup>465</sup> Sierra Club Additional Contentions at 8.



This proposed contention is the same as Contention 27, except “high burnup fuel” has been substituted with the term “groundwater.” Sierra Club relies on the same documents as the basis for Contentions 27 and 28. Sierra Club also uses the same language to dispute Holtec’s assertion at the oral argument that the aging management program is voluntary.

As with Contention 27, because this contention was submitted after the deadline, we first determine whether it meets the good cause standard of 10 C.F.R. § 2.309(c). We agree with the NRC Staff and Holtec that Sierra Club’s Contention 28 fails to meet the first prong of section 2.309(c)(1),<sup>466</sup> and conclude that Sierra Club could have made this challenge in its initial petition. Again, Sierra Club does not assert that the information quoted from the oral argument or the documents underlying this contention are new or materially different than the information in Holtec’s application, only that Sierra Club’s interpretation is new. As explained *supra*, previously available information that is newly interpreted by the petitioner does not constitute good cause to file a new contention.<sup>467</sup>

Sierra Club Contention 28 is not admitted.

## **29. Sierra Club Contention 29**

Sierra Club Contention 29 states:

The [Environmental Report], Rev. 3, has now added “utilities,” in addition to DOE, as possible entities that might take title to the radioactive waste in the [consolidated interim storage] facility. The [Environmental Report] provides no hint, however, as to whether a private utility that owns a nuclear reactor would agree to retain title to the waste. In fact, the costs to a private utility would be so great that the utility would not want to retain title to the waste. And Holtec is still presenting DOE as a possible titleholder in the [Environmental Report], even though Holtec’s counsel admitted at the ASLB hearing on January 24, 2019, that DOE cannot legally take title to the waste. Thus, Holtec has failed to show reasonable assurance of funding for the project, as required by 10 C.F.R. § 72.22(e).<sup>468</sup>

Sierra Club relies on a report by Robert Alvarez that “describes the financial implications to reactor owners” as support for the assertion that it “is highly unlikely — in fact, probably a fanciful dream — that private reactor owners would agree to incur that kind of expense”<sup>469</sup> to retain title to the nuclear waste.

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<sup>466</sup> NRC Staff Answer to Sierra Club New Contentions at 7; Holtec Opp. to Sierra Club New Contentions at 17-20.

<sup>467</sup> *Turkey Point*, LBP-90-5, 31 NRC at 79.

<sup>468</sup> Sierra Club Additional Contentions at 14.

<sup>469</sup> *Id.* at 15. Mr. Alvarez has significant experience in nuclear materials and policy development.

Sierra Club also cites the *Louisiana Energy Services* and *Private Fuel Storage* Commission decisions for a discussion of “what constitutes reasonable assurance of adequate funding.”<sup>470</sup> In its motion to file Contention 29, Sierra Club claims that the information forming the basis for this challenge is materially different than information previously available because “Sierra Club had no reason to believe the option of the reactor owners’ involvement was a serious proposal.”<sup>471</sup>

As with Contentions 27 and 28, because this contention was submitted after the initial deadline, we first determine if it meets the good cause standard of 10 C.F.R. § 2.309(c). We agree with the NRC Staff<sup>472</sup> and Holtec<sup>473</sup> that Sierra Club’s Contention 29 fails to meet that standard, because Sierra Club could have made this challenge in its original petition. Sierra Club admits that Holtec’s application always contained a private funding option, but it had not taken that option seriously.<sup>474</sup> We agree with the NRC Staff that “[w]hether or not Sierra Club believed the private funding option was ‘a serious proposal’, it was unquestionably . . . previously available.”<sup>475</sup>

Sierra Club Contention 29 is not admitted.

## C. Joint Petitioners

### 1. Joint Petitioners Contention 1<sup>476</sup>

Joint Petitioners Contention 1 states:

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<sup>470</sup> *Id.* at 17-18 (citing *Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), CLI-97-15, 46 NRC 294 (1997) and *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-00-13, 52 NRC 23 (2000)).

<sup>471</sup> Sierra Club’s Motion to File New Late-Filed Contentions 27, 28, and 29 at unnumbered p. 3.

<sup>472</sup> NRC Staff Answer to Sierra Club New Contentions at 11-13.

<sup>473</sup> Holtec Opp. to Sierra Club New Contentions at 22-26.

<sup>474</sup> See Sierra Club’s Motion to File New Late-Filed Contentions 27, 28, and 29 at unnumbered pp. 1-2 (“As Sierra Club had said previously, Holtec’s documentation appeared to present the option of the reactor owners’ involvement as a fig leaf to hide the real intent for DOE to take title to the waste.”).

<sup>475</sup> NRC Staff Answer to Sierra Club New Contentions at 11 (quoting Sierra Club’s Motion to File New Late-Filed Contentions 27, 28, and 29 at unnumbered p. 3).

<sup>476</sup> Joint Petitioners also include an “objection” in their initial petition and move “for the dismissal and termination of this licensing proceeding.” Joint Pet’rs Pet. at 24-25. They allege that “there is no federal authorization for the Holtec CISF” because “neither Part 72 nor the NWPA authorize” it, and the proposed facility does not fall under the NRC’s definition of an independent spent fuel storage installation under 10 C.F.R. § 72.3. *Id.*

The Board overrules the objection. As explained in the Commission Secretary’s Order denying Beyond Nuclear and Fasken’s substantially similar motions to dismiss, the NRC’s regulations do not provide for the filing of threshold motions or objections. See Order Denying Motions to Dismiss. Even if Joint Petitioners had made this argument in the form of a contention, we would not admit it for the same reasons we do not admit Beyond Nuclear’s contention and Sierra Club Contention 1.

The redaction of some 144 pages from Appendix C of the Holtec Environmental Report violates [NEPA] and National Historic Preservation Act.<sup>477</sup>

Joint Petitioners allege that “Holtec has violated § 106 of the [National Historic Preservation Act (NHPA)] by redacting extensive details about two historic or cultural properties referenced elsewhere in the Environmental Report.”<sup>478</sup> Joint Petitioners point to the Environmental Report’s Appendix C, which describes the two historic or cultural properties in question but which has been wholly redacted. Joint Petitioners therefore allege that “[t]he redaction of 144 pages of Appendix C as being security-related has precluded Holtec’s precise identification of the resources, and further has made public involvement in mitigation advocacy impossible.”<sup>479</sup>

As the NRC Staff stated in its reply, it was the Staff — not Holtec — who redacted Appendix C in accordance with the NHPA.<sup>480</sup> Specifically, the NRC Staff made a preliminary conclusion that public disclosure of this information might risk harm to a potential historic resource.<sup>481</sup> Upon completion of the Staff’s consultation with the Keeper of the National Register of Historic Places and a final determination of eligibility, the Staff will make available to the public any information that would not harm any potential historic properties.<sup>482</sup>

Moreover, if Joint Petitioners wanted access to the sensitive information in Appendix C, they had two opportunities to request it: once when the opportunity to request a hearing was published in the *Federal Register*,<sup>483</sup> and again when the Commission offered Joint Petitioners another 10-day opportunity to request access to such information.<sup>484</sup> Joint Petitioners did not take either opportunity to request access. In any event, because Joint Petitioners Contention 1 does not raise a dispute with Holtec’s application, it is inadmissible.<sup>485</sup>

Joint Petitioners Contention 1 is not admitted.

## 2. *Joint Petitioners Contention 2*

Joint Petitioners Contention 2 has evolved. As initially proffered, it stated:

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<sup>477</sup> Joint Pet’rs Pet. at 26.

<sup>478</sup> *Id.*

<sup>479</sup> *Id.* at 27.

<sup>480</sup> NRC Staff Consol. Answer at 29 (citing 54 U.S.C. § 307103(a)).

<sup>481</sup> *Id.* at 30.

<sup>482</sup> *Id.*

<sup>483</sup> Notice of Opportunity to Request a Hearing, 83 Fed. Reg. at 32,919, 32,922-24.

<sup>484</sup> *See* Order Denying Motions to Dismiss.

<sup>485</sup> 10 C.F.R. § 2.309(f)(1)(vi).

Holtec cannot provide reasonable assurances that it can obtain the necessary funds to cover the costs of construction, operation, maintenance, and decommissioning of the CISF.<sup>486</sup>

Although not articulated in the contention itself, Joint Petitioners' original basis for Contention 2 explained that their challenge to Holtec's financial plan arose from their conviction that Holtec would not construct its proposed storage facility "without financial guarantees from the U.S. Department of Energy."<sup>487</sup> However, Joint Petitioners contended, if Holtec contracted with DOE to store the nuclear power companies' spent fuel, it would violate the NWPA.<sup>488</sup> Thus, insofar as it relied on the assertion that Holtec's contracting with DOE would violate the NWPA, Joint Petitioners Contention 2 was substantially similar to Beyond Nuclear's sole contention and to Sierra Club Contention 1, discussed *supra*.

Indeed, after Holtec's counsel conceded that, with limited exceptions, it would violate the NWPA as currently in effect for DOE to take title to nuclear plant owners' spent fuel,<sup>489</sup> Joint Petitioners did just what Beyond Nuclear and the Sierra Club did. On the same day Beyond Nuclear moved to amend its contention and the Sierra Club moved to amend Sierra Club Contention 1, Joint Petitioners moved to amend the basis for their Contention 2 to add exactly the same statement:

Language in Rev. 3 of Holtec's Environmental Report, which presents federal ownership as a possible alternative to private ownership of spent fuel, does not render Holtec's financial assurance plan lawful. As long as Holtec includes the federal government as a potential guarantor or financer of the project, which in turn requires federal ownership of spent fuel, the application violates the NWPA.<sup>490</sup>

Insofar as Joint Petitioners Contention 2 now asserts that reference to the mere possibility of contracting with DOE must be expunged from Holtec's application, it remains substantially similar to both Beyond Nuclear's amended contention and Sierra Club's amended Contention 1. We therefore likewise grant Joint Petitioners' February 6, 2019 motion to amend their Contention 2, but rule that portion is not admissible for the same reasons that Beyond Nu-

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<sup>486</sup> Joint Pet'rs Pet. at 31.

<sup>487</sup> *Id.* at 32.

<sup>488</sup> *Id.* at 32-33.

<sup>489</sup> Tr. at 250-52.

<sup>490</sup> Motion of [Joint Petitioners] to Amend Their Contention 2 Regarding Federal Ownership of Spent Fuel in the Holtec International Revised License Application (Feb. 6, 2019) at 8.

clear's amended contention and Sierra Club's amended Contention 1 are not admissible.

But Joint Petitioners did not stop there. While leaving the text of their original Contention 2 unchanged, on February 25, 2019 Joint Petitioners moved to further amend the basis for the contention.<sup>491</sup> More than five months after timely filing their original petition, Joint Petitioners ask to replace their five-page basis statement for Contention 2 with a fifteen-page statement accompanied by a fourteen-page expert report.

Because Joint Petitioners seek to amend their contention after the deadline for filing petitions, we must first consider whether its second motion satisfies the three-prong test in 10 C.F.R. § 2.309(c)(1)(i)-(iii). It does not.

Although Holtec and the NRC Staff argue to the contrary,<sup>492</sup> we agree that the new information on which Joint Petitioners *purport* to base their filing is materially different from information previously available, and that Joint Petitioners timely filed their motion within 30 days of when that information became available. However, Joint Petitioners' second motion to amend seeks to add material that is not in fact "based" upon that new information, as required by 10 C.F.R. § 2.309(c). Rather, their motion seeks to add arguments and supporting opinions that could have been submitted with their original petition.

Specifically, Joint Petitioners allege the new information triggering their second motion to amend the basis statement for Contention 2 is Holtec counsel's concession, during oral argument on January 24, 2019, that in nearly all instances DOE may not lawfully contract with Holtec to store nuclear power companies' spent fuel under the NWPA as currently in effect.<sup>493</sup> Joint Petitioners correctly assert that this was the first time Holtec unequivocally conceded that it cannot presently contract with DOE to store most spent nuclear fuel.<sup>494</sup> Joint Petitioners' response to this development, however, was not to address Holtec's concession, but rather to seize the chance to try to further amend their basis statement for Contention 2 so as to visit or revisit a wide range of issues that were, or should have been, addressed in their original petition.

The centerpiece of Joint Petitioners' second motion to amend their basis statement for Contention 2 is the accompanying sworn declaration of Robert Alvarez, dated February 23, 2019, which is summarized and repeated in part in

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<sup>491</sup> Motion of [Joint Petitioners] to Amend Their Contention 2 Regarding Holtec's Proposed Means of Financing the Proposed [CISF] (Feb. 25, 2019) [hereinafter Joint Pet'rs Feb. 25 Motion to Amend].

<sup>492</sup> Holtec Opposition to [Joint Petitioners'] Motion to Amend Contention 2 (Mar. 22, 2019) at 4-12; NRC Staff Response to [Joint Petitioners'] Motion to Amend Contention 2 (Mar. 22, 2019) at 5-7.

<sup>493</sup> Joint Pet'rs Feb. 25 Motion to Amend at 8.

<sup>494</sup> *Id.*

the basis statement itself.<sup>495</sup> Mr. Alvarez has significant experience in the areas of nuclear materials and policy development.<sup>496</sup>

Mr. Alvarez's declaration asserts that he reviewed Holtec's license application "in light of Holtec's admission that the only lawful way to finance the project was from the licensee owners of the waste using [Holtec's facility] for interim storage."<sup>497</sup> What follows in his declaration, however, is a statement that fails to analyze any specific provision in Holtec's application, and that contains 34 footnoted references all dating (apart from Holtec counsel's concession) from earlier than 2018. There is nothing new in Mr. Alvarez's declaration, and virtually nothing that purports to relate directly to Holtec counsel's January 24, 2019 concession.

This is confirmed by Mr. Alvarez's own summary of his declaration, in which he sets forth six conclusions.

First, Mr. Alvarez states: "Holtec's license application relies heavily on illegal, nonexistent conditions and contract terms. Large amounts of spent fuel from commercial nuclear power fleet require very long term management and storage."<sup>498</sup>

This statement appears to be a throwback to Joint Petitioners' original Contention 2, which assumed that Holtec would rely on contracts with DOE that both Holtec and Joint Petitioners now agree would currently be unlawful. No one disputes that spent nuclear fuel requires long term management and storage. Mr. Alvarez's first conclusion presents no new information.

Second, Mr. Alvarez states:

By assuming DOE would take title, the cost basis for the Holtec [facility] relies on DOE bearing costs. Since this option is not legal, the nuclear licensees must pay all costs. Management costs are more for the licensees when they must pay all costs of onsite storage, transport to and from a CISF and all [facility] operating and closure costs.<sup>499</sup>

Insofar as this statement challenges Holtec's financial plan as being unlawfully premised on contracts with DOE, it ignores Holtec's October 9, 2018 Answer to Joint Petitioners' original Contention 2, in which Holtec clarified that it "is not relying on DOE contracts to demonstrate its financial qualifications."<sup>500</sup>

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<sup>495</sup> Joint Pet'rs Feb. 25 Motion to Amend, attach., Expert Report and Curriculum Vitae of Robert Alvarez (Feb. 23, 2019) [hereinafter Joint Pet'rs Alvarez Report].

<sup>496</sup> *Id.*, Curriculum Vitae at 1, 4.

<sup>497</sup> *Id.*, Alvarez Decl. at 1.

<sup>498</sup> *Id.* at 14.

<sup>499</sup> *Id.*

<sup>500</sup> Holtec Answer to Joint Pet'rs at 31.

Insofar as this statement is intended to suggest that Holtec's pricing structure will discourage power companies from contracting for spent fuel storage, it simply repeats Joint Petitioners' claim that private financing is "improbable," as set forth in Joint Petitioners' October 16, 2018 reply in support of their original Contention 2.<sup>501</sup> Either way, Mr. Alvarez's second conclusion presents no new information.

Third, Mr. Alvarez states: "These costs of continued licensee ownership at a [consolidated interim storage facility] have not been fully explored or revealed by Holtec and appear, based on existing information, to be significantly higher than management at the reactor sites."<sup>502</sup>

Insofar as this statement suggests that private financing is improbable because nuclear power plant owners might conclude they are financially better off by retaining their spent fuel, rather than by paying Holtec to store the fuel, it again repeats the same argument that Joint Petitioners raised more than four months earlier, in their reply in support of their original Contention 2.<sup>503</sup> Mr. Alvarez's third conclusion presents no new information.

Fourth, Mr. Alvarez states:

High burnup fuel, an increasingly large portion of the wasted inventory, needs longer cooling in wet storage and its cladding could have less integrity than that of lower burnup fuel, thus the long term impacts of repeated transport must be considered before permitting routine massive shipments to a temporary location.<sup>504</sup>

The likelihood that high burnup fuel might present special concerns was the subject of several contentions that were proffered in Sierra Club's original petition<sup>505</sup> — contentions in which Joint Petitioners sought to join.<sup>506</sup> Mr. Alvarez's fourth conclusion presents no new information related to Holtec counsel's concession that Holtec may not lawfully contract with DOE to store most spent nuclear fuel under the NWPA, as currently in effect.

Fifth, Mr. Alvarez states: "High burnup fuel could need more protective storage such as double containerization to be moved and these costs have not been included."<sup>507</sup>

Again, as stated above, the considerations applicable to high burnup fuel have been previously addressed in this proceeding, and Joint Petitioners themselves

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<sup>501</sup> Joint Pet'rs Reply at 18.

<sup>502</sup> Joint Pet'rs Alvarez Report, Alvarez Decl. at 14.

<sup>503</sup> Joint Pet'rs Reply at 18.

<sup>504</sup> Joint Pet'rs Alvarez Report, Alvarez Decl. at 14.

<sup>505</sup> See Sierra Club Pet. at 67-75.

<sup>506</sup> Joint Pet'rs Pet. at 88.

<sup>507</sup> Joint Pet'rs Alvarez Report, Alvarez Decl. at 14.

have sought to join in contentions that address this issue. Mr. Alvarez's fifth conclusion presents no new information, and does not appear related to Holtec counsel's concession that Holtec may not lawfully contract with DOE to store most spent nuclear fuel under the NWPA, as currently in effect.

Sixth, Mr. Alvarez states: "Holtec does not include a dry transfer facility in its operations for at least the first century, but it will be needed well before that to repackage [spent nuclear fuel] for disposal and for the remediation of leaking, cracked or otherwise flawed and/or dangerous canisters."<sup>508</sup>

Likewise, the absence of a dry transfer facility has always been apparent from Holtec's license application. It was, in fact, addressed in Joint Petitioners Contentions 4 and 7, as submitted with their original petition on September 14, 2018.<sup>509</sup> Mr. Alvarez's sixth and final conclusion presents no new information, and does not appear connected to Holtec counsel's concession that Holtec may not lawfully contract with DOE to store most spent fuel under the NWPA as currently in effect.

Because the new information on which Joint Petitioners purport to rely (Holtec counsel's concession) is not, in fact, "[t]he information upon which the filing is based," they fail to satisfy 10 C.F.R. § 2.309(c). We therefore deny Joint Petitioners' second motion to amend the basis statement for Joint Petitioners Contention 2.

Moreover, if we did allow Joint Petitioners to file their second amended basis for Contention 2, the contention still would not be admissible. As explained above, Mr. Alvarez's declaration is devoid of a single specific reference to Holtec's application and fails to raise a genuine dispute. Nor do the arguments advanced in Joint Petitioners' proffered amended basis itself warrant further proceedings.

For example, Joint Petitioners ignore the fact that Holtec's license application seeks approval of only the first of twenty potential phases. Joint Petitioners' claims about financial assurances for later phases or for storage beyond the licensed term are therefore outside the scope of this proceeding, and fail to satisfy 10 C.F.R. § 2.309(f)(1)(iii).

Nor do Joint Petitioners demonstrate how any information in Mr. Alvarez's declaration controverts Holtec's financial plan for the first phase or renders it deficient. General speculation about potential future costs, without specifying how they make incorrect the financial analysis for the only phase covered by the application, does not raise a genuine dispute with the application as required by 10 C.F.R. § 2.309(f)(1)(vi).

Insofar as Joint Petitioners contend that Holtec's application is deficient for

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<sup>508</sup> *Id.*

<sup>509</sup> Joint Pet'rs Pet. at 46-49, 61-64.



failure to address liability coverage and the scope of Price-Anderson Act protection, they misapprehend the requirements of 10 C.F.R. § 72.22(e). That provision requires that an applicant either possesses, or demonstrates reasonable assurance of obtaining the necessary funds to cover (1) estimated construction costs; (2) estimated operating costs; and (3) estimated decommissioning costs.<sup>510</sup> It says nothing about liability coverage. Regardless of whether the Price-Anderson Act will cover Holtec's activities, contrary to 10 C.F.R. § 2.309(f)(1)(iv) Joint Petitioners have not demonstrated why this issue is material to the NRC's review of Holtec's application or relates to their concern with its financial qualifications.

Likewise, although Joint Petitioners challenge as inadequate both Holtec's environmental cost-benefit analysis and its analysis of alternatives, they do not discuss or address, much less controvert, these sections of Holtec's Environmental Report. Thus, they fail to demonstrate a genuine material dispute with Holtec's license application, as required by 10 C.F.R. § 2.309(f)(1)(vi).

Neither Mr. Alvarez's declaration nor Joint Petitioners' second amended basis for their Contention 2 therefore supports a contention that satisfies 10 C.F.R. § 2.309(f)(1).

Finally, insofar as Joint Petitioners Contention 2 continues to assert that Holtec intends to go forward with the project *only* if it is able to contract with DOE,<sup>511</sup> it is likewise not admissible for failure to raise a genuine dispute with the application. Holtec readily admits that it would prefer if Congress would change the law and permit it to contract with DOE.<sup>512</sup> But both Holtec's license application and the statements of counsel at oral argument assure us that Holtec intends to proceed by attempting to negotiate storage contracts with the nuclear power plant owners themselves, at least unless and until another option is available.<sup>513</sup>

If Holtec is not successful, then the facility will not be built, as Holtec's license application makes clear it has no intention of beginning construction until it has sufficient contracts in hand.<sup>514</sup> No purpose would be served by convening an evidentiary hearing to further explore Holtec's intent, based either upon company documents that preceded its application or upon one sentence in a single more recent company publication that is arguably ambiguous.<sup>515</sup> None of these documents raises a genuine material dispute with Holtec's license application, as required by 10 C.F.R. § 2.309(f)(1)(vi).

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<sup>510</sup> 10 C.F.R. § 72.22(e).

<sup>511</sup> Joint Pet'rs Pet. at 34.

<sup>512</sup> Tr. at 250.

<sup>513</sup> Tr. at 248.

<sup>514</sup> Holtec Proposed License at 2.

<sup>515</sup> See Joint Pet'rs Feb. 25 Motion to Amend at 3; Motion by [Joint Petitioners] for Leave to File a New Contention (Jan. 17, 2019); [Joint Petitioners] Contention 14 (Jan. 17, 2019).

Joint Petitioners Contention 2, as amended, is not admitted.

### 3. *Joint Petitioners Contention 3*

Joint Petitioners Contention 3 states:

The Environmental Report contains a gross underestimation of the volume of low-level radioactive waste (“LLRW”) that will be generated by the use of concrete and other materials for bunkering of the [spent nuclear fuel] canisters, and by replacement of the canisters themselves during the operational life of the CISF. Besides providing a distorted view of the waste management obligations the project will create, the financial burdens arising from creation, oversight and disposition of millions of additional tons of LLRW causes a seriously inaccurate picture of the true costs of constructing, operating and decommissioning the Holtec [facility].<sup>516</sup>

Taking issue with Holtec’s estimate that it will only generate “small quantities of hazardous and non-hazardous waste . . . includ[ing] [LLRW],”<sup>517</sup> Joint Petitioners allege that “Holtec omits to mention that millions of tons of concrete will be mixed and poured onsite,” which upon the facility’s decommissioning “will have been transformed into a large quantity of radioactively activated waste.”<sup>518</sup> For support, Joint Petitioners rely upon “common sense” that the storage facility’s concrete and subsoils will become activated, and upon the inferences that allegedly can be drawn from Holtec’s narrow reply rebutting the *volume* of LLRW generated, not the generation of LLRW itself.<sup>519</sup> Joint Petitioners also challenge Holtec’s reliance on the Continued Storage GEIS (and therefore section 51.23), as the Continued Storage GEIS “does not contemplate a storage facility that uses 8,000,000 tons of concrete” for housing spent fuel canisters<sup>520</sup> nor does it “account for the large, and escalating cost item of repackaging spent fuel to be moved from reactor sites to a consolidated storage facility, and thence ultimately to a geological repository,” and thus Holtec may not rely upon it in its application.<sup>521</sup>

Holtec and the NRC Staff argue that Joint Petitioners have not met their burden in proffering facts or expert opinion supporting their allegations.<sup>522</sup> The Board agrees. Joint Petitioners only speculate that all “8,000,000 tons” of con-

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<sup>516</sup> Joint Pet’rs Pet. at 36-37.

<sup>517</sup> *Id.* at 37 (citing ER at 3-108).

<sup>518</sup> *Id.*

<sup>519</sup> *See* Tr. at 161-62.

<sup>520</sup> Joint Pet’rs Pet. at 40, 41.

<sup>521</sup> *Id.* at 41.

<sup>522</sup> *See* NRC Staff Consol. Answer at 34; Holtec Answer to Joint Pet’rs at 36.

crete used at the facility will become LLRW, despite conceding that the facility's concrete can be decontaminated by Holtec<sup>523</sup> and notwithstanding that the design of the proposed facility includes a "liner that serves to protect [the concrete] from contamination from its resident canister."<sup>524</sup> The Continued Storage GEIS concerning ISFSI decommissioning concludes:

Although the exact amount of LLW and nonradioactive waste depends on the level of contamination, the quantity of waste generated from the replacement of the canisters, storage casks, concrete storage pads, DTS, and canister transfer building is still expected to be comparable to the LLW generated during reactor decommissioning, which was previously determined to have a SMALL impact in the Generic Environmental Impact Statement for License Renewal of Nuclear Plants (NRC 2013a).<sup>525</sup>

As to Joint Petitioners' complaint regarding the Continued Storage GEIS, including the alleged omission of the topics of repackaging of spent fuel and disposal of the spent fuel casks after repackaging, Holtec's Environmental Report appropriately relies on the Continued Storage GEIS. We therefore agree with Holtec that Joint Petitioners' complaint amounts to an impermissible attack on the NRC's regulations.<sup>526</sup>

Joint Petitioners Contention 3 is not admitted.

#### **4. *Joint Petitioners Contention 4***

Joint Petitioners Contention 4 states:

Holtec has defined a site-specific spent nuclear storage facility that does not qualify for the exclusions from NEPA scrutiny conferred by the Waste Storage GEIS. Consequently, severe accident mitigation during transportation to and from the Holtec CISF and at the CISF, and SNF and GTCC storage and management operations at the CISF site, may not be treated as generic issues and excused from consideration within the EIS.<sup>527</sup>

On February 18, 2019, Joint Petitioners moved to amend Contention 4 based on allegedly new information revealed in Holtec's January 17, 2019 responses

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<sup>523</sup> See Tr. at 162.

<sup>524</sup> Holtec Answer to Joint Pet'rs at 43 (citing Decommissioning Plan at 9).

<sup>525</sup> Continued Storage GEIS at 5-48.

<sup>526</sup> See 10 C.F.R. § 2.335.

<sup>527</sup> Joint Pet'rs Pet. at 46.

to the NRC Staff's requests for additional information (RAIs).<sup>528</sup> The amended contention would add the following paragraph:

Holtec has created an issue of fact by claiming that its over-optimistic conclusion that there are no credible challenges to canister confinement integrity capable of causing radioactivity release is consistent with the GEIS.<sup>529</sup>

In their motion, Joint Petitioners rely on Dr. Gordon Thompson's declaration to try to show that Holtec's RAI 9-3 response about accident conditions is "seriously inconsistent" with the GEIS.<sup>530</sup> Joint Petitioners also claim that Holtec's "insistence that there is zero potential accident or attack scenario that would result in a release of hazardous radioactivity lacks credibility and undermines . . . Holtec's decisions to not have an on-site emergency response plan for radiological accidents and its determination not to have [dry transfer system (DTS)] capability."<sup>531</sup>

As explained *supra*, the Board will consider an amended contention filed after the original deadline only if petitioner demonstrates good cause under the three-pronged test of 10 C.F.R. § 2.309(c)(1). Here, we agree with the NRC Staff and Holtec that Joint Petitioners have failed to demonstrate good cause, because the information upon which they base their amended contention was previously available. The difference between Holtec's original SAR section 9.2.2 and its answer in RAI 9-3 is three words. Holtec changed "there is no credible normal or accident situation" to "there is no credible normal, *off-normal*, or accident *conditions*." This revision is consistent with the same conclusions made by Holtec in SAR 9.2.1. Joint Petitioners do not show how those three words in RAI 9-3 change Holtec's answer in a way that provides new or materially different information. In fact, Dr. Thompson's declaration acknowledges that Holtec's RAI response is an "equivalent assertion" to one made in its Environmental Report in section 4.13.2.<sup>532</sup> Because Joint Petitioners have failed to meet the first prong under 10 C.F.R. § 2.309(c)(1), we deny their motion to amend Contention 4.

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<sup>528</sup> Joint Pet'rs Motion to Amend Contentions 4 & 7, at 6-7.

<sup>529</sup> See Joint Petitioners' Amended Contentions 4 & 7 (Feb. 18, 2019) [hereinafter Joint Pet'rs Amended Contentions 4 & 7]. The NRC Staff and Holtec timely filed responses in opposition to the Joint Petitioners' motion. See NRC Staff's Response to [Joint Petitioners] Motion to Amend Contentions 4 and 7 (Mar. 14, 2019) [hereinafter NRC Staff's Response to Joint Pet'rs Motion to Amend Contentions 4 & 7]; Holtec Opposition to [Joint Petitioners'] Motion to Amend Contentions 4 and 7 (Mar. 15, 2019).

<sup>530</sup> Joint Pet'rs Amended Contentions 4 & 7, at 6-7.

<sup>531</sup> *Id.* at 7.

<sup>532</sup> Joint Pet'rs Amended Contentions 4 & 7, at 7.

Accordingly, we analyze Joint Petitioners Contention 4 as originally filed. In their original filing, Joint Petitioners cite four bases for their contention: (1) the proposed facility is not legally authorized; (2) the proposed facility departs from assumptions in the GEIS; (3) Holtec agrees that its project is site-specific; and (4) the proposed facility is not covered by the GEIS exemption.<sup>533</sup>

We have previously rejected the first basis in addressing Beyond Nuclear's contention and Sierra Club's Contention 1, *supra*. As to the remaining bases, we agree with Holtec<sup>534</sup> and the NRC Staff<sup>535</sup> that Joint Petitioners' challenges to the lack of dry transfer system capability at the proposed facility and to Holtec's "return to sender" policy do not demonstrate a genuine dispute with the application on a material issue of law or fact. The Continued Storage GEIS acknowledges that not all storage facilities will necessarily match the "assumed generic facility," and therefore when it comes to "size, operational characteristics, and location of the facility, the NRC will evaluate the site-specific impacts of the construction and operation of any proposed facility as part of that facility's licensing process."<sup>536</sup> The site-specific evaluation would not "reanalyze the impacts of continued storage," because that is already covered by the GEIS and requires a waiver to challenge.<sup>537</sup> Accordingly, Holtec's Environmental Report contains a site-specific impact analysis for the period of the proposed activity. Neither the Continued Storage GEIS nor NRC regulations require an analysis of a dry transfer system at this time; rather, because Holtec does not intend to build a dry transfer system during the initial license term, the analysis will not be required until Holtec pursues a dry transfer system as a separate action.<sup>538</sup>

Joint Petitioners Contention 4 is not admitted.

## 5. *Joint Petitioners Contention 5*

Joint Petitioners Contention 5 states:

Horizontal hydraulic fracturing ("fracking") is certain to occur underneath the Holtec site. Holtec has acquired mineral rights to a depth of 5,000 feet to part of its site from Intrepid, a potash mining firm. However, within the boundaries of the Holtec site there are mineral leases held by at least half a dozen oil and gas drilling firms and Mosaic Potash, a mining firm. There is no indication in the Environmental Report of any control over present or potential potash mining

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<sup>533</sup> Joint Pet'rs Pet. at 46-49.

<sup>534</sup> See Holtec Answer to Joint Pet'rs at 44-46.

<sup>535</sup> See NRC Staff Consol. Answer at 36-37.

<sup>536</sup> Continued Storage GEIS at 5-2.

<sup>537</sup> *Id.*

<sup>538</sup> *Id.*

or oil and gas drilling. And the very area where the concrete bunkers containing [spent nuclear fuel] casks will be located, fracking activity can be carried on below 5,000 feet. Typical oil and gas wells in the Permian Basin region in which Holtec is located are 8,000 or more feet deep. The mineral interests are inadequately disclosed, and the realistic prospects for mineral development immediately surrounding and underneath the Holtec site, and their implications for inducing or expediting geological problems and groundwater movement beneath the site, are inadequately disclosed in the ER.<sup>539</sup>

Joint Petitioners Contention 5 concerns potential mining and fracking at and underneath the site. Joint Petitioners first claim that “fracking is certain to occur”<sup>540</sup> at the Holtec site, and further claim that the Environmental Report reveals that Holtec does not in fact control any of the mineral rights at the proposed storage facility’s boundary except those belonging to Intrepid Potash–New Mexico, LLC (Intrepid).<sup>541</sup> They contend that there are twelve abandoned hydrocarbon wells, “many on that part of the site where the concrete bunkers are to be built,” and assert that, in light of the “long history of underground potash mining” at the site, the Environmental Report “does not faithfully report the true story of land ownership and mineral rights interests” at the site.<sup>542</sup> Second, Joint Petitioners allege that the Environmental Report “fails to connect the considerable history of oil and gas brine disposal at the Holtec site” which in turn causes a “possible relationship to poor quality and corrosive groundwater,” soil, and “wind-blown dust.”<sup>543</sup> Joint Petitioners allege that these phenomena could thus corrode the “steel or alloy canisters nosed into concrete bunkers down to about 23 feet of depth, for a century or more,” as well as the concrete UMAX canister system itself.<sup>544</sup> Third, Joint Petitioners assert that Holtec failed to comply with 10 C.F.R. § 72.103(f), alleging that Holtec did not investigate the “geological and seismic implications of mining and fracking . . . *inside* the site boundaries.”<sup>545</sup> Finally, Joint Petitioners posit that the Environmental Report fails to satisfy 10 C.F.R. § 72.90 and 10 C.F.R. § 72.94, because it is missing analyses of “site characteristics that may directly affect the safety or environmental impact of the ISFSI” and “past and present man-made facilities and activities that might endanger the proposed ISFSI.”<sup>546</sup>

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<sup>539</sup> Joint Pet’rs Pet. at 49.

<sup>540</sup> *Id.*

<sup>541</sup> *Id.* at 50.

<sup>542</sup> *Id.* at 51-52.

<sup>543</sup> *Id.* at 52.

<sup>544</sup> *Id.*

<sup>545</sup> *Id.* at 54.

<sup>546</sup> *Id.* at 54-55.

Regarding fracking and potash mining, Joint Petitioners' proffered exhibit, an ELEA Mineral Conflict Analysis map from 2015, does not set forth a genuine dispute with the Holtec application on a material issue of fact. According to Holtec's Environmental Report, its proposed facility would be built on grid 13 of coordinate 020S, 032E, the western half of grid 18 and the southwestern corner of grid 17.<sup>547</sup> Comparing these coordinates to Joint Petitioners' proffered 2015 Map, it is clear that (1) although COG Operating LLC appears to own mineral rights at grid 13, the proposed facility's footprint does not show any active or abandoned gas or oil zones inside the footprint of the facility; and (2) only Intrepid's rights exist at the site pursuant to its New Mexico potash mining lease.<sup>548</sup> Moreover, the Environmental Report states that Holtec controls the mineral rights at the site down to 5,000 feet pursuant to an agreement with Intrepid, and Intrepid will not mine at the site.<sup>549</sup> Additionally "any future oil drilling or fracking beneath the site would occur at greater than 5,000 feet depth," which would ensure that no subsidence would occur at the site.<sup>550</sup> The discussion of land use and maps in Chapter 3 of Holtec's Environmental Report reports the status of mineral rights and land ownership at the proposed HI-STORE site.

Regarding possible brine, contaminated groundwater, soil, and wind-blown dust that could potentially degrade the HI-STORE vault and spent fuel storage canisters stored therein, we agree with the NRC Staff that this aspect of the contention concerns safety,<sup>551</sup> yet Joint Petitioners do not cite to or even mention the SAR. Holtec did address issues regarding soil chemistry analysis and groundwater flow at the site both in its Environmental Report and SAR.<sup>552</sup> Joint Petitioners do not proffer any explanation of how this alleged caustic brine, groundwater, or soil could enter into the HI-STORE UMAX system and corrode the canisters. Nor do they proffer facts or expert opinion discussing how the alleged wind-blown caustic dust could get to the UMAX and degrade the UMAX concrete. Therefore, this aspect of the contention is inadmissible for failing to raise a genuine dispute with Holtec's license application.<sup>553</sup>

Finally, as to the alleged lack of discussion of seismology inside the site boundary pursuant to section 73.103(f), the Environmental Report and the SAR do discuss geological and seismic issues as they relate to mining and fracking

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<sup>547</sup> ER at 3-5 to -6.

<sup>548</sup> 2015 Map at 3-4.

<sup>549</sup> ER at 3-2.

<sup>550</sup> *Id.*

<sup>551</sup> NRC Staff Consol. Answer at 43-44.

<sup>552</sup> See ER at 3-15 (soil); *id.* at 3-39 to -41, 3-54 (Fig. 3.5.1), 3-56 (Fig. 3.5.3) (groundwater); SAR at 2-3 to -9, 2-26 (soil); *id.* at 1-5, 1-14; 2-78 to -79, 2-81, 2-90, 2-96 to -99 (groundwater).

<sup>553</sup> 10 C.F.R. § 2.309(f)(1)(v), (vi).

inside the site boundary.<sup>554</sup> As discussed *supra* in connection with Sierra Club Contention 14, no faults of any kind were found at the proposed site (i.e., inside the site boundary<sup>555</sup>). Joint Petitioners' other allegations are impermissibly vague.<sup>556</sup>

Joint Petitioners Contention 5 is not admitted.

## 6. *Joint Petitioners Contention 6*

Joint Petitioners Contention 6 states:

The Holtec [facility] is a major component of a large plan to aggregate [spent nuclear fuel] in southeastern New Mexico for purposes of reprocessing. A radioactively 'dirty' industrial activity, reprocessing has been omitted from analysis and disclosure of cumulative environmental impacts.<sup>557</sup>

Joint Petitioners rely on "a 2015 slide show given by a Holtec representative to the New Mexico State Legislature" that stated that the proposed facility may provide "flexibility for recycling, research, and disposal" and also listed "re-processing [spent nuclear fuel]" as an option under "waste solutions."<sup>558</sup> Joint Petitioners also cite a 2017 *Los Angeles Times* article that quoted a voting member of the Eddy-Lea Energy Alliance as saying, "We believe if we have an interim storage site, we will be the center for future nuclear fuel reprocessing."<sup>559</sup> Joint Petitioners claim that NEPA requires a cumulative impacts analysis of reprocessing spent nuclear fuel at the proposed facility, because such an action "falls within the realm of 'cumulative actions' delineated in the [Council on Environmental Quality (CEQ)] regulations."<sup>560</sup>

Joint Petitioners fail to raise a genuine dispute with the application on an issue of material fact or law, because the application does not seek authorization for, or even mention, reprocessing at the proposed facility. Neither NEPA nor NRC regulations require an environmental analysis of potential actions that are

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<sup>554</sup> See ER at 3-17 to -18; SAR at 2-107 to -108.

<sup>555</sup> See ER at 3-13 to -14.

<sup>556</sup> See *Southern Nuclear Operating Co.* (Vogtle Electric Generating Plant, Units 3 and 4), LBP-16-5, 83 NRC 259, 281 (2016) (citing *Palisades*, LBP-06-10, 63 NRC at 341, *aff'd*, CLI-06-17, 63 NRC 727 (2006)).

<sup>557</sup> Joint Pet'rs Pet. at 55.

<sup>558</sup> *Id.*

<sup>559</sup> *Id.* at 55-56.

<sup>560</sup> *Id.* at 59. The CEQ regulations do not bind the NRC as an agency, but the Commission has chosen to follow them in some instances. See *Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-11-11, 74 NRC 427, 443-44 (2011).



“merely contemplated” and have not been proposed.<sup>561</sup> We agree with the NRC Staff that the cited sources, at most, “suggest a political appetite for such a project in the area,” without creating any proposed plans for reprocessing spent fuel.<sup>562</sup>

Because reprocessing is not material to Holtec’s license application, Joint Petitioners’ claims about the safety of reprocessing are not relevant. In addition, their claims are unsupported by any facts or expert opinion, and do not raise a genuine issue with the application for that reason as well.

Joint Petitioners Contention 6 is not admitted.

## 7. *Joint Petitioners Contention 7*

Joint Petitioners original Contention 7 states:

Holtec’s “HI-STORE philosophy” of “Start Clean/Stay Clean,” whereby incoming shipments of canisters that are contaminated, leaking, or otherwise compromised will be returned to the originating power plant for dispositioning, is illegal under NRC regulations and the Atomic Energy Act. It is unlawful to knowingly ship containers with radiation on exposed or external surfaces. Once delivered to the site, leaky and/or contaminated canisters must remain at Holtec — but Holtec expressly intends to return such canisters to their points of origin. Leaking or otherwise compromised shipping containers would likewise present an immediate danger to the corridor communities through which they would travel back to their nuclear power plant site of origin, likely violating numerous additional NRC and DOT regulations[.]<sup>563</sup>

On February 18, 2019, Joint Petitioners moved to amend Contention 7, seeking to add the following paragraph:

Holtec’s refusal to publicize emergency and contingency plans, as well as its insistence that there is zero potential accident or attack scenario that would result in a radiation release (and hence no need for dry transfer storage capability) reflects a lack of a national policy for handling and disposal of [spent nuclear fuel] and Holtec’s misperception as to the role of a CISF in national policy. The applicant’s non-credible positions on these matters takes them outside the coverage and shield

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<sup>561</sup> *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), CLI-02-14, 55 NRC 278, 295 (2002). See also *Kleppe v. Sierra Club*, 427 U.S. 390, 410 (1976); *Strata Energy, Inc.* (Ross In Situ Uranium Recovery Project), CLI-16-13, 83 NRC 566, 577 (2016), *petition for review denied sub nom.*, *Nat. Res. Def. Council v. NRC*, 879 F.3d 1202 (D.C. Cir. 2018).

<sup>562</sup> NRC Staff Consol. Answer at 47.

<sup>563</sup> Joint Pet’rs Pet. at 61.

of the Continued Storage GEIS and requires them to be scrutinized under NEPA and addressed in the Environmental Impact Statement.<sup>564</sup>

Joint Petitioners base the motion on (1) Holtec's RAI Response 9-3 and (2) Holtec's RAI Response LA-1, both dated January 16, 2019 and released in the NRC's Agencywide Documents Access and Management System (ADAMS) on January 17, 2019. Joint Petitioners specifically cite the portion of RAI Response 9-3 that references SAR 9.2.2, "Operational Activities," addressing the NRC Staff's request for clarification about off-normal conditions "in addition to the normal, off-normal and accident conditions while on-site prior to, or during receipt inspection."<sup>565</sup> Joint Petitioners also cite RAI Response LA-1, which addressed the NRC Staff's questions regarding "the absence of a time limit for a canister to be returned to the nuclear plant of origin or other facility licensed to perform fuel loading procedures" in the HI-STORE storage facility's Technical Specifications.<sup>566</sup>

We first consider whether Joint Petitioners' motion to amend Contention 7 meets the three-pronged standard for good cause under 10 C.F.R. § 2.309(c). It does not. RAI Response 9-3 did not reveal any materially new information.<sup>567</sup> Joint Petitioners previously had the chance to challenge the statement in Holtec's SAR section 9.2.2 that identified "no credible events . . . that would result in a release of any radioactive materials into the work areas or the environment."<sup>568</sup> And essentially they did just that in Contention 7, as originally filed. In the absence of new information, Joint Petitioners are not entitled to a second chance to support a claim that was identified in their original pleadings by proffering the statement of Dr. Gordon Thompson at this late date.

As to RAI Response LA-1, the Board also concludes that it presents no materially different new information under 10 C.F.R. § 2.309(c)(1). The NRC Staff merely sought details concerning the time limit during which a canister would be returned to the site of origin or licensed fuel loading site, and Holtec responded by amending its SAR at section 10.3.3.1 and section 5.5.5.b.3 to its proposed materials license.<sup>569</sup> Although these sections now detail that the amount of time Holtec would have to return a leaky canister to its point of origin or fuel loading facility is based on the NRC's maximum annual dose rate limits, Joint Petitioners' overarching "start clean/stay clean" challenge is the same as in their

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<sup>564</sup> Joint Pet'rs Amended Contentions 4 & 7, at 6.

<sup>565</sup> RAI Response 9-3 at 4.

<sup>566</sup> RAI Response LA-1 at 1.

<sup>567</sup> See discussion of RAI Response 9-3 under Joint Petitioners Contention 4, *supra*.

<sup>568</sup> SAR at 9-7.

<sup>569</sup> See SAR at 10-12 to -14; Revised App. A to Materials License No. SNM-1051, Tech. Specs. for the HI-STORE [CISF] at 5-6 (Nov. 30, 2018) (ADAMS Accession No. ML18345A138).

original petition.<sup>570</sup> And Holtec's procedure is in accord with Joint Petitioners' originally-disputed portion of the SAR (rev. 0A), section 3.1.4.6.<sup>571</sup> This new information is therefore not materially different.

Joint Petitioners' witness, Dr. Thompson, opines that the potential use of a "sequestration canister with a gasketed lid," without an articulated plan for its use, "suggests that Holtec is not serious about contingency planning."<sup>572</sup> RAI Response LA-1 does not create a basis for the sequestration canister aspect of the proposed amended Contention 7, as that information was readily available before the deadline for petitions in this proceeding.<sup>573</sup> Finally, even if we were to find that the information in RAI Response LA-1 is new and material, Joint Petitioners do not provide a sufficient nexus to the amended Contention 7. RAI Response LA-1 simply does not support Joint Petitioners' new challenges concerning Holtec's alleged "refusal to publicize emergency and contingency plans," the "lack of a national policy for handling and disposal of [spent nuclear fuel]," and Holtec's "misperception as to the role of a CISF in national policy."<sup>574</sup>

We deny the motion to amend Contention 7, and therefore analyze Contention 7 as originally pled. Joint Petitioners assert that Holtec's "policy of rejecting and returning canisters that have unacceptable external radioactive or structural damage[ ] . . . will create potential exposure routes that pose radioactive contamination threats to the public, nuclear workers, and the environment."<sup>575</sup> Joint Petitioners also take issue with the lack of a dry transfer system at the proposed storage facility, claiming that such a transfer system could potentially ameliorate their concerns regarding casks that arrive damaged to the facility.<sup>576</sup>

Joint Petitioners Contention 7 is inadmissible because it fails to cite facts or expert opinions that support Joint Petitioners' position on the issue of the "start clean/stay clean" philosophy. Although Joint Petitioners claim that a canister could arrive to the facility damaged and emitting "significant radioactive materials" that could "migrate off-site,"<sup>577</sup> they offer no facts or expert opinion

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<sup>570</sup> See Joint Pet'rs Pet. at 61.

<sup>571</sup> *Id.* at 62.

<sup>572</sup> Joint Pet'rs Motion to Amend 4 & 7, at 8.

<sup>573</sup> See SAR rev. 0C at 604 (May 31, 2018).

<sup>574</sup> Joint Pet'rs Amended Contentions 4 & 7, at 6. Even if we accepted that this alleged new information supported these assertions, Holtec's Emergency Plans were available at the commencement of the proceeding, SAR at 6-45, 10-29, 15-10, 15-11, 15-16, and challenges to the national spent fuel management policy go well beyond the permissible scope of this proceeding. 10 C.F.R. § 2.309(f)(1)(iii).

<sup>575</sup> Joint Pet'rs Pet. at 61-62.

<sup>576</sup> *Id.* at 64.

<sup>577</sup> *Id.* at 62.

supporting that position. Specifically, Joint Petitioners fail to submit facts or expert opinion that show (1) how the spent fuel, when packaged at the reactor site, would leave the site leaking or damaged notwithstanding NRC-approved quality assurance programs; (2) how the spent fuel canister, within its transport overpack cask, would become credibly damaged in an accident scenario that results in an exceedance of dose rates while in transit; and (3) how the sequestration sleeve, as outlined in Holtec's SAR at the time petitions were due in this proceeding, is an inadequate remedy should the cask and canister somehow become damaged.

Indeed, the Commission has already spoken to this issue in a similar proposed facility proceeding, *Private Fuel Storage*.<sup>578</sup> In that proceeding, the State of Utah proffered a contention where a canister "improperly constructed or improperly sealed, could be loaded and shipped" to the spent fuel storage facility, which in turn could harm the environment.<sup>579</sup> Similar to Holtec's proposed policy, storage facility operator Private Fuel Storage's (PFS) policy was to ship back a leaking or defective canister to its point of origin, and Utah alleged that this practice was unsafe (as Joint Petitioners do here).<sup>580</sup>

As the NRC had already generically determined that an accidental canister breach was not a credible scenario, the Commission held that Utah had failed to advance a credible, unconsidered accident scenario concerning a canister breach while in transport.<sup>581</sup> And as for PFS's "return to sender" policy regarding damaged fuel canisters, which is the same as Holtec's, the Commission held that Utah had failed to contest the NRC-approved quality assurance programs in the packaging and transportation of spent nuclear fuel<sup>582</sup> — those very programs that provide that a transportation accident or breach of canister is not credible. As *Private Fuel Storage* is analogous to this proceeding, we reject Contention 7 for the same reasons the Commission rejected Utah's contention.

Joint Petitioners Contention 7 is not admitted.

## 8. *Joint Petitioners Contention 8*

Joint Petitioners Contention 8 states:

In several places in the [Environmental Report], Holtec states that "Table 4.9.1" provides data tending to show minimal radiation dangers from transporting the casks of spent nuclear fuel [(SNF)]. The data is not narratively reproduced in the

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<sup>578</sup> *Private Fuel Storage*, CLI-04-22, 60 NRC at 136-37.

<sup>579</sup> *Id.* at 136, 137.

<sup>580</sup> *Id.* at 138.

<sup>581</sup> *Id.* at 137.

<sup>582</sup> *Id.* at 138.

ER. The missing table undermines Holtec's basis for claiming minimal effects from transporting SNF and GTCC waste.<sup>583</sup>

Because Joint Petitioners withdrew Contention 8,<sup>584</sup> it is not admitted.

### **9. Joint Petitioners Contention 9**

Joint Petitioners Contention 9 states:

There is only one map published in the Environmental Report that shows any of the routes which will be taken for delivery of [spent nuclear fuel (SNF)] and [greater than class C (GTCC)] waste to Holtec, and it only mentions transport of radioactive material from two reactors. The information provided comes nowhere near disclosure of a 20-year transport campaign of an estimated 10,000 cask deliveries.<sup>585</sup>

Joint Petitioners ask for “unconditional disclosure of probabl[e] transportation routes, whether by barge, highway or rail” so that they can “meaningfully participate in the NEPA process” and “public and emergency response officials [can] begin to understand the scope of the Holtec project’s transportation side.”<sup>586</sup> They also claim that the “transportation aspects of Holtec are of high significance to completion of the project” and that NRC regulations require discussion of “[a]dverse environmental effects which cannot be avoided,” of alternatives, and of “any irreversible and irretrievable commitments of resources which would be involved in the proposed action,” as well as an “investigation of environmental effects of the act of transporting the [spent nuclear fuel]-filled canisters.”<sup>587</sup>

We agree with the NRC Staff<sup>588</sup> and Holtec<sup>589</sup> that Joint Petitioners fail to demonstrate how NEPA or NRC regulations require a specific assessment of possible transportation routes. None of the legal authority cited by Joint Petitioners (10 C.F.R. §§ 51.45, 72.108, and NEPA) specifies that a certain number of transportation routes must be analyzed in an applicant’s Environmental Report, let alone every conceivable transportation route. Holtec’s Environmental Report already evaluates three “representative routes” to determine likely radiological

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<sup>583</sup> Joint Pet’rs Pet. at 64.

<sup>584</sup> Joint Pet’rs Reply at 50.

<sup>585</sup> Joint Pet’rs Pet. at 66.

<sup>586</sup> *Id.* at 67.

<sup>587</sup> *Id.* at 67-68 (citing 10 C.F.R. §§ 51.45(b)(1)-(3),(5), 72.108).

<sup>588</sup> *See* NRC Staff Consol. Answer at 51-53.

<sup>589</sup> *See* Holtec Answer to Joint Pet’rs at 70-71.

impacts of transportation — one from San Onofre to the proposed facility, one from Maine Yankee to the proposed facility, and one from the proposed facility to Yucca Mountain.<sup>590</sup> The use of representative routes is in keeping with past NRC practice to evaluate transportation impacts.<sup>591</sup> Joint Petitioners have failed to raise a genuine dispute with Holtec's application.

Regarding Joint Petitioners' statement that "public and emergency response officials" need "unconditional disclosure of probabl[e] transportation routes," we agree with Holtec<sup>592</sup> that this concern is outside the scope of this proceeding. Spent nuclear fuel transportation route identification requires separate review and approval by the NRC and the Department of Transportation, as well as by applicable States or Tribes.<sup>593</sup> For that separate review process, Holtec will also need to coordinate with local law enforcement and emergency responders. Such coordination is not relevant at this point in the licensing process.

Joint Petitioners Contention 9 is not admitted.

#### **10. Joint Petitioners Contention 10**

Joint Petitioners Contention 10 states:

Holtec plans to provide long-term [spent nuclear fuel (SNF)] storage for up to 120 years, or for however much time beyond 120 years it may take to develop a deep geological repository elsewhere. Holtec itself has recommended to the U.S. Department of Energy that a [CISF] should have a minimum service life of 300 years.<sup>594</sup>

Joint Petitioners claim that "[e]xtended operation of the Holtec CISF beyond the 100-year benchmark is a cumulative action and must be analyzed as such under NEPA."<sup>595</sup>

The proposed action in this proceeding is a 40-year initial license.<sup>596</sup> Holtec

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<sup>590</sup> ER at § 4.9.

<sup>591</sup> See, e.g., Continued Storage GEIS at 5-49 to -54; Final Environmental Impact Statement for the Construction and Operation of an Independent Spent Fuel Storage Installation on the Reservation of the Skull Valley Band of Goshute Indians and the Related Transportation Facility in Tooele County, Utah, NUREG-1714 at 5-39 (Dec. 2001). See also 10 C.F.R. § 51.52, tbl. S-4 (deriving generic effects of transportation and fuel waste for one power reactor based on survey of then-existing power plants).

<sup>592</sup> Holtec Answer to Joint Pet'rs at 68.

<sup>593</sup> See 10 C.F.R. Parts 71 and 73; 49 C.F.R. Parts 107, 171-180, 390-397.

<sup>594</sup> Joint Pet'rs Pet. at 68 (internal quotations omitted).

<sup>595</sup> *Id.* at 69.

<sup>596</sup> Notice of Opportunity to Request a Hearing, 83 Fed. Reg. at 32,919 ("If the NRC approves  
(Continued)

may anticipate following the initial license with two 40-year license renewals, under 10 C.F.R. § 72.42, but that is not relevant to this proceeding, as those renewals would trigger new hearing opportunities. The Continued Storage Rule explicitly provides that an applicant’s Environmental Report is not required to discuss impacts following the proposed license term.<sup>597</sup> Therefore, we agree with the NRC Staff<sup>598</sup> and Holtec<sup>599</sup> that Joint Petitioners impermissibly challenge the Continued Storage Rule and the impact evaluations contained in the Continued Storage GEIS. Joint Petitioners have not requested a waiver, and this contention is therefore outside the scope of this proceeding under 10 C.F.R. § 2.309(f)(1)(iii).

Joint Petitioners Contention 10 is not admitted.

## **11. Joint Petitioners Contention 11**

Joint Petitioners Contention 11 states:

NEPA Requires Significant Security Risk Analyses for the Massive Spent Nuclear Fuel and Greater-Than-Class-C Wastes Proposed for Interim Storage And Associated Transportation Component at Holtec’s New Mexico Facility.<sup>600</sup>

Joint Petitioners claim that this Board should require in Holtec’s Environmental Report an analysis of terrorist attacks as a “not so remote and highly speculative” environmental impact, consistent with the Ninth Circuit’s decision in *San Luis Obispo Mothers for Peace v. NRC*.<sup>601</sup> Joint Petitioners then direct the Board to a 69-page report by Dr. James D. Ballard concerning human-initiated events, transportation, and storage of highly radioactive materials at the proposed UMAX interim storage facility.<sup>602</sup> Based on the Ballard Report, Joint Petitioners put forward twenty-eight “detailed sub-contentions”<sup>603</sup> ranging from recommending Holtec create a “site specific and programmatic EIS process” be-

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the application and issues a license to Holtec, Holtec intends to store . . . commercial spent nuclear fuel . . . for a 40-year license term.”).

<sup>597</sup> 10 C.F.R. § 51.23(b).

<sup>598</sup> NRC Staff Consol. Answer at 54.

<sup>599</sup> Holtec Answer to Joint Pet’rs at 72.

<sup>600</sup> Joint Pet’rs Pet. at 70.

<sup>601</sup> Joint Pet’rs Pet. at 77 (quoting *San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016, 1032 (9th Cir. 2006)).

<sup>602</sup> James David Ballard, *Holtec HI-STORM UMAX Interim Storage Facility (a.k.a. CISF): Human Initiated Events (HIE), Transportation of the Inventory and Storage of Highly Radioactive Waste Materials* (Sept. 2018) [hereinafter Ballard Report]. Dr. Ballard has a Ph.D. in sociology and is a professor of criminology and justice studies at California State University, Northridge.

<sup>603</sup> Joint Pet’rs Pet at 79.

cause of its “vertical monopoly” in the energy industry;<sup>604</sup> to wanting the NRC and/or Holtec to “define [Design Basis Events] and [Design Basis Threats] for the whole duration of the transportation campaign;<sup>605</sup> to recommending the NRC define through regulations the specific penalties to be imposed upon Holtec for “lack of vigilance” in any aspect of the transportation and the management of the spent fuel;<sup>606</sup> to suggesting the NRC incorporate consent-based siting, waste transport, and storage based on the Blue Ribbon Commission and National Academy of Sciences report recommendations.<sup>607</sup>

In *San Luis Obispo Mothers for Peace*, the United States Court of Appeals for the Ninth Circuit held “that it was unreasonable for the NRC to categorically dismiss the possibility of terrorist attack on the Storage Installation . . . as too remote and highly speculative to warrant consideration under NEPA.”<sup>608</sup> And although Joint Petitioners acknowledge that New Mexico is not part of the Ninth Circuit,<sup>609</sup> they claim that because “hundreds of shipments will come through the Ninth Circuit en route to New Mexico . . . the Ninth Circuit law must be respected and abided by within the geographic territory of the Ninth Circuit,” and thus Holtec must conduct a terrorism analysis in its Environmental Report under the Ninth Circuit standard in accordance with NEPA.<sup>610</sup>

The NRC takes the position (as confirmed by the United States Court of Appeals for the Third Circuit<sup>611</sup>) that for all licensing actions outside the Ninth Circuit, “terrorist attacks are too far removed from the natural or expected consequences of agency action to require environmental analysis.”<sup>612</sup> Unless the proposed facility would be located in one of the nine states in the Ninth Circuit, no terrorist analysis under NEPA is required. Holtec’s facility would be constructed in New Mexico (located in the Tenth Circuit). Holtec’s Environmental Report need not conduct an analysis concerning terrorism under NEPA. This aspect of Contention 12 is therefore inadmissible as outside the scope of this proceeding.<sup>613</sup>

As to the remaining recommendations and observations in the Ballard Report, we agree with the NRC Staff’s assessment<sup>614</sup> that all of the twenty-eight

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<sup>604</sup> *Id.* at 79-80.

<sup>605</sup> *Id.* at 80.

<sup>606</sup> *Id.* at 84.

<sup>607</sup> *Id.* at 85.

<sup>608</sup> *San Luis Obispo Mothers for Peace*, 449 F.3d at 1030 (internal quotations omitted).

<sup>609</sup> Joint Pet’rs Reply at 61.

<sup>610</sup> Tr. at 174.

<sup>611</sup> *N.J. Dep’t of Env’tl. Prot. v. NRC*, 561 F.3d 132 (3d Cir. 2009).

<sup>612</sup> Continued Storage GEIS at 4-91.

<sup>613</sup> 10 C.F.R. § 2.309(f)(1)(iii).

<sup>614</sup> See NRC Staff Consol. Answer at 57-59.



proffered subcontentions fall short of the Commission’s contention admissibility standards. Namely, they all fail to show a genuine dispute with the interim storage facility application, much less even address or acknowledge the application in the petition.<sup>615</sup> An admissible contention must, at a minimum, reference the portion of the application to which the contention is challenging “and show where the applicant is lacking” — here, none of the subcontentions does this.<sup>616</sup> Board proceedings regarding an application for an NRC-issued license are not a proper forum for contentions that comprise broad policy recommendations and challenges to the Agency’s rules.<sup>617</sup>

Joint Petitioners Contention 11 is not admitted.

## **12. Joint Petitioners Contention 12**

Joint Petitioners Contention 12 states:

Because of the geologic formations and conditions beneath the Holtec site, there are risks inherent in siting and operating the [consolidated interim storage] facility as proposed by Holtec. The [Environmental Report] and SAR in this case do not adequately discuss and evaluate the risks created by those geologic conditions.<sup>618</sup>

Joint Petitioners cite two regulations, 10 C.F.R. § 51.45 (requirement for an environmental report) and 10 C.F.R. § 72.90 (site characteristics related to safety),<sup>619</sup> but mainly rely on a thirty-page report by a geologist, Dr. Steven Schafersman.<sup>620</sup> Joint Petitioners allege that Dr. Schafersman has “extensive experience and knowledge regarding Permian Basin geology.”<sup>621</sup> The Schafersman Report is divided into two parts: Part I, which presents “three geologic reasons that demonstrate why it is inadvisable to temporarily or permanently store [spent nuclear fuel/high level nuclear waste]” at the proposed Holtec site; and Part II, which presents “six major reasons that oppose the transport and storage of [spent

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<sup>615</sup> The NRC Staff notes, and we agree, that only in one place does the Ballard Report cite sections of the application. See Ballard Report at 54-55 n.11. The report does not grapple with the application as required by the Commission’s contention admissibility standards.

<sup>616</sup> *Arizona Public Service Co.* (Palo Verde Nuclear Generating Station, Units 1, 2, and 3), CLI-91-12, 34 NRC 149, 156 (1991).

<sup>617</sup> 10 C.F.R. § 2.335.

<sup>618</sup> Joint Pet’rs Pet. at 88.

<sup>619</sup> *Id.*

<sup>620</sup> See Steven Schafersman, Ph.D., *Geological Report Documenting and Opposing Use of the Holtec Site in New Mexico to Store High Level Nuclear Wastes* (2018) [hereinafter Schafersman Report].

<sup>621</sup> *Id.*

nuclear fuel/high level nuclear waste] at the Holtec site.”<sup>622</sup> In his report, Dr. Schafersman generally describes the geology<sup>623</sup> and hydrology<sup>624</sup> of the region, and puts forth his ideas concerning “several scientific, economic, political, and anecdotal reasons that make it inadvisable to store high-level nuclear wastes” at the proposed HI-STORE UMAX storage facility.<sup>625</sup>

Joint Petitioners Contention 12 is inadmissible because it does not comply with the Commission’s strict-by-design contention admissibility standards.<sup>626</sup> Merely referencing a report that does not identify specific portions of the license application does not comply with the Commission’s specificity requirements.<sup>627</sup> The Schafersman Report does not provide sufficient information to show that a genuine dispute exists with Holtec’s license application;<sup>628</sup> indeed, the Schafersman Report does not even mention the Holtec application (save for one reference to Figure 3.3.2 in the Environmental Report to establish that the top of the Salado Formation below the Holtec storage facility is 1400 feet below the facility) and does not challenge any aspect of the application.

The Commission’s contention admissibility rules require petitioners seeking intervention “to read the pertinent portions of the license application, including the [SAR] and the Environmental Report, [and] state the applicant’s position and the petitioners’ opposing view.”<sup>629</sup> The Schafersman Report does not meet this requirement.<sup>630</sup>

Joint Petitioners Contention 12 is not admitted.

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<sup>622</sup> Schafersman Report at unnumbered p. 1.

<sup>623</sup> *Id.* at unnumbered pp. 1-16.

<sup>624</sup> *Id.* at unnumbered pp. 16-20.

<sup>625</sup> *Id.* at unnumbered pp. 20-30.

<sup>626</sup> *Millstone*, CLI-01-24, 54 NRC at 358.

<sup>627</sup> See *NextEra Energy Seabrook LLC* (Seabrook Station, Unit 1), CLI-12-5, 75 NRC 301, 332 (2012); *Baltimore Gas & Electric Co.* (Calvert Cliffs Nuclear Power Plant, Units 1 and 2), CLI-98-25, 48 NRC 325, 348 (1998) (“Mere reference to documents does not provide an adequate basis for a contention.”).

<sup>628</sup> 10 C.F.R. § 2.309(f)(1)(vi).

<sup>629</sup> Rules of Practice for Domestic Licensing Proceedings — Procedural Changes in the Hearing Process, 54 Fed. Reg. 33,168, 33,170 (Aug. 11, 1989).

<sup>630</sup> Further, several of Contention 12’s claims are outside the scope of this proceeding. See, e.g., Schafersman Report at 4 (exploring the supposition that a “large militia group can take over the facility, declare themselves an independent state” and threaten to destroy the storage facility should authorities try to take back the facility); 21 (alleging the facility will be permitted for 120 years and the fuel will never be moved to a permanent repository); 22 (discussing “our poorly-regulated American free enterprise system” where corporations internalize gains and externalize losses at the expense of the environment).

### **13. Joint Petitioners Contention 13**

Joint Petitioners Contention 13 states:

Pursuant to 10 C.F.R. [§] 2.309(f)(3), Petitioners move to adopt all contentions filed by the Sierra Club in this proceeding and to re-allege them as their own as if written herein.<sup>631</sup>

To adopt a contention, a participant must have demonstrated standing in their own right and have themselves proffered an admissible contention.<sup>632</sup> As Joint Petitioners have done neither, they may not adopt any of Sierra Club's contentions.

Joint Petitioners Contention 13 is not admitted.

### **14. Joint Petitioners Contention 14**

Joint Petitioners Contention 14 states:

Section 186 of the Atomic Energy Act (AEA) (42 U.S.C. § 2236) provides that a license issued by the NRC may be revoked for any material false statement in the license application. Holtec has made a material false statement in its license application in this case by stating repeatedly that title to the waste to be stored at the [consolidated interim storage] facility would be held by DOE and/or the nuclear plant owners. This false statement was repeated in Holtec's Answers to Sierra Club's Contention 1 and [Joint Petitioners'] Contention 2.

The statement that nuclear plant *owners* might retain title to the waste is shown to be false by a January 2, 2019, e-mail message from Holtec to the public titled "Reprising 2018[.]" "Reprising 2018" states, "While we endeavor to create a national monitored retrievable storage location for aggregating used nuclear fuel at reactor sites across the U.S. into one (HI-STORE CISF) to maximize safety and security, its deployment will ultimately depend on the DOE and the U.S. Congress."

Thus, if a false statement such as Holtec has made in its filings in this case is grounds for revoking a license, it is grounds for not issuing the license in the first instance.<sup>633</sup>

Joint Petitioners' Contention 14 is substantially identical to Sierra Club Contention 26. It is based on the same January 2, 2019 Holtec e-mail message to

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<sup>631</sup> Joint Pet'rs Pet. at 88.

<sup>632</sup> See *Indian Point*, CLI-01-19, 54 NRC at 132-33.

<sup>633</sup> Joint Pet'rs Motion to File New Contention, attach., [Joint Petitioners] Contention 14, at unnumbered p. 1.

the public (“Reprising 2018”), and was submitted on the same day (January 17, 2019).

As discussed *supra*, the Board granted the motion to file Sierra Club Contention 26, but rejected the Contention as inadmissible. For the same reasons, we grant the motion to file Joint Petitioners Contention 14 and likewise rule it inadmissible.

Joint Petitioners Contention 14 is not admitted.

#### **D. Fasken**

Rather than submit a contention in response to the proceeding’s *Federal Register* notice, Fasken instead filed a motion with the Commission to dismiss this proceeding as well as the *Interim Storage Partners LLC* proceeding, which involves a proposed interim storage facility that would be constructed in Texas.<sup>634</sup> The Secretary of the Commission denied the motion and referred it for review under the NRC’s contention admissibility standards.<sup>635</sup>

Fasken’s contention states:

The NRC lacks jurisdiction over the [application] because [it is] premised on the proposition that the U.S. Department of Energy (“DOE”) will be responsible for the spent fuel that would be transported to and stored at the proposed [facility]. This premise is prohibited under the NWPA because the DOE is precluded from taking title to spent fuel until a permanent repository is available.<sup>636</sup>

The NRC’s acceptance and processing of the application[ ] conflicts with the essential predicate that a permanent repository be available before licensure of a [consolidated interim storage facility]. Further, processing the subject applications implies that the NRC disregards the NWPA’s unambiguous requirement that spent fuel remain owned by and is the responsibility of reactor licensees until a permanent repository is available. The logic that underpins the plain language of the NWPA’s requirement for a functioning permanent repository is effectively vitiated by processing the[ ] application[ ]. [Fasken] contend[s] the [consolidated interim storage facility] applicant[ ] should be required to show cause why [its] application[ ] do[es] not constitute a violation of the NWPA since no permanent repository for spent nuclear fuel exists in the United States. Processing the[ ] application[ ] to licensure under the present circumstances invites the situation Congress was attempting to avoid because licensure of a CISF without an available permanent repository contradicts the NWPA’s objective to establish a permanent repository.

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<sup>634</sup> Fasken Motion to Dismiss at 1-8.

<sup>635</sup> Order Denying Motions to Dismiss.

<sup>636</sup> Fasken Motion to Dismiss at 1-2 (citing 42 U.S.C. §§ 10222(a)(5)(A), 10143).

The prospect that any CISF will become a *de facto* permanent repository is precisely what the NWPA intends to avoid.<sup>637</sup>

Fasken's contention is similar to Beyond Nuclear's contention. However, its basis solely relies upon Beyond Nuclear's petition and incorporates by reference "the arguments and authorities in the Beyond Nuclear Inc. motion to dismiss at sections IV, V and VI."<sup>638</sup>

The Commission has approved the incorporation of contentions of other petitioners by reference, but only for those who have demonstrated standing and have submitted their own admissible contention themselves.<sup>639</sup> However, the Commission cautioned:

Nor will we permit wholesale incorporation by reference by a petitioner who, in a written submission, merely establishes standing and attempts, without more, to incorporate the issues of other petitioners. Further, we would not accept incorporation by reference of another petitioner's issues in an instance where the petitioner has not independently established compliance with our requirements for admission as a party in its own pleadings by submitting at least one admissible issue of its own.<sup>640</sup>

Although Fasken demonstrated standing in this proceeding, it did not proffer a contention of its own — it only incorporated Beyond Nuclear's arguments and authorities by reference. Fasken would be permitted to do this if it had proffered its own admissible contention, but it did not.

Fasken's contention is therefore not admitted.

## **E. AFES**

### **1. AFES Contention 1**

AFES Contention 1 states:

As a matter of law, the applicant has not performed a sufficient investigation and has not done a sufficient analysis to support that the Holtec site will not have a disparate impact on the minority and low income population of Lea and Eddy County.<sup>641</sup>

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<sup>637</sup> *Id.* at 2 (citing Decl. of Tommy Taylor ¶ 8).

<sup>638</sup> *Id.* at 7.

<sup>639</sup> *Indian Point*, CLI-01-19, 54 NRC at 132.

<sup>640</sup> *Id.* at 133.

<sup>641</sup> AFES Pet. at 11.

AFES objects to Holtec's site selection process, because it alleges that the siting process "entirely fails to account for *alternative sites*" for Holtec's proposed fuel storage facility.<sup>642</sup> AFES cites a licensing board decision, *Louisiana Energy Services, L.P.* (Claiborne Enrichment Center),<sup>643</sup> alleging that *Claiborne* is akin to binding precedent upon this Board because that licensing board "addressed in detail what a licensing applicant must do to ensure that the site selection process to possess and use nuclear material is free from impermissible discrimination as to minority and low income populations."<sup>644</sup> AFES further alleges that Holtec violates NEPA, *Claiborne*, and Executive Order 12898 (which incorporates the topic of environmental justice into all executive agencies' NEPA reviews)<sup>645</sup> because it did not conduct a site selection process "other than a cursory review of a report on a different site selection process"<sup>646</sup> and allegedly only relied "on the unsupported opinions" of the Eddy-Lea Energy Alliance (ELEA).<sup>647</sup>

Environmental justice is a federal policy established in 1994 by Executive Order 12898 directing federal agencies to identify and address "disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."<sup>648</sup> The Commission's *Claiborne* decision clarified that NEPA requires the NRC to consider "social and economic impacts ancillary" to environmental impacts; that is, environmental justice concerns.<sup>649</sup>

In response to *Claiborne* and Executive Order 12898, the NRC promulgated its policy statement concerning environmental justice matters involving NRC licensing and regulatory actions.<sup>650</sup> The policy statement directs the Staff to conduct a more thorough analysis "if the percentage in the impacted area significantly exceeds that of the State or County percentage for either the minority or low-income population."<sup>651</sup> Although not binding regulations, NRC guidance documents specify that the applicant's Environmental Report should include "a

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<sup>642</sup> *Id.* at 17 (emphasis in original).

<sup>643</sup> *Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), LBP-97-8, 45 NRC 77 (1997), *aff'd in part, rev'd in part*, CLI-98-3, 47 NRC 77 (1998).

<sup>644</sup> AFES Pet. at 11.

<sup>645</sup> See Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations, Exec. Order 12898, 59 Fed. Reg. 7629 (Feb. 11, 1994) [hereinafter Exec. Order 12898].

<sup>646</sup> AFES Pet. at 18.

<sup>647</sup> *Id.* at 19.

<sup>648</sup> See Exec. Order 12898, 59 Fed. Reg. at 7629.

<sup>649</sup> *Claiborne*, CLI-98-3, 47 NRC at 101.

<sup>650</sup> See Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions, 69 Fed. Reg. 52,040, 52,040-41, 52,048 (Aug. 24, 2004) [hereinafter NRC Environmental Justice Policy Statement]. Because the NRC is an independent agency, Executive Order 12898 did not automatically apply to the NRC.

<sup>651</sup> *Id.* at 52,048.

discussion of the methods used to identify and quantify impacts on low-income and minority populations, the location and significance of any environmental impacts during construction on populations that are particularly sensitive, and any additional information pertaining to mitigation.”<sup>652</sup> The NRC Staff considers “differences [of block groups compared to the state and county percentages of minority populations] greater than 20 percentage points to be significant” enough for an Environmental Report to warrant greater detail.<sup>653</sup>

We conclude that AFES Contention 1 is not admissible because AFES has not shown any legal requirement for Holtec to conduct a more in-depth inquiry into alternatives to the proposed action (i.e., the siting of the facility) or environmental justice analyses in its Environmental Report. Moreover, AFES has not cited any legal basis mandating Holtec to further analyze environmental justice impacts. Environmental Report section 3.8 describes the social and economic characteristics for the 50-mile region of influence (ROI) around Holtec’s proposed facility.<sup>654</sup> Environmental Report section 3.8.5, titled “Environmental Justice,” cites to and responds to Executive Order 12898 and the NRC Environmental Justice Policy Statement regarding the proposed storage facility’s ROI. The Environmental Report’s table 3.8.13 identifies percentages of minority and low-income communities within the Holtec facility’s ROI. Because Holtec did not find differences greater than 20 percent, as recommended by the NRC Environmental Justice Policy Statement,<sup>655</sup> Holtec did not consider environmental justice in greater detail than it already had. As AFES cites no other legal requirement for Holtec to consider environmental justice impacts in greater detail, the contention fails to show a genuine dispute with the application regarding a material issue of law or fact.

Insofar as the contention concerns Holtec’s site selection process, where AFES alleges the Environmental Report “fails to account for alternative sites,”<sup>656</sup> (i.e., a contention of omission) the contention fails as well. The Environmental Report contains an analysis of location alternatives that explains the methodology of Holtec’s selection of the proposed site,<sup>657</sup> and also shows six other potential sites that were analyzed and considered for suitability of the Holtec HI-STORE consolidated interim storage facility’s characteristics.<sup>658</sup>

AFES Contention 1 is not admitted.

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<sup>652</sup> Final Report, Environmental Review Guidance for Licensing Actions Associated with NMSS Programs, NUREG-1748 at 6-25 (Aug. 2003) [hereinafter NUREG-1748].

<sup>653</sup> *Id.* at C-5.

<sup>654</sup> *See* ER at 3-95.

<sup>655</sup> *Id.* at 4-29.

<sup>656</sup> AFES Pet. at 17.

<sup>657</sup> *See* ER §§ 2.3, 2.4.2.

<sup>658</sup> *Id.* at 2-27 (Fig. 2.3.1).

## 2. *AFES Contention 2*

AFES Contention 2 states:

As a matter of fact and expert opinion, the siting process will have a disparate impact on the minority and low income population of Lee and Eddy County.<sup>659</sup>

To support its assertion, AFES submits an affidavit from Professor Myrriah Gómez, Ph.D., that is entitled “Environmental Racism an Active Factor in the Siting and White Privilege Associated with the Holtec International HI-STORE Consolidated Interim Storage Facility Project.”<sup>660</sup> Dr. Gómez claims that the proposal “is an example of environmental racism based on studies defining and documenting environmental racism across . . . the United States,” and alleges that the proposed Holtec facility meets African-American civil rights leader Benjamin Chavis’s definition of environmental racism.<sup>661</sup> AFES argues that “Holtec’s reliance on an invitation for siting by a small group of government officials is a deficient process from the outset.”<sup>662</sup>

AFES Contention 2 is inadmissible because it does not show a genuine dispute with the application on a material issue of law or fact. As discussed *supra*, the environmental justice analysis in an applicant’s Environmental Report is guided by the NRC’s Environmental Justice Policy Statement and NUREG-1748, which were issued in response to Executive Order 12898. Holtec addressed environmental justice matters to the depth recommended by NRC guidance,<sup>663</sup> and neither AFES’s petition nor Dr. Gómez’s affidavit challenge the information in Holtec’s Environmental Report. Rather, AFES Contention 2 challenges the NRC’s environmental justice policy and implementing guidance documents themselves.<sup>664</sup>

AFES Contention 2 is not admitted.

## 3. *AFES Contention 3*

AFES Contention 3 states:

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<sup>659</sup> AFES Pet. at 22.

<sup>660</sup> *Id.*, Ex. 7. Dr. Gómez holds a Ph.D. in English with a concentration in Latina/o literature and works as an assistant professor for the Honors College at the University of New Mexico.

<sup>661</sup> *Id.*, Ex. 7, at 2-3.

<sup>662</sup> AFES Reply at 22.

<sup>663</sup> See ER at 3-113 (tbl. 3.8.13).

<sup>664</sup> Because both AFES Contentions 1 and 2 are inadmissible, we need not address Holtec’s motion to strike concerning these contentions. See [Holtec’s] Motion to Strike Portions of Replies of [AFES], [Joint Petitioners], [NAC], and Sierra Club (Oct. 26, 2018) at 4-5.



There is no factual support for Holtec's primary site selection criterion, which is community support.<sup>665</sup>

Acknowledging that "community support" is not a material issue to the findings that the NRC must make to license the proposed facility, AFES points the Board to Environmental Report section 2.4.2 to clarify that Holtec "has made community support a material issue" regarding the proposed site selection criterion for two reasons.<sup>666</sup> First, AFES claims that, because Holtec has taken ELEA's support for the proposed facility as local "community support," Holtec has misrepresented the community support (or the lack thereof) in its application.<sup>667</sup> AFES alleges that this makes the issue of public support material to Holtec's application, in addition to the alleged violations by ELEA of New Mexico's Open Meetings Act.<sup>668</sup> Second, AFES contends that "Holtec cannot even demonstrate that the land under the site is 'controlled' by Holtec,"<sup>669</sup> which AFES alleges is the "lynchpin of Holtec's entire application."<sup>670</sup>

AFES Contention 3 is inadmissible because the issue of public support for the proposed facility is not material to the findings the NRC must make in this licensing proceeding. Assertion of community support or opposition in a license application does not lend any weight to the environmental justice analysis to be conducted by the applicant.<sup>671</sup> And, as discussed *supra*, an Environmental Report's environmental justice analysis may follow NUREG-1748, Appendix C, which Holtec chose to do. Because AFES points to no other source of law that places weight on "community support" with regard to the selection of a project site, the contention fails.

Although not expressly set forth in AFES Contention 3, AFES also raises, in its supporting bases, a claim that the ELEA acquired the proposed site (which it intends to sell to Holtec) in violation of the New Mexico Open Meetings Act.<sup>672</sup> These claims under New Mexico law against an entity that is not seeking a license from the NRC are plainly outside the scope of this proceeding.

AFES contention 3 is not admitted.

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<sup>665</sup> AFES Pet. at 23.

<sup>666</sup> *Id.*

<sup>667</sup> *Id.* at 23-24.

<sup>668</sup> *Id.* at 24.

<sup>669</sup> *Id.* (citing ER, rev. 0 § 2.2.1).

<sup>670</sup> *Id.*

<sup>671</sup> *See* Exec. Order 12898; NRC Environmental Justice Policy Statement; NUREG-1748.

<sup>672</sup> N.M. Stat. Ann. § 10-15-1 (1978).

## F. NAC

### 1. NAC Contention 1

NAC Contention 1 states:

The Holtec CISF license application inadequately substantiates its design basis analyses concerning normal, off-normal, and accident events, which are required to demonstrate compliance with 10 C.F.R. Part 72, including Subparts E, F and G (and related acceptance criteria in NUREG 1567), as it lacks required design and safety information on the NAC canisters to be housed in the CISF UMAX casks.<sup>673</sup>

Because NAC has not licensed or otherwise provided its proprietary design information to Holtec,<sup>674</sup> it alleges that Holtec cannot comply with NRC safety-related requirements, as Holtec lacks required design and safety information on any NAC canisters that would be stored in the proposed facility. In support, NAC submits the affidavit of George C. Carver, its Vice President of Engineering & Licensing.<sup>675</sup>

As explained *supra* in connection with the Board's discussion of standing, however, Holtec is not presently seeking NRC approval to store any NAC canisters. NAC Contention 1 is therefore outside the scope of this licensing proceeding.

If and when Holtec seeks NRC permission to store NAC canisters, the necessary license amendment or amendments will provide NAC with an opportunity to participate, as Holtec acknowledges.<sup>676</sup> NAC's argument that future license amendment proceedings (if any) might be affected in some way by the present proceeding is not persuasive.<sup>677</sup> To speculate about the possibility of such an impact does not bring NAC's claims in Contention 1 within the scope of the present proceeding.<sup>678</sup>

NAC Contention 1 is not admitted.

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<sup>673</sup> NAC Pet. at 10.

<sup>674</sup> *Id.* at 4.

<sup>675</sup> *Id.*, attach., Aff. of George C. Carver (Sept. 14, 2018).

<sup>676</sup> Holtec Answer to NAC at 11.

<sup>677</sup> See NAC Reply at 6-8.

<sup>678</sup> The Board has also considered and rejected NAC's argument — first expressed in its petition and amplified in its reply — that Holtec is somehow seeking a "universal" license notwithstanding the more limited scope of its actual application. As set forth *infra*, the Board has denied as moot Holtec's motion to strike portions of NAC's reply that make this argument because we determine NAC's contentions are not admissible regardless of whether we consider its reply. See Holtec Motion to Strike at 9-10.

## 2. *NAC Contention 2*

NAC Contention 2 states:

The Holtec CISF application omits technical information required under NRC regulations, including but not limited to 10 C.F.R. § 72.24, about the design and safety performance of NAC canisters within its UMAX casks.<sup>679</sup>

Similar to its claims in Contention 1, NAC alleges in Contention 2 that, because Holtec does not have access to NAC's proprietary information, Holtec's license application omits required technical information about the design and safety performance of NAC canisters.

NAC Contention 2 is not admissible for the same reason NAC Contention 1 is not admissible. Holtec is not presently seeking NRC approval to store any NAC canisters, so NAC Contention 2 is outside the scope of this proceeding.

NAC Contention 2 is not admitted.

## 3. *NAC Contention 3*

NAC Contention 3 states:

The Holtec CISF license application incorrectly omits a design alternatives analysis on the speculative grounds that the UMAX cask system is the only such system that is capable of including as contents all non-Holtec canister types.<sup>680</sup>

NAC alleges that, in its Environmental Report, Holtec incorrectly chose not to examine in detail the alternative cask designs of various competitors, including NAC. Specifically, Holtec identified but eliminated from detailed analysis design alternatives to “use the AREVA, NAC, and EnergySolutions systems.”<sup>681</sup>

Although the NRC Staff would have us deny NAC's hearing request for failure to demonstrate standing, the Staff would otherwise not oppose the admissibility of NAC Contention 3 “to the extent that the [Environmental Report's] basis for eliminating these design alternatives from detailed analysis is unclear.”<sup>682</sup> The Board does not agree. As Holtec's counsel stated during oral argument, “the purpose of this project is to deploy Holtec technology.”<sup>683</sup> As a practical

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<sup>679</sup> NAC Pet. at 10.

<sup>680</sup> NAC Pet. at 14.

<sup>681</sup> *Id.* (quoting ER, rev. 1 § 2.4.1).

<sup>682</sup> NRC Staff Consol. Answer at 65.

<sup>683</sup> Tr. at 267.

matter, it seems most unlikely that Holtec would elect in any circumstances to go forward with the project to deploy its competitors' storage technology.

Regardless, an applicant's Environmental Report is not required to include the type of alternatives analysis that NAC claims must be included. NAC does not allege any of the systems (including its own) that it claims Holtec should have analyzed in detail would have any lesser environmental impacts than Holtec's own HI-STORM UMAX system. Nor is any such difference apparent, as all of these competing systems are similar — comprised of canisters contained within casks.

To be sure, NEPA requires federal agencies (and hence the NRC requires applicants' Environmental Reports<sup>684</sup>) to take a hard look at the environmental impacts of a proposed action and of environmentally-significant alternatives. An applicant's discussion of alternatives in its Environmental Report must be sufficiently complete to aid the NRC in complying with NEPA.<sup>685</sup>

But NEPA does not require a detailed analysis of alternatives that are of no environmental significance. As stated in the Council on Environmental Quality's implementing regulations, NEPA calls for consideration of reasonable alternatives to proposed actions "that will avoid or minimize adverse effects of these actions upon the quality of the human environment"<sup>686</sup> or that involve unresolved conflicts concerning alternative users of available resources.<sup>687</sup> NAC has not alleged that any such environmental impacts or unresolved conflicts would be associated with Holtec's use of its competitors' storage systems rather than its own.

As the Commission has reminded us, an environmental analysis "is not intended to be 'a research document.'"<sup>688</sup> If there are alleged omissions in the analysis, "in an NRC adjudication it is [the] Intervenor's burden to show their significance and materiality."<sup>689</sup> NAC has not done so.

NAC Contention 3 is not admitted.

## V. INTERESTED GOVERNMENT PETITIONERS

Government entities (1) City of Carlsbad, New Mexico; (2) The Eddy-Lea

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<sup>684</sup> See 10 C.F.R. §§ 51.45, 51.61.

<sup>685</sup> *Id.* § 51.45(b)(3).

<sup>686</sup> 40 C.F.R. § 1500.2(e).

<sup>687</sup> *Id.* §§ 1501.2(c), 1502.1.

<sup>688</sup> *Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-22, 72 NRC 202, 208 (2010) (citation omitted).

<sup>689</sup> *Exelon Generating Co., LLC* (Early Site Permit for Clinton ESP Site), CLI-05-29, 62 NRC 801, 811 (2005).

Energy Alliance; (3) Lea County, New Mexico; (4) City of Hobbs, New Mexico; and (5) Eddy County, New Mexico timely filed requests to participate as an interested governmental body.<sup>690</sup> The NRC Staff stated that it “does not object to the participation of any of these governmental bodies . . . if a hearing is granted.”<sup>691</sup> Neither Holtec nor any other petitioner has raised an objection.

Pursuant to 10 C.F.R. § 2.315(c), a local governmental body that is not admitted as a party under section 2.309 shall, upon request, be permitted a reasonable opportunity to participate in a hearing as an interested non-party. Section 2.315(c) does not require a demonstration of standing, but does require identification of those contentions on which the non-party intends to participate.<sup>692</sup>

As the Board denies all the petitioners’ requests for a hearing, the motions of the City of Carlsbad, New Mexico; Eddy-Lea Energy Alliance; Lea County, New Mexico; City of Hobbs, New Mexico; and Eddy County, New Mexico are accordingly denied as moot.

## VI. RULING ON PETITIONS

Although Beyond Nuclear, Sierra Club, and Fasken have demonstrated standing in accordance with 10 C.F.R. § 2.309(d), no petitioner has proffered an admissible contention meeting the requirements of 10 C.F.R. § 2.309(f)(1). Therefore, in accordance with 10 C.F.R. § 2.309(a), the Board denies the requests for hearing and petitions for leave to intervene submitted by Beyond Nuclear, Sierra Club, Joint Petitioners, Fasken, AFES, and NAC.

## VII. ORDER

For the foregoing reasons:

- A. Beyond Nuclear’s petition is *denied*. Beyond Nuclear’s contention is *not admitted*.
- B. Sierra Club’s petition is *denied*. Sierra Club’s contentions are *not admitted*.
- C. Joint Petitioners’ petition is *denied*. Joint Petitioners’ contentions are *not admitted*.
- D. Fasken’s petition is *denied*. Fasken’s contention is *not admitted*.

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<sup>690</sup> See ELEA Pet.; Lea Cty. Pet.; Carlsbad Pet.; Hobbs Pet.; Eddy Cty. Pet.

<sup>691</sup> NRC Staff Consol. Answer at 3-4 n.11.

<sup>692</sup> 10 C.F.R. § 2.315(c).

- E. AFES’s petition is *denied*. AFES’s contentions are *not admitted*.
- F. NAC’s petition is *denied*. NAC’s contentions are *not admitted*.
- G. The petitions of City of Carlsbad, Eddy-Lea Energy Alliance, Lea County, City of Hobbs, and Eddy County to participate as local interested government bodies are *denied* as moot.
- H. Holtec’s October 26, 2018 motion to strike is *denied* as moot.<sup>693</sup>
- I. Holtec’s November 8, 2018 Motion for Leave to Reply to Alliance Response is *denied* as moot.<sup>694</sup>
- J. Fasken’s December 10, 2018 motion to file a supplemental declaration is *granted*.<sup>695</sup>
- K. Joint Petitioners’ and Sierra Club’s January 11, 2019 motions to adopt each other’s contentions are *denied* as moot.<sup>696</sup>
- L. Sierra Club’s and Joint Petitioners’ joint motion for a subpart G hearing is *denied* as moot.<sup>697</sup>
- M. Sierra Club’s January 17, 2019 motion to late-file new Contention 26 is *granted*.<sup>698</sup>
- N. Joint Petitioners’ January 17, 2019 motion to late-file new Contention 14 is *granted*.<sup>699</sup>
- O. Sierra Club’s February 6, 2019 motion to amend its Contention 1 is *granted*.<sup>700</sup>
- P. Beyond Nuclear and Fasken’s February 6, 2019 motion to amend Beyond Nuclear’s contention is *granted*.<sup>701</sup>

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<sup>693</sup> Holtec Motion to Strike.

<sup>694</sup> [Holtec’s] Motion for Leave to Reply to [AFES’] Response to [Holtec’s] Motion to Strike (Nov. 8, 2018).

<sup>695</sup> Motion for Permission to File Supplemental Standing Declaration of Tommy E. Taylor (Dec. 10, 2018).

<sup>696</sup> Sierra Club’s Motion to Adopt the Contentions of [Joint Petitioners] (Jan. 11, 2019); Motion of [Joint Petitioners] to Adopt and Litigate Sierra Club Contentions (Jan. 11, 2019).

<sup>697</sup> Joint Motion to Establish Hearing Procedures by Sierra Club, [Joint Petitioners] (Jan. 3, 2019).

<sup>698</sup> Sierra Club’s Motion to File a New Late-Filed Contention (Jan. 17, 2019).

<sup>699</sup> Motion by [Joint Petitioners] for Leave to File a New Contention (Jan. 17, 2019).

<sup>700</sup> Sierra Club’s Motion to Amend Contention 1 (Feb. 6, 2019).

<sup>701</sup> Motion by Petitioners Beyond Nuclear and Fasken to Amend Their Contentions Regarding Federal Ownership of Spent Fuel to Address Holtec International’s Revised License Application (Feb. 6, 2019).

- Q. Joint Petitioners' February 6, 2019 motion to amend their Contention 2 is *granted*.<sup>702</sup>
- R. Sierra Club's February 18, 2019 motion to amend its Contention 16 is *denied*.<sup>703</sup>
- S. Joint Petitioners' February 18, 2019 motion to amend their Contentions 4 and 7 is *denied*.<sup>704</sup>
- T. Joint Petitioners February 25, 2019 motion to amend their Contention 2 is *denied*.<sup>705</sup>
- U. Sierra Club's February 25, 2019 motion to file new late-filed Contentions 27, 28, and 29 is *denied*.<sup>706</sup>
- V. This proceeding is *terminated*.

Any appeal of this decision to the Commission shall be filed in conformity with 10 C.F.R. § 2.311.

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<sup>702</sup> Motion by [Joint Petitioners] to Amend Their Contention 2 Regarding Federal Ownership of Spent Fuel in the Holtec International Revised License Application (Feb. 6, 2019).

<sup>703</sup> Sierra Club's Motion to Amend Contention 16 (Feb. 18, 2019).

<sup>704</sup> Motion of [Joint Petitioners] to Amend Their Contentions 4 and 7 Regarding Holtec's Decision to Have No Dry Transfer System Capability and Holtec's Policy of Returning Leaking, Externally Contaminated or Defective Casks and/or Canisters to Originating Reactor Sites (Feb. 18, 2019).

<sup>705</sup> Motion of [Joint Petitioners] to Amend Their Contention 2 Regarding Holtec's Proposed Means of Financing the Proposed Consolidated Interim Storage Facility (Feb. 25, 2019).

<sup>706</sup> Sierra Club Additional Contentions.

It is so ORDERED.

THE ATOMIC SAFETY AND  
LICENSING BOARD

Paul S. Ryerson, Chairman  
ADMINISTRATIVE JUDGE

Nicholas G. Trikouros  
ADMINISTRATIVE JUDGE

Dr. Gary S. Arnold  
ADMINISTRATIVE JUDGE

Rockville, Maryland  
May 7, 2019



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

**COMMISSIONERS:**

**Kristine L. Svinicki**, Chairman  
**Jeff Baran**  
**Annie Caputo**  
**David A. Wright**

**In the Matter of**

**Docket Nos. 50-219-LT  
72-015-LT**

**EXELON GENERATION  
COMPANY, LLC  
(Oyster Creek Nuclear Generating  
Station)**

**June 18, 2019**

The Commission denies a petition for a hearing and request for intervention in a license transfer proceeding. The Commission also considers a letter requesting a public meeting and denies the request to the extent that it was intended as a request for an adjudicatory hearing. The Commission additionally refers the letter to the NRC Staff for consideration as comments on the proposed license transfer.

**LICENSE TRANSFERS**

Under the Atomic Energy Act of 1954, as amended, and our associated regulations, the NRC must provide written consent for a license transfer. The NRC will approve a license transfer application if it finds the proposed transferee to be qualified to hold the license and that the transfer is otherwise consistent with applicable law, regulations, and Commission orders.

**LICENSE TRANSFERS**

The license transfer review is limited to specific matters, including the fi-

nancial and technical qualifications of the proposed transferee. As part of the financial qualifications showing, an applicant must provide reasonable assurance that sufficient funds will be available to decommission the facility and to carry out applicable activities under the license.

#### **LICENSE TRANSFERS**

NRC regulations outline acceptable methods of demonstrating financial assurance for decommissioning. The prepayment method involves funds deposited into an account kept segregated from the licensee's assets and outside of the licensee's control, in an amount that would be sufficient to pay decommissioning costs at the time permanent termination of operations is expected.

#### **CONTENTIONS, ADMISSIBILITY**

NRC regulations in 10 C.F.R. § 2.309(f) specify the contention admissibility requirements. These requirements are strict by design. They require a petitioner to explain the basis for each contention, providing supporting facts or expert opinion on which the petitioner intends to rely in litigating the contention. Each contention must also fall within the scope of the proceeding and be material to the findings that the NRC must make regarding the proposed licensing action.

#### **LICENSE TRANSFERS**

A petitioner claiming that financial data are either inaccurate or insufficient must identify each failure and explain why the data are flawed. Unsupported claims of insufficient information do not establish a genuine, material dispute with the application.

#### **DECOMMISSIONING FUNDING**

The NRC's review of the adequacy of decommissioning and spent fuel management funding is not a one-time look but instead part of a continuous, long-term process. Throughout the license term, our regulations require licensees to plan financially for the eventual need to decommission a power reactor or ISFSI.

#### **DECOMMISSIONING FUNDING**

After a licensee in decommissioning has submitted its site-specific decommissioning cost estimate, it must annually continue to provide to the NRC finan-

cial assurance status reports that revisit and update the decommissioning cost projections and funding status, and the spent fuel management cost projections and funding status.

#### **DECOMMISSIONING FUNDING**

A licensee must notify the NRC (in writing, with a copy sent to the affected state(s)) prior to performing any decommissioning activities that would significantly increase the facility's decommissioning cost. If new developments point to a projected funding shortfall, the NRC requires additional financial assurance to cover the estimated cost to complete the decommissioning. The NRC's oversight of a licensee's decommissioning funding is an ongoing process that begins with licensing and continues through license termination.

#### **MANAGEMENT CHARACTER**

To be admissible as a litigable matter in an adjudicatory proceeding, claims of character or integrity must have some direct and obvious relationship between the character issues and the licensing action in dispute. When claims of prior violations or past events are raised for litigation, we expect them to be directly germane to the challenged licensing action.

#### **LICENSE TRANSFERS, NEPA**

Unless the NRC determines that there are "special circumstances," an environmental assessment or environmental impact statement is not required for approval of a license transfer (and any associated administrative license amendments).

### **MEMORANDUM AND ORDER**

This license transfer proceeding concerns an application filed by Exelon Generation Company, LLC (Exelon), Oyster Creek Environmental Protection, LLC (OCEP), and Holtec Decommissioning International, LLC (HDI) (collectively, the Applicants).<sup>1</sup> The Applicants seek NRC approval of a direct transfer of the

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<sup>1</sup> See Application for Order Approving Direct Transfer of Renewed Facility Operating License and General License and Proposed Conforming License Amendment, at 1 (Application), attached (encl. 1) to Letter from J. Bradley Fewell, Senior Vice President Regulatory Affairs and General

*(Continued)*

renewed facility operating license for the Oyster Creek Nuclear Generating Station and the general license for the Oyster Creek Independent Spent Fuel Storage Installation (ISFSI) from Exelon, the current license holder, to OCEP and HDI, the proposed licensed owner and operator, respectively.<sup>2</sup> The Applicants also request that the NRC approve a conforming amendment to the operating license to reflect the proposed transfer.

We consider today the petition for leave to intervene and request for a hearing submitted by Lacey Township (the Township).<sup>3</sup> As we outline below, the petition does not include an admissible contention for hearing and we therefore deny the request. We also consider a letter submitted by the New Jersey Chapter of the Sierra Club (Sierra Club) requesting a “public hearing” regarding Oyster Creek.<sup>4</sup> To the extent that the Sierra Club seeks an adjudicatory hearing to contest the license transfer application, we deny the request because the letter does not include an admissible contention and does not demonstrate the Sierra Club’s standing to intervene.

## I. BACKGROUND

### A. Proposed License Transfer

Exelon, the current licensee, has permanently ceased power operations at Oyster Creek and removed all fuel from the reactor vessel.<sup>5</sup> Pursuant to our

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Counsel, Exelon, to NRC Document Control Desk (Aug. 31, 2018) (Cover Letter). The cover letter, attached license transfer application, and associated enclosures may be found at ADAMS accession no. ML18243A489.

<sup>2</sup>OCEP and HDI are indirect, wholly-owned subsidiaries of Holtec International (Holtec). *See* Application at 1, 3. HDI was formed to assume the licensed operator responsibilities for decommissioning the nuclear power plant sites that Holtec acquires. *See id.*

<sup>3</sup>Township of Lacey’s Petition for Leave to Intervene and Hearing Request (Nov. 8, 2018) (Township Petition). The Applicants oppose the petition. *See* Exelon Generation Company, LLC, Oyster Creek Environmental Protection, LLC and Holtec Decommissioning International, LLC’s Answer Opposing the Township of Lacey’s Petition for Leave to Intervene and Request for a Hearing on the Proposed License Transfer of the Oyster Creek Nuclear Generating Station (Dec. 3, 2018).

<sup>4</sup>Letter from Jeff Tittel, Director, New Jersey Sierra Club, to NRC (Nov. 1, 2018), at 1 (ML18306-A866) (Sierra Club Letter). The Applicants oppose the Sierra Club’s letter to the extent that it is intended to be read as a petition to intervene and request for an adjudicatory hearing. *See* Exelon Generation Company, LLC, Oyster Creek Environmental Protection, LLC and Holtec Decommissioning International, LLC’s Answer Opposing Sierra Club’s Letter Requesting a Hearing on the Proposed License Transfer of the Oyster Creek Nuclear Generating Station (Nov. 26, 2018), at 2-5 (Applicants’ Answer to Sierra Club). They also state that to the extent that the Sierra Club instead seeks a public meeting, they would not oppose such a request. *See id.* at 2.

<sup>5</sup>*See* Letter from Michael P. Gallagher, Vice President, License Renewal & Decommissioning, (Continued)

regulations, the Oyster Creek license “no longer authorizes operation of the reactor or emplacement or retention of fuel into the reactor vessel.”<sup>6</sup> In short, the reactor is permanently shut down.

Under the proposed license transfer, OCEP would become the licensed owner and HDI the licensed operator of Oyster Creek.<sup>7</sup> Contingent on the NRC’s approval of the proposed transfer, OCEP would purchase Oyster Creek from Exelon pursuant to an Asset Purchase and Sale Agreement.<sup>8</sup> Following the purchase, OCEP would own the Oyster Creek facility and its associated assets and real estate and would take title to the spent nuclear fuel.<sup>9</sup> At closing, Exelon also would transfer the assets in the Oyster Creek Nuclear Decommissioning Trust to OCEP, which would hold the assets in a trust separate from its other assets and outside of its administrative control.<sup>10</sup> OCEP intends to enter into a decommissioning operator services agreement with HDI, under which HDI, in the role of the licensed operator, would be responsible for maintaining and decommissioning the facility. OCEP would pay HDI’s costs of post-shutdown operations, including all decommissioning and spent fuel management costs.<sup>11</sup>

As described in the application, HDI intends to contract with Comprehensive Decommissioning International, LLC (CDI) to serve as the general contractor for decommissioning Oyster Creek.<sup>12</sup> CDI was formed by its joint owners, Holtec (through its subsidiary HDI) and SNC-Lavalin Group (through its subsidiary Kentz USA Inc.).<sup>13</sup> If the proposed transfer is approved, CDI would perform the licensed activities at Oyster Creek, subject to HDI’s oversight and control as the licensed operator.<sup>14</sup>

If completed, the proposed transfer would significantly accelerate the current decommissioning schedule for Oyster Creek. Exelon’s current decommissioning schedule, outlined in its Post-Shutdown Decommissioning Activities Report (PSDAR), states that the Oyster Creek license would be terminated in 2078 and

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Exelon, to NRC Document Control Desk, Certification of Permanent Removal of Fuel from the Reactor Vessel for Oyster Creek Nuclear Generating Station (Sept. 25, 2018), at 1 (ML18268A258).

<sup>6</sup> 10 C.F.R. § 50.82(a)(2).

<sup>7</sup> See Oyster Creek Nuclear Generating Station; Consideration of Approval of Transfer of License and Conforming Amendment, 83 Fed. Reg. 53,119, 53,120 (Oct. 19, 2018) (Notice).

<sup>8</sup> Application at 1-2.

<sup>9</sup> *Id.* at 3.

<sup>10</sup> *Id.*

<sup>11</sup> *Id.* at 1, 3.

<sup>12</sup> *Id.* at 1, 4.

<sup>13</sup> See *id.* at 4-5, 12. SNC-Lavalin is a company based in Montreal, Canada. *Id.* at 5.

<sup>14</sup> See *id.* at 1-2, 4 (HDI would “retain ultimate decision-making authority and provide direct governance and oversight of CDI’s performance”); see also *id.* at 5, 12-14.

the site restored by 2080.<sup>15</sup> Exelon’s schedule is based on implementing the SAFSTOR decommissioning option. The SAFSTOR method “involves placing the facility in a safe, stable condition and maintaining that state for a period of time, followed by subsequent decontamination and dismantlement to levels that permit license termination.”<sup>16</sup> After removal of reactor fuel and radioactive fluids, the facility is left intact for a dormant period to allow for significant reductions in radioactivity levels due to radioactive decay. Following this safe storage period, the facility is decontaminated and dismantled to levels that permit license termination.

OCEP and HDI instead intend to implement an accelerated schedule for decommissioning Oyster Creek based on the DECON decommissioning approach. Under the DECON option, all “equipment, structures, and portions of the facility and site that contain radioactive contaminants are promptly removed or decontaminated to a level that permits termination of the license shortly after cessation of operations.”<sup>17</sup> HDI outlined its plans for the accelerated decommissioning of Oyster Creek in a Revised PSDAR, which is contingent on approval of the proposed license transfers and closure of the asset sale. HDI expects to complete radiological decommissioning and release the Oyster Creek site (except for the ISFSI portion) within 8 years of the license transfer and asset sale closure, and HDI expects to complete ISFSI decommissioning and final site restoration by 2035.<sup>18</sup> If the licenses are not transferred, Exelon’s current PSDAR and decommissioning schedule will remain in effect.<sup>19</sup>

## **B. License Transfer and Financial Qualifications**

Under the Atomic Energy Act of 1954, as amended (AEA), and our associated regulations, the NRC must provide prior written consent for a license transfer.<sup>20</sup> The NRC will approve a license transfer application if it finds the

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<sup>15</sup> See Post-Shutdown Decommissioning Activities Report, attached to Letter from Michael P. Gallagher, Vice President, License Renewal & Decommissioning, Exelon, to NRC Document Control Desk (May 21, 2018), at 8 (ML18141A775) (Exelon PSDAR); see also Application at 4.

<sup>16</sup> See “Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, Supplement 1 Regarding the Decommissioning of Nuclear Power Reactors” (Final Report), NUREG-0586, Supplement 1, vol. 1 (Nov. 2002), at 3-19 (ML023470304) (Decommissioning GEIS).

<sup>17</sup> See *id.*, vol. 1, at 3-16.

<sup>18</sup> See Revised Post-Shutdown Decommissioning Activities Report, attached to Letter from Pamela B. Cowan, Sr. Vice President & Chief Operating Officer, HDI, to NRC Document Control Desk (Sept. 28, 2018) (ML18275A116), at 4-5, 17 (HDI PSDAR).

<sup>19</sup> See *id.* at 2.

<sup>20</sup> See AEA § 184, 42 U.S.C. § 2234 (providing that “[n]o license granted [under the AEA] shall

*(Continued)*

proposed transferee to be qualified to hold the license and the transfer is otherwise consistent with applicable law, regulations, and Commission orders.<sup>21</sup> The license transfer review is limited to specific matters, including the financial and technical qualifications of the proposed transferee.<sup>22</sup>

As part of the financial qualifications showing, an applicant must provide reasonable assurance that sufficient funds will be available to decommission the facility and to carry out applicable activities under the license.<sup>23</sup> NRC regulations outline acceptable methods of demonstrating financial assurance for decommissioning.<sup>24</sup> For example, the “prepayment” method, referenced in the application, involves depositing funds into an account kept segregated from the licensee’s assets and outside of the licensee’s administrative control, in an amount that would be sufficient to pay decommissioning costs at the time permanent termination of operations is expected.<sup>25</sup> A licensee that has set aside prepaid funds based on a site-specific decommissioning cost estimate may take credit for projected earnings on decommissioning funds, up to a 2% annual real rate of return, through the projected decommissioning period.<sup>26</sup> Other methods to demonstrate financial assurance for decommissioning include several methods, such as a surety bond, a letter of credit, insurance, or a parent company guarantee.<sup>27</sup>

## II. DISCUSSION

### A. Contention Requirements

To intervene in an NRC licensing proceeding, a petitioner must show standing to intervene and submit at least one admissible contention for hearing.<sup>28</sup> NRC regulations in 10 C.F.R. § 2.309(f) specify the contention admissibility requirements. These requirements are strict by design and intended to ensure that adjudicatory proceedings are triggered only by substantive safety or envi-

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be transferred . . . directly or indirectly, through transfer of control of any license to any person, unless the Commission shall . . . give its consent in writing”); 10 C.F.R. §§ 50.80(a), 72.50(a) (implementing the AEA provision as to power reactor and ISFSI licenses, respectively).

<sup>21</sup> 10 C.F.R. § 50.80(c).

<sup>22</sup> *See id.* § 50.80(b)(1)(i).

<sup>23</sup> *See id.* §§ 50.33(f), 50.33(k)(1), 50.75, 50.80(b)(1)(i), 50.82(a), 72.30(b)-(c). Because power operations have permanently ceased at Oyster Creek, the Applicants need not demonstrate financial qualifications to cover power reactor operating costs. *See id.* § 50.33(f)(2).

<sup>24</sup> *See id.* § 50.75(e).

<sup>25</sup> *See id.* § 50.75(e)(1)(i); Application at 18.

<sup>26</sup> 10 C.F.R. § 50.75(e)(1)(i).

<sup>27</sup> *See id.* § 50.75(e)(1)(iii).

<sup>28</sup> *See id.* § 2.309(a), (d), (f); Notice, 83 Fed. Reg. at 53,120 (referencing contention requirements).

ronmental issues, rooted in a “reasonably specific factual or legal basis.”<sup>29</sup> They require a petitioner to explain the basis for each contention, providing supporting facts or expert opinion on which the petitioner intends to rely in litigating the contention. The requirements serve to screen out ill-defined, speculative, or otherwise unsupported claims.

To be admissible, each contention also must fall within the scope of the proceeding and be material to the findings that the NRC must make regarding the proposed licensing action. A contention therefore must demonstrate a genuine dispute with the applicant on a material issue of law or fact.<sup>30</sup> As the contention rules make clear, the petitioner must identify the “specific portions of the application . . . that the petitioner disputes,” with the supporting reasons for each dispute; or, if a petitioner believes that an application fails altogether to contain information required by law, the petitioner must identify each failure and provide supporting reasons for the petitioner’s belief.<sup>31</sup>

## **B. Township’s Petition to Intervene and Request for Hearing**

The Oyster Creek site is located within Lacey Township. Therefore, the Township’s standing to intervene is established.<sup>32</sup> In its petition, the Township presents three contentions for hearing. None meet our contention admissibility requirements.

### **1. Contention 1**

Contention 1 concerns the funding for decommissioning Oyster Creek. In Contention 1, the Township claims that a “funding shortfall already exists.”<sup>33</sup> Specifically, the Township states that decommissioning is projected to cost approximately \$1.4 billion, but that as of July 2018, the Oyster Creek decommissioning fund contained \$945 million. The Township claims that the disparity between these amounts reflects a “significant” and “well-known” shortfall in decommissioning funding, about which “little publicly available information” exists.<sup>34</sup> The Township goes on to argue that this asserted “gap in available funding” may further grow as a result of various potential events or circum-

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<sup>29</sup> See *PPL Susquehanna, LLC* (Susquehanna Steam Electric Station, Units 1 and 2), CLI-15-8, 81 NRC 500, 504 (2015) (quoting *Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Unit 2), CLI-03-14, 58 NRC 207, 213 (2003) (citation omitted)).

<sup>30</sup> See 10 C.F.R. § 2.309(f)(1)(vi).

<sup>31</sup> *Id.*

<sup>32</sup> See *id.* § 2.309(h)(2); Township Petition at 2.

<sup>33</sup> Township Petition at 3.

<sup>34</sup> *Id.*



stances, such as increases in overhead costs, radiological incidents, and the discovery of previously unknown contamination.<sup>35</sup> The Township states that it seeks a detailed plan “from OCEP and HDI as to how the [decommissioning] funds will be used and how they will be generated to meet the financial needs of decommissioning.”<sup>36</sup>

Contention 1 lacks support and does not challenge the application. The Township’s decommissioning shortfall claim is based on an asserted decommissioning cost of \$1.4 billion. But the Township does not identify the source of this estimate, which is not in the application. The estimate appears to reflect decommissioning cost estimates that Exelon — the current licensee — provided in its PSDAR. Exelon’s estimated costs of radiological decommissioning (\$1,109,576,000), spent fuel management (\$290,116,000), and site restoration (\$60,202,000) together total approximately \$1.46 billion.<sup>37</sup> But Exelon’s cost estimates are rooted in its choice of the lengthier decommissioning approach under SAFSTOR.

The Applicants base their decommissioning cost estimates on the accelerated decommissioning that they intend to perform under the DECON option. As described in the application, the Applicants estimate the total decommissioning cost for Oyster Creek to be \$885 million (in 2018 dollars), including provisions for site restoration, and for the storage of spent fuel and Greater Than Class C waste until “acceptance by the Department of Energy.”<sup>38</sup> The Applicants state that the assets available in the Oyster Creek decommissioning trust fund will be sufficient to cover the estimated costs of radiological decommissioning, spent fuel management, and site restoration, assuming projected earnings at a 2 percent real rate of return on the trust funds.<sup>39</sup> They therefore conclude that the assets available in the Oyster Creek decommissioning trust are sufficient to satisfy the terms of the NRC’s “prepayment” method of demonstrating adequate financial assurance for decommissioning.<sup>40</sup>

The Township does not dispute or otherwise address the estimated \$885 million decommissioning cost described in the application. The Township also does not address the Applicants’ assertion that the funding in the decommissioning trust is sufficient to demonstrate financial assurance for decommissioning via the NRC’s prepayment method. The contention does not include facts or expert

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<sup>35</sup> *Id.*

<sup>36</sup> *Id.*

<sup>37</sup> *See* Exelon PSDAR at 9.

<sup>38</sup> *See* Encl. 4 to Application, Schedule and Financial Information for Decommissioning, at 2 (Encl. 4).

<sup>39</sup> *See* Application at 18.

<sup>40</sup> *See id.* (also addressing funding assurance for spent fuel management).

opinion challenging the financial qualifications discussion in the application. Therefore, it does not raise a genuine material dispute with the application.

The Township additionally states that it seeks a plan from the Applicants showing how the decommissioning funds will be used and “generated to meet the financial needs of decommissioning.”<sup>41</sup> The application includes, however, tables depicting how the Applicants intend to use the decommissioning funds to pay for various expenses. One table breaks the overall \$885 million decommissioning cost estimate down into separate cost categories, including “removal,” “packaging,” “disposal,” “program management,” “transportation,” “insurance and regulatory fees,” “energy,” “characterization and licensing surveys,” “property taxes,” and “spent fuel.”<sup>42</sup> Another table displays estimated decommissioning costs to be paid each year from 2018 through 2035 for each of the referenced cost categories.<sup>43</sup> The Township does not contest or otherwise specifically address the accuracy or sufficiency of any of the cost estimates or related payment schedules outlined in the application. In short, the Township’s argument of a significant decommissioning funding shortfall lacks support and does not raise a genuine material dispute.

The Township also claims generally that the application presents insufficient information to “provide financial assurance to meet the regulatory requirements” for license transfer.<sup>44</sup> But the Township does not identify any particular financial data that it considers necessary yet finds missing from the application. A petitioner claiming that financial data are “either inaccurate or insufficient” must “identify[ ] each failure and explain[ ] why the data are flawed.”<sup>45</sup> Unsupported claims of insufficient information do not establish a genuine, material dispute with the application.<sup>46</sup>

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<sup>41</sup> See Township Petition at 3.

<sup>42</sup> See Application, Encl. 4, at 3 (“Decommissioning Cost Estimate Summary”).

<sup>43</sup> See *id.*, Encl. 4, at 4 (“Decommissioning Cost Estimate Annualized”).

<sup>44</sup> See Township Petition at 3.

<sup>45</sup> See *Fansteel, Inc.* (Muskogee, Oklahoma Site), CLI-03-13, 58 NRC 195, 205 (2003).

<sup>46</sup> See 10 C.F.R. § 2.309(f)(1)(vi) (if a petitioner believes that an application fails to contain information on a relevant matter required by law, the petitioner must identify each failure and the supporting reasons for the petitioner’s belief).

In the application, the Applicants additionally stated that HDI would submit a revised PSDAR containing, among other items, a description of the planned decommissioning activities under the DECON approach and an estimate of their expected costs. See Application at 21. HDI subsequently submitted its PSDAR, providing further information on the \$885 million cost estimate described in the application, along with a Revised Site-Specific Decommissioning Cost Estimate (Revised DCE), which includes an annual cash flow analysis of projected decommissioning trust fund withdrawals, earnings, and year-end balances for the years 2019 through 2035. See HDI PSDAR at 18-19, and associated enclosure, Revised DCE, at 19-46, 52-54. Both the revised DCE and revised PSDAR were submitted together under the same cover letter and may be found at ML18275A116.

The Township also expresses generalized concerns about potential events, such as normal increased overhead costs due to delays and inflation, that it claims may further drain the decommissioning funds.<sup>47</sup> These general claims do not address or challenge the financial information in the application. Nevertheless, an additional point regarding the NRC's review of a transfer applicant's financial assurance warrants emphasis. For a power reactor license transfer, the NRC requires an applicant to demonstrate reasonable assurance of having, or being able to obtain, the necessary funding for decommissioning and spent fuel management.<sup>48</sup> These requirements are intended to ensure that a license is not turned over to an entity that is unable to satisfy applicable NRC financial assurance requirements. The NRC's review of the adequacy of decommissioning and spent fuel management funding is not a one-time look but instead part of a continuous, long-term process.

Throughout the license term, our regulations require licensees to plan financially for the eventual need to decommission a power reactor or ISFSI.<sup>49</sup> The NRC's oversight of decommissioning funding heightens as the time for decommissioning approaches. Within 2 years of permanently ceasing operations, the licensee must provide a site-specific decommissioning cost estimate if one has not already been submitted.<sup>50</sup> Thereafter, it must annually submit to the NRC a financial assurance status report for decommissioning.<sup>51</sup> NRC regulations also require status reports on the licensee's funding for spent fuel management.<sup>52</sup>

Our regulations account for the potential need to adjust projected decommissioning cost estimates, for any number of factors, including inflation. As NRC guidance describes, cost projections may need to be adjusted to account for "recent developments in decontamination, waste processing and disposal, or . . . other technology; updated information about the facility conditions, such as larger levels of contamination than anticipated; updated waste disposal con-

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<sup>47</sup> See Township Petition at 3.

<sup>48</sup> See 10 C.F.R. §§ 50.33(f), 50.33(k)(1), 50.80(b)(1)(i).

<sup>49</sup> See *id.* §§ 50.75, 72.30(b)-(c).

<sup>50</sup> See *id.* § 50.82(a)(8)(iii); see also *id.* § 50.82(a)(4)(i) (the site-specific decommissioning cost estimate may be submitted with the PSDAR that the NRC requires be submitted before or within 2 years following permanent cessation of operations).

<sup>51</sup> See *id.* § 50.82(a)(8)(v). This obligation continues until the licensee completes its final radiation survey and demonstrates that residual radioactivity has been reduced to levels permitting license termination.

<sup>52</sup> See *id.* § 50.82(a)(8)(vii) (after submitting its site-specific cost estimate for decommissioning, the licensee must annually submit a report on the status of its funding for managing irradiated fuel); see also *id.* § 50.54(bb) (requiring submission for Commission review and preliminary approval the "program by which the licensee intends to manage and provide funding for the management of all irradiated fuel at the reactor" following cessation of operations and until the fuel is transferred for its ultimate disposition in a repository).

ditions; updated residual radioactivity limits; and experience gained from the actual decommissioning of similar facilities.”<sup>53</sup> After a licensee has submitted its site-specific decommissioning cost estimate, it must continue to provide to the NRC financial assurance status reports that revisit and update the decommissioning cost projections and funding status, and the spent fuel management cost projections and funding status.<sup>54</sup>

The NRC also performs onsite inspections of decommissioning activities and reviews plant information relevant to financial assurance. And a licensee must notify the NRC (in writing, with a copy sent to the affected state(s)) prior to performing any decommissioning activities that would significantly increase the facility’s decommissioning cost.<sup>55</sup> If new developments point to a projected funding shortfall, the NRC requires additional financial assurance to cover the estimated cost to complete the decommissioning.<sup>56</sup> Consequently, unexpected cost increases, if they materially impact decommissioning costs, can be addressed in the periodic financial assurance status reports. In sum, the NRC’s oversight of a licensee’s decommissioning funding is an ongoing process that begins with licensing and continues through license termination.

## 2. *Contention 2*

In Contention 2, the Township expresses concerns about HDI’s intention to subcontract decommissioning work to CDI. As noted above, CDI is jointly owned by Holtec (through its subsidiary HDI) and SNC-Lavalin (through its subsidiary Kentz USA). The Township states that it is concerned about the “trustworthiness and . . . overall involvement in the decommissioning of Oyster Creek” of CDI’s parent company SNC-Lavalin, which “has been charged in Canada with corruption, fraud and bribery.”<sup>57</sup> The Township calls for the NRC

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<sup>53</sup> “Assuring the Availability of Funds for Decommissioning Nuclear Reactors,” Regulatory Guide 1.159, rev. 2 (Oct. 2011), at 12 (ML112160012).

<sup>54</sup> See 10 C.F.R. § 50.82(a)(8)(v)-(vii).

<sup>55</sup> See *id.* § 50.82(a)(7); see also *id.* § 50.82(a)(8)(i)(B)-(C).

<sup>56</sup> See, e.g., *id.* § 50.82(a)(8)(vi) (setting out the circumstances under which the licensee’s financial assurance status report must provide additional funding assurance to cover the estimated cost of completing decommissioning); *id.* § 50.82(a)(8)(vii) (status report on funding for managing irradiated fuel must include a “plan to obtain additional funds to cover the cost” of any projected shortfall). In addition, a contingency allowance built into cost estimates helps offset the uncertainties in cost predictions. See, e.g., Revised DCE, enclosed with HDI PSDAR, at 45 (addressing contingency allowance incorporated in cost estimates). And licensees in decommissioning continue to carry on-site property damage insurance and offsite nuclear liability insurance, in amounts the NRC requires for a defueled plant. See 10 C.F.R. §§ 50.54(w), 140.11; Application at 20 (addressing insurance coverage and the Price-Anderson indemnity agreement for Oyster Creek).

<sup>57</sup> See Township Petition at 3-4.

to “host a local hearing” to address charges made against SNC-Lavalin.<sup>58</sup> The Township goes on to argue that unless SNC-Lavalin can “convince the NRC and [the] public of its innocence in connection with those charges” and of its “overall trustworthiness, the license transfer should not be approved.”<sup>59</sup> The Township further states that these claims of trustworthiness relate to the issue of “the NRC’s lack of assurances of financial stability.”<sup>60</sup>

The Township does not, however, tie its concerns about SNC-Lavalin to any material issue within the scope of this license transfer proceeding. SNC-Lavalin is not an Applicant. SNC-Lavalin is one of two parent companies that formed and own CDI, which the Applicants intend to engage to serve as the general contractor for the decommissioning work.<sup>61</sup> But the Township does not specify how SNC-Lavalin may adversely impact Oyster Creek decommissioning activities or their funding. If the transfer is completed, the licensed operator responsible for the direct oversight and control of licensed activities at Oyster Creek would be HDI, not SNC-Lavalin. More significantly, the Township has not linked its concerns about SNC-Lavalin, a general contractor’s co-parent, to the technical or financial qualifications of the Applicants, or to any other matter within the scope of this proceeding.

We have long held that to be admissible as a litigable matter in an adjudicatory proceeding, claims of poor character or integrity must have “some direct and obvious relationship between the character issues and the licensing action in dispute.”<sup>62</sup> When claims of prior violations or past events are raised for litigation, we “expect them to be directly germane to the challenged licensing action.”<sup>63</sup> Here, the Township does not describe the bribery or other charges it references and does not link them to any aspect of the technical or financial qualifications of the Applicants. It does not claim or provide any indication that individuals who may have been involved in the asserted wrongdoing remain at SNC-Lavalin or are likely to be involved in managing Oyster Creek’s decommissioning activities. The Township does not indicate when and where the referenced violations by SNC-Lavalin personnel occurred. The Township presents no connection between the referenced charges against SNC-Lavalin and the Applicants’ technical

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<sup>58</sup> *Id.* at 4.

<sup>59</sup> *Id.*

<sup>60</sup> *Id.*

<sup>61</sup> Holtec is the other parent, and the majority owner, of CDI. *See* Application at 4-5.

<sup>62</sup> *See Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Units 2 and 3), CLI-01-24, 54 NRC 349, 365-66 (2001) (citation omitted).

<sup>63</sup> *See id.* at 366-67.

qualifications to safely carry out the necessary decommissioning and spent fuel management activities until license termination.<sup>64</sup>

The Township states that its claims regarding overall trustworthiness bear on assurances of financial stability.<sup>65</sup> But the Township does not connect the character claims about the general contractor's co-parent to the Applicants' financial qualifications. The application states that the Applicants meet the NRC's *prepayment* method of demonstrating financial assurance for decommissioning — that sufficient funding exists in the decommissioning trust fund to cover the estimated costs (assuming a projected annual 2 percent real rate of return). The application also states that CDI, the proposed general contractor, would have no direct access to the decommissioning trust funds.<sup>66</sup> The Township does not describe how its concerns about SNC-Lavalin call into question the financial qualifications of separate entities, the Applicants. Thus, the contention does not state a genuine material dispute, and we therefore find it inadmissible.<sup>67</sup>

### 3. *Contention 3*

In Contention 3, the Township raises environmental claims. It states generally that it has “interest and concerns” regarding onsite spent fuel storage.<sup>68</sup> It further asserts that the Barnegat Bay, which is located near the Oyster Creek site, has an “already extremely sensitive” ecological system, and therefore “[a]ny mismanagement or mistake can result in significant negative impacts to this ecosystem.”<sup>69</sup>

The Township claims that the National Environmental Policy Act (NEPA) requires an environmental review of the proposed transfer — a “hard look” at potential environmental consequences — before the NRC may render a decision on the application.<sup>70</sup> It expresses concerns about the proposed management by

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<sup>64</sup> The application addresses the technical qualifications of CDI, including the plans for its staffing. See Application at 12-15. The Township does not address or challenge that information.

<sup>65</sup> Township Petition at 4.

<sup>66</sup> Application at 5; see also *id.* at 13 (“CDI will be subject to continuous oversight by HDI for regulatory and procedural compliance, as well as expenditure control.”).

<sup>67</sup> While the Township has not proffered an admissible contention for hearing regarding its concerns about SNC-Lavalin, various public comments submitted on the license transfer also raised particular concerns about SNC-Lavalin to the Staff. We expect that the Staff will respond as appropriate to the comments as part of its review of the application. See, e.g., Comments on Oyster Creek Nuclear Plant License Transfer from Concerned Citizens for Lacey Coalition (Nov. 16, 2018) (ML18324A638) (referencing charges against SNC-Lavalin for corruption, fraud, and bribery relating to business operations in Libya); Comments of Alfred Decker (Nov. 18, 2018) (ML18324A776).

<sup>68</sup> Township Petition at 4.

<sup>69</sup> See *id.*

<sup>70</sup> *Id.*

HDI because HDI participated in the San Onofre nuclear power plant closing, which the Township asserts involved the discovery of “faulty casks.”<sup>71</sup> The Township argues that “HDI should be held accountable and confirm to the NRC and the public” that public health and safety and the environment are not at risk, and “that such [cask-related] mistakes will not occur” at Oyster Creek.<sup>72</sup> The Township states that it is “not satisfied that [NEPA] standards have been met” for the proposed license transfer.<sup>73</sup>

In Contention 3, the Township seeks a NEPA analysis for the proposed license transfer. Our environmental regulations, however, categorically exclude license transfer applications, and associated license amendments necessary to reflect approval of the transfers, from the requirement of an additional environmental review.<sup>74</sup> Unless the NRC determines that there are “special circumstances,” an environmental assessment or environmental impact statement is not required for an approval of a license transfer (and any associated administrative license amendments).<sup>75</sup>

After performing many environmental assessments for license transfers, which uniformly demonstrated no significant environmental effects linked to license transfers, the NRC determined by rule that direct and indirect transfers and their associated administrative license amendments comprise a category of actions that have no significant effect, either individually or cumulatively, on the human environment.<sup>76</sup> License transfers were found not to constitute “a major federal action significantly affecting the environment.”<sup>77</sup> As the NRC described, license transfers do not “in and of themselves permit the licensee to operate the facility” in a different manner than that allowed under the existing licenses, and consequently, a transfer would not usually raise environmental impact issues different from those already considered in generic or site-specific NEPA analyses.<sup>78</sup>

The Township does not address the categorical exclusion for license transfers and associated amendments, even though the application — in the section titled “Environmental Review” — explicitly references and relies on the exclusion.<sup>79</sup>

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<sup>71</sup> *Id.*

<sup>72</sup> *Id.*

<sup>73</sup> *See id.*

<sup>74</sup> *See* 10 C.F.R. § 51.22(c)(21).

<sup>75</sup> *See id.* § 51.22(b), (c)(21).

<sup>76</sup> *See* Streamlined Hearing Process for NRC Approvals of License Transfers, Final Rule, 63 Fed. Reg. 66,721, 66,728 (Dec. 3, 1998).

<sup>77</sup> *Id.*

<sup>78</sup> *Id.* If, however, a proposed license amendment “directly affect[s] the actual operation of a facility,” then the categorical exclusion would not apply. *Id.*

<sup>79</sup> Application at 22.

The Township also does not suggest that the categorical exclusion is inapplicable here. Without more, the Township's request for an environmental analysis under NEPA constitutes an impermissible challenge to the categorical exclusion rule and does not meet our contention standards.<sup>80</sup> The contention does not state a genuine material dispute within the scope of this proceeding, and we therefore find it inadmissible.

Separate from this license transfer proceeding, we note that HDI's revised PSDAR addresses the environmental impacts of its planned site-specific decommissioning activities at Oyster Creek.<sup>81</sup> HDI concludes that the potential impacts are "less than and bounded by" the impacts described in previously issued environmental impact statements, including both the NRC's Generic Environmental Impact Statement on the impacts of decommissioning, and site-specific environmental impact statements prepared in relation to the licensing of Oyster Creek.<sup>82</sup> Our regulations expressly prohibit a licensee from performing any decommissioning activity that results in "significant environmental impacts not previously reviewed."<sup>83</sup> Any violation of this restriction is subject to NRC enforcement action. If the impacts of a planned decommissioning activity are not enveloped by previous environmental impacts analyses, a licensee seeking to undertake the activity should submit a license amendment request, together with a supplemental environmental report evaluating the additional impacts.<sup>84</sup> In evaluating such a license amendment request, the Staff would, as appropriate, prepare either an environmental assessment or an environmental impact statement.<sup>85</sup>

### **C. Letter from the New Jersey Chapter of the Sierra Club**

The New Jersey Chapter of the Sierra Club filed a letter expressing concerns about the proposed license transfer and requesting a "public hearing."<sup>86</sup> The letter leaves unclear whether the Sierra Club seeks an adjudicatory hearing to contest the application or a public meeting to be able to pose questions and obtain additional information on the proposed transfer. To the extent that the Sierra Club seeks to intervene as a party in this adjudicatory proceeding, we

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<sup>80</sup> See 10 C.F.R. § 2.335(a).

<sup>81</sup> See HDI PSDAR at 20-47.

<sup>82</sup> See *id.* at 20.

<sup>83</sup> See 10 C.F.R. § 50.82(a)(6)(ii).

<sup>84</sup> See *Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), CLI-16-17, 84 NRC 99, 123-24 (2016); Decommissioning GEIS, vol. 1, at 1-11, 2-3; Decommissioning of Nuclear Power Reactors, Final Rule, 61 Fed. Reg. 39,278, 39,286 (July 29, 1996).

<sup>85</sup> See *Vermont Yankee*, CLI-16-17, 84 NRC at 124.

<sup>86</sup> See Sierra Club Letter at 1.



deny the request because the Sierra Club neither demonstrated standing nor submitted an admissible contention.

As to standing, the notice of opportunity to request a hearing outlined the factors that must be addressed to show standing to intervene. The Sierra Club neither addressed these factors for itself nor claimed representational standing on behalf of any members.<sup>87</sup> The Sierra Club therefore has not established its standing to intervene.

The Sierra Club also has not satisfied the contention admissibility requirements.<sup>88</sup> It does not challenge or reference any part of the application. In fact, the Sierra Club states that it does not “have a position on the license transfer” but instead has “a lot of questions” that it seeks to have answered.<sup>89</sup> Sierra Club does not raise a genuine material dispute with the application. We therefore deny the Sierra Club’s request to the extent that it seeks to intervene in an adjudicatory hearing. In the event, however, that the Sierra Club instead seeks a public meeting or other opportunity to obtain additional particular information, we refer the Sierra Club’s letter to the Staff for consideration as comments on the license transfer and for action as the Staff may deem appropriate.<sup>90</sup>

### III. CONCLUSION

For the reasons outlined in this decision, we *deny* the Township’s request for hearing and petition to intervene, and we *deny* the Sierra Club’s request to the extent that it seeks an adjudicatory hearing on the license transfer application. We *refer* the Sierra Club’s letter to the Staff for consideration as comments on the license transfer and for action as the Staff may deem appropriate. Finally, we *terminate* this adjudicatory proceeding.

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<sup>87</sup> See 10 C.F.R. § 2.309(d); Notice, 83 Fed. Reg. at 53,120. An organization invoking “representational” standing on behalf of members must show that “at least one of its members may be affected by the Commission’s approval of the [license] transfer,” which requires identifying the member(s) the organization purports to represent and providing written authorization of such representation. See, e.g., *Consumers Energy Co. (Palisades Nuclear Plant)*, CLI-07-18, 65 NRC 399, 409-10 (2007); see also *id.* at 411 (organization that seeks to intervene based on its organizational purposes must satisfy the same standing requirements as individuals seeking to intervene).

<sup>88</sup> See 10 C.F.R. § 2.309(f)(1)(i)-(vi).

<sup>89</sup> See Sierra Club Letter at 1.

<sup>90</sup> We note that the Applicants do not oppose a public meeting on the license transfer. See Applicants’ Answer to Sierra Club, at 2. In addition, on June 7, 2019, the Concerned Citizens for Lacey Coalition submitted to the NRC a request that a decision on the license transfer application be held in abeyance until matters referenced in the request are resolved. We refer the Coalition’s request to the Staff for consideration with other comments that have been received. See E-mail from Paul Dressler, Concerned Citizens for Lacey Coalition, to NRC Hearing Docket (June 7, 2019).

IT IS SO ORDERED.

For the Commission

Annette L. Vietti-Cook  
Secretary of the Commission

Dated at Rockville, Maryland,  
this 18th day of June 2019.

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

**ATOMIC SAFETY AND LICENSING BOARD**

**Before Administrative Judges:**

**Michael M. Gibson**, Chairman  
**Dr. Michael F. Kennedy**  
**Dr. Sue H. Abreu**

**In the Matter of**

**Docket Nos. 50-277-SLR  
50-278-SLR  
(ASLBP No. 19-960-01-SLR-BD01)**

**EXELON GENERATION  
COMPANY, LLC  
(Peach Bottom Atomic Power  
Station, Units 2 and 3)**

**June 20, 2019**

This proceeding concerns Exelon Generation Company's subsequent license renewal application for Peach Bottom Atomic Power Station, Units 2 and 3, located near York, Pennsylvania. Beyond Nuclear, Inc. filed a petition to intervene and request for a hearing, proffering two contentions. In this memorandum and order, the Licensing Board determines that Beyond Nuclear has standing and grants its motion to amend its contentions. However, the Board ultimately denies Beyond Nuclear's petition to intervene because it failed to proffer an admissible contention.

**RULES OF PRACTICE: STANDING**

To participate in an NRC licensing proceeding, the petition must state (1) the name, address, and telephone number of the petitioner; (2) the nature of the petitioner's right under either the Atomic Energy Act or the National Environmental Policy Act to be made a party to the proceeding; (3) the nature and

extent of the petitioner's property, financial, or other interest in the proceeding; and (4) the possible effect of any decision or order that may be issued in the proceeding on the petitioner's interest.

**RULES OF PRACTICE: STANDING (BURDEN)**

It is each petitioner's burden to demonstrate that standing requirements are met, but licensing boards are to construe the petition in favor of the petitioner when determining whether a petitioner has demonstrated standing.

**RULES OF PRACTICE: STANDING (REPRESENTATIONAL)**

When an organization seeks to intervene on behalf of its members, it may establish standing by showing that (1) one or more of its members individually meet the standing requirements; (2) the interest represented by the organization is germane to its own purpose; (3) neither the claim asserted nor the relief requested requires an individual member's participation in the organization's legal action; and (4) the member has authorized the organization to represent his or her interest.

**RULES OF PRACTICE: STANDING (TRADITIONAL)**

The Commission has traditionally applied contemporaneous judicial concepts of standing, requiring a showing of concrete and particularized injury that is fairly traceable to the challenged action and is likely to be redressed by a favorable decision.

**RULES OF PRACTICE: STANDING (PROXIMITY PLUS PRESUMPTION)**

In certain situations involving obvious potential for offsite consequences, the Commission has routinely granted standing to petitioners who reside within a certain distance of the power reactor at issue, effectively dispensing with a petitioner's need to make an affirmative showing of injury, causation, and redressability.

**RULES OF PRACTICE: STANDING (SUBSEQUENT POWER REACTOR LICENSE RENEWAL)**

Licensing boards routinely have applied the 50-mile proximity presumption in power reactor license renewal proceedings, reasoning that renewal allows

operation of a reactor over an additional period of time during which the reactor could be subject to the same equipment failures and personnel errors as during operations over the original period of the license.

**RULES OF PRACTICE: INTERVENTION**

To intervene as a party in an adjudicatory proceeding, a petitioner must (1) establish it has standing; and (2) proffer at least one admissible contention.

**RULES OF PRACTICE: CONTENTIONS (ADMISSIBILITY)**

An admissible contention must be timely and must: (1) provide a specific statement of law or fact to be raised or controverted; (2) provide a brief explanation for the basis of the contention; (3) demonstrate that the issue raised is within the proceeding's scope; (4) demonstrate that the issue raised is material to the findings the NRC must make to support the action that is involved in the proceeding; (5) concisely state the alleged facts or expert opinions that support the petitioner's position and on which the petitioner intends to rely at the hearing, including references to the specific sources and documents on which the petitioner intends to rely; and (6) show that a genuine dispute exists on a material issue of law or fact by referring to specific portions of the application that the petitioner disputes or, if the application is alleged to be deficient, by identifying such deficiencies and the supporting reasons for this allegation.

**RULES OF PRACTICE: CHALLENGE TO COMMISSION REGULATIONS**

A petitioner may not challenge an NRC rule or regulation in a contention unless the petitioner seeks and obtains a waiver from the Commission in accordance with 10 C.F.R. § 2.335.

**RULES OF PRACTICE: CONTENTIONS (ADMISSIBILITY)**

Failure to satisfy even one of the contention admissibility standards renders a contention inadmissible.

**RULES OF PRACTICE: CONTENTIONS (GOOD CAUSE FOR AMENDMENT)**

A petitioner who seeks to amend its original contention or proffer a new one after the initial deadline for filing contentions must meet the good cause

standard in 10 C.F.R. § 2.309. Good cause exists if the petitioner can show: (1) the information upon which the amended or new contention is based was not previously available; (2) the information upon which the filing is based is materially different from information previously available; and (3) the filing has been submitted in a timely fashion based on the availability of the subsequent information.

**RULES OF PRACTICE: CONTENTIONS (ENVIRONMENTAL)**

All contentions must be based on documents or other information available at the time the petition is to be filed. For environmental contentions, petitioners must file contentions based on the applicant's environmental report. Petitioners who choose to wait to proffer environmental contentions challenging the NRC Staff's later-issued environmental document "do so at their peril" because if there is no material difference between the applicant's environmental report and the NRC Staff's environmental document, a contention raised at that point would be rendered "impermissibly late."

**NATIONAL ENVIRONMENTAL POLICY ACT: ENVIRONMENTAL IMPACT STATEMENT**

The National Environmental Policy Act mandates that federal agencies prepare an environmental impact statement before undertaking any major federal actions significantly affecting the quality of the human environment, including a detailed discussion of the environmental impact of the proposed action, any adverse environmental effects which cannot be avoided should the proposal be implemented, and alternatives to the proposed action.

**NATIONAL ENVIRONMENTAL POLICY ACT: FEDERAL ACTION**

The renewal of a license to operate a nuclear power reactor constitutes a major federal action triggering the NRC's obligation to prepare an environmental impact statement.

**NATIONAL ENVIRONMENTAL POLICY ACT: ENVIRONMENTAL REPORT**

Although preparing an environmental impact statement that complies with the National Environmental Policy Act is ultimately the NRC's responsibility, the process begins with the license renewal applicant's environmental report.

Pursuant to 10 C.F.R. §§ 51.45 and 51.53(c)(1), license renewal applicants must submit an environmental report.

**NATIONAL ENVIRONMENTAL POLICY ACT: HARD LOOK**

Although the National Environmental Policy Act requires agencies to take a hard look at environmental consequences of major federal actions, it seeks to guarantee process, not specific outcomes.

**LICENSE RENEWAL APPLICATIONS: SAFETY REVIEW**

The Commission deems it inappropriate or unnecessary to throw open the full gamut of provisions in a plant's current licensing basis for re-analysis during license renewal. The scope of safety issues that may be considered in a license renewal proceeding is restricted to the plant's systems, structures, and components for which current regulatory activities and requirements may not be sufficient to manage the effects of aging in the period of extended operation. The requirements governing renewal of operating licenses for nuclear power plants, which are found in 10 C.F.R. Part 54, center on the "detrimental effects of aging."

**LICENSE RENEWAL APPLICATIONS: SAFETY REVIEW**

The Commission may issue a renewed license if it concludes that the licensee's management of aging effects on the plant's identified systems, structures, and components will provide reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the current licensing basis.

**MEMORANDUM AND ORDER**  
**(Denying Beyond Nuclear's Petition to Intervene)**

Before this Licensing Board is Beyond Nuclear, Inc.'s (Beyond Nuclear) November 19, 2018 request for hearing and petition for leave to intervene, challenging the subsequent license renewal application of Exelon Generation Company, LLC (Exelon) for Peach Bottom Atomic Power Station, Units 2 and 3. The Board concludes that Beyond Nuclear has standing to intervene in this proceeding. However, because Beyond Nuclear has not proffered an admissible contention, the Board denies its petition.

## I. BACKGROUND

On July 10, 2018, Exelon submitted<sup>1</sup> its license renewal application<sup>2</sup> to renew for an additional twenty years its operating licenses for Units 2 and 3 of the Peach Bottom Atomic Power Station, located in York, Pennsylvania. The current operating licenses for Units 2 and 3 expire at midnight on August 8, 2033, and July 2, 2034, respectively.<sup>3</sup> Since both operating licenses have already been renewed once, this is a subsequent license renewal proceeding.<sup>4</sup>

After receiving Exelon's application, a notice was published in the *Federal Register* affording interested members of the public an opportunity to request a hearing and petition to intervene by November 5, 2018 (which was later extended to November 19, 2018).<sup>5</sup>

On November 19, 2018, Beyond Nuclear timely filed a request for hearing and petition for leave to intervene, proffering two contentions.<sup>6</sup> The NRC Staff and Exelon timely filed their respective answers on December 14, 2018,<sup>7</sup> and Beyond Nuclear timely filed its reply to those answers on December 21, 2018.<sup>8</sup>

On March 27, 2019, this Board heard oral argument from counsel for Beyond Nuclear, the NRC Staff, and Exelon regarding Beyond Nuclear's petition.<sup>9</sup>

Thereafter, on May 1, 2019, Beyond Nuclear moved to amend its hearing

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<sup>1</sup> See Letter from Michael P. Gallagher, Vice President of License Renewal and Decommissioning, Exelon to NRC Document Control Desk (July 10, 2018) (ADAMS Accession No. ML18193A697).

<sup>2</sup> Subsequent License Renewal Application, Peach Bottom Atomic Power Station Units 2 and 3 (July 2018) (ADAMS Accession No. ML18193A773).

<sup>3</sup> *Id.* at 1-1.

<sup>4</sup> To date, only two other subsequent license renewal applications have been submitted to the NRC: Florida Power & Light Company, Turkey Point Nuclear Plant Units 3 & 4 Subsequent License Renewal Application (rev. 1 Apr. 2018), and Dominion Energy Virginia, Surry Power Station Units 1 & 2 Subsequent License Renewal Application (Oct. 2018). We review the regulatory requirements and agency guidance documents for subsequent license renewal applications *infra*.

<sup>5</sup> Exelon Generation Company, LLC: Peach Bottom Atomic Power Station, Units 2 & 3, 83 Fed. Reg. 45,285, 45,285 (Sept. 6, 2018); Order of the Secretary (Extending the Hearing Request Deadline) at 2 (Nov. 1, 2018).

<sup>6</sup> Beyond Nuclear, Inc.'s Hearing Request and Petition to Intervene (Nov. 19, 2018) ("Petition").

<sup>7</sup> NRC Staff Answer to Beyond Nuclear, Inc.'s Hearing Request and Petition to Intervene (Dec. 14, 2018) ("NRC Staff Answer"); Exelon's Answer Opposing Beyond Nuclear Inc.'s Hearing Request and Petition to Intervene (Dec. 14, 2018) ("Exelon Answer").

<sup>8</sup> Beyond Nuclear's Reply to Exelon's and NRC Staff's Oppositions to Hearing Request and Petition to Intervene (Dec. 21, 2018) ("Beyond Nuclear Reply").

<sup>9</sup> Tr. at 1-218.



request.<sup>10</sup> Pursuant to the Board’s May 3, 2019 scheduling order,<sup>11</sup> the NRC Staff and Exelon timely filed their respective answers opposing Beyond Nuclear’s motion to amend on May 17, 2019.<sup>12</sup> Beyond Nuclear timely replied to the Exelon and NRC Staff responses on May 22, 2019.<sup>13</sup>

## II. STANDING

### A. Legal Standard

To participate in an NRC licensing proceeding, a petitioner must establish standing to intervene.<sup>14</sup> A petition to intervene must state (1) the name, address, and telephone number of the petitioner; (2) the nature of the petitioner’s right under either the Atomic Energy Act or the National Environmental Policy Act (NEPA) to be made a party to the proceeding; (3) the nature and extent of the petitioner’s property, financial, or other interest in the proceeding; and (4) the possible effect of any decision or order that may be issued in the proceeding on the petitioner’s interest.<sup>15</sup> While a petitioner bears the burden of establishing standing, licensing boards are to “evaluate a petitioner’s standing . . . constru[ing] the petition in favor of the petitioner.”<sup>16</sup>

#### 1. Representational Standing

When an organization (such as Beyond Nuclear) seeks to intervene on behalf of its members, it may establish standing by showing that (1) one or more of its members would individually meet the above articulated standing requirements; (2) the interest represented by the organization is germane to the organization’s purpose; (3) neither the asserted claim nor the requested relief requires the

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<sup>10</sup> Beyond Nuclear, Inc.’s Amended Hearing Request and Petition to Intervene (May 1, 2019) (“Amended Petition”).

<sup>11</sup> Licensing Board Notice and Order (Scheduling Briefing on Beyond Nuclear’s Motion to Amend Its Petition and the Board’s Issuance of Order on Standing and Contention Admissibility) (May 3, 2019) (unpublished).

<sup>12</sup> NRC Staff Answer to Beyond Nuclear Inc.’s Amended Hearing Request and Petition to Intervene (May 17, 2019) (“NRC Staff Answer to Amended Hearing Request”); Exelon’s Opposition to Beyond Nuclear, Inc.’s Amended Hearing Request and Petition to Intervene (May 17, 2019) (“Exelon Answer to Amended Hearing Request”).

<sup>13</sup> Beyond Nuclear, Inc.’s Reply to Exelon’s and NRC Staff’s Oppositions to Amended Hearing Request and Petition to Intervene (May 22, 2019).

<sup>14</sup> See 10 C.F.R. § 2.309(a).

<sup>15</sup> *Id.* § 2.309(d)(1).

<sup>16</sup> *Georgia Institute of Technology* (Georgia Tech Research Reactor, Atlanta, Georgia), CLI-95-12, 42 NRC 111, 115 (1995) (citing *Kelley v. Selin*, 42 F.3d 1501, 1508 (6th Cir. 1995)).

organization's member to participate in the lawsuit; and (4) the member has authorized the organization to represent his or her interest.<sup>17</sup>

## 2. *Individual Standing and the 50-Mile Proximity Presumption*

To determine whether a petitioner satisfies standing requirements, the Commission has traditionally applied contemporaneous judicial concepts of standing, requiring a showing of “concrete and particularized injury that is fairly traceable to the challenged action and is likely to be redressed by a favorable decision.”<sup>18</sup> In certain “situations involving . . . obvious potential for offsite consequences” — including power reactor licensing, power reactor license renewal, and at least some power reactor license amendment proceedings — the Commission has routinely granted standing to petitioners who reside within a certain distance of the power reactor at issue under the “proximity presumption,” effectively dispensing with a petitioner's need to make an affirmative showing of injury, causation, and redressability.<sup>19</sup>

Licensing boards routinely have applied the 50-mile proximity presumption in power reactor license renewal proceedings, reasoning that renewal “allows operation of a reactor over an additional period of time during which the reactor could be subject to the same equipment failures and personnel errors as during operations over the original period of the license.”<sup>20</sup> Ultimately, the 50-mile proximity presumption “is simply a shortcut for determining standing in certain cases.”<sup>21</sup> The Commission implicitly endorsed this approach when it cited with approval a licensing board's application of the proximity presumption in a reactor license renewal proceeding.<sup>22</sup> Applying this shortcut to reactor license renewal proceedings not only satisfies contemporaneous judicial concepts of

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<sup>17</sup> See *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-99-10, 49 NRC 318, 323 (1999) (citing *Hunt v. Wash. State Apple Advert. Comm'n*, 432 U.S. 333, 343 (1977)).

<sup>18</sup> *Cleveland Electric Illuminating Co.* (Perry Nuclear Power Plant, Unit 1), CLI-93-21, 38 NRC 87, 92 (1993) (citing *Lujan v. Defs. of Wildlife*, 504 U.S. 555, 561 (1992)); see also *Yankee Atomic Electric Co.* (Yankee Nuclear Power Station), CLI-98-21, 48 NRC 185, 195 (1998); *Ga. Tech Research Reactor*, CLI-95-12, 42 NRC at 115.

<sup>19</sup> *Florida Power & Light Co.* (St. Lucie Nuclear Power Plant, Units 1 and 2), CLI-89-21, 30 NRC 325, 329-30 (1989); see also *PPL Bell Bend, LLC* (Bell Bend Nuclear Power Plant), CLI-10-7, 71 NRC 133, 138-39 (2010); *Calvert Cliffs 3 Nuclear Project, LLC and Unistar Nuclear Operating Services, LLC* (Calvert Cliffs Nuclear Power Plant, Unit 3), CLI-09-20, 70 NRC 911, 915-16 (2009).

<sup>20</sup> *Exelon Generation Co.* (Limerick Generating Station, Units 1 and 2), LBP-12-8, 75 NRC 539, 547 (2012) (citing *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), LBP-98-33, 48 NRC 381, 385 n.1 (1998)), *rev'd in part on other grounds*, CLI-12-19, 76 NRC 377 (2012).

<sup>21</sup> *Calvert Cliffs*, CLI-09-20, 70 NRC at 917.

<sup>22</sup> See *id.* at 915 n.15 (citing *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), LBP-01-6, 53 NRC 138, 150, *aff'd on other grounds*, CLI-01-17, 54 NRC 3 (2001)).

standing, but also provides clarity for litigants and licensing boards, thereby promoting efficiency in the adjudicatory process.<sup>23</sup> We therefore conclude that the 50-mile proximity presumption should apply to this proceeding.<sup>24</sup>

## **B. Analysis**

Neither Exelon nor the NRC Staff challenge the standing of Beyond Nuclear to participate in this proceeding. Nevertheless, this Board is charged with independently determining the standing of Beyond Nuclear.<sup>25</sup>

Beyond Nuclear states that it is “a nonprofit, nonpartisan membership organization that aims to educate and activate the public about the connections between nuclear power and nuclear weapons and the need to abolish both to protect public health and safety, prevent environmental harms, and safeguard our future.”<sup>26</sup> The environmental interests Beyond Nuclear seeks to protect in this proceeding are thus germane to its organizational purpose. Further, Beyond Nuclear provides declarations from three of its members, all of whom (1) live within 50 miles of Peach Bottom and therefore have standing in their own right pursuant to the proximity presumption; and (2) have authorized Beyond Nuclear to represent their interests in this proceeding, thus rendering it unnecessary for them to participate as individuals.<sup>27</sup> Therefore, we find that Beyond Nuclear satisfies the requirements for representational standing.

## **III. CONTENTION ADMISSIBILITY**

### **A. Legal Standard**

#### ***1. Contention Admissibility Factors***

For a hearing to be granted, a petitioner not only must establish its standing to intervene, but also must proffer at least one admissible contention.<sup>28</sup> An

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<sup>23</sup> See, e.g., *Florida Power & Light Co.* (Turkey Point Nuclear Generating Units 3 and 4), LBP-19-3, 89 NRC 245, 258-59 (2019); *Entergy Operations, Inc.* (River Bend Station, Unit 1), LBP-18-1, 87 NRC 1, 7 n.4 (2018).

<sup>24</sup> The same conclusion was recently reached in a recent subsequent license renewal proceeding. *Turkey Point*, LBP-19-3, 89 NRC at 258.

<sup>25</sup> 10 C.F.R. § 2.309(d)(2).

<sup>26</sup> Petition at 2.

<sup>27</sup> Petition, attach. 1, Decl. of Ernest Eric Guyll ¶¶ 2, 4 (Oct. 20, 2018); *id.*, attach. 2, Decl. of John S. Adams ¶¶ 2, 4 (Oct. 29, 2018); *id.*, attach. 3, Decl. of Virginia Topkis ¶¶ 2, 4 (Nov. 9, 2018).

<sup>28</sup> See 10 C.F.R. § 2.309(a).

admissible contention must be timely<sup>29</sup> and must satisfy the requirements of 10 C.F.R. § 2.309(f)(1), which states in relevant part that a petition must:

- (i) Provide a specific statement of the issue of law or fact to be raised or controverted . . . ;
- (ii) Provide a brief explanation of the basis for the contention;
- (iii) Demonstrate that the issue raised in the contention is within the scope of the proceeding;
- (iv) Demonstrate that the issue raised in the contention is material to the findings the NRC must make to support the action that is involved in the proceeding;
- (v) Provide a concise statement of the alleged facts or expert opinions which support the . . . petitioner's position on the issue and on which the petitioner intends to rely at hearing, together with references to the specific sources and documents on which the . . . petitioner intends to rely to support its position on the issue; [and]
- (vi) . . . [P]rovide sufficient information to show that a genuine dispute exists with the applicant/licensee on a material issue of law or fact. This information must include references to specific portions of the application (including the applicant's environmental report and safety report) that the petitioner disputes and the supporting reasons for each dispute, or, if the petitioner believes that the application fails to contain information on a relevant matter as required by law, the identification of each failure and the supporting reasons for the petitioner's belief.<sup>30</sup>

A petitioner's failure to comply with any of these section 2.309(f)(1) requirements renders a contention inadmissible.<sup>31</sup>

## **2. Safety Review Requirements for License Renewal Applications**

When the NRC issues an initial operating license, it makes a "comprehensive determination that the design, construction, and proposed operation of the facility satisfie[s] the Commission's requirements and provide[s] reasonable assurance of adequate protection to the public health and safety and common

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<sup>29</sup> See *id.* § 2.309(b)(3)(i) (requiring filing of a petition to intervene within the "time specified in any . . . notice of proposed action").

<sup>30</sup> *Id.* § 2.309(f)(1).

<sup>31</sup> See *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-99-10, 49 NRC 318, 325 (1999) (citing *Arizona Public Service Co.* (Palo Verde Nuclear Generating Station, Units 1, 2, and 3), CLI-91-12, 34 NRC 149, 155-56 (1991)).

defense and security.”<sup>32</sup> Along with its operating license, each nuclear power plant has a “current licensing basis,” defined as an “evolving set of requirements and commitments” applicable to the plant that are effective through the plant’s license term.<sup>33</sup>

Because the Commission deems it inappropriate or unnecessary “to throw open the full gamut of provisions in a plant’s current licensing basis” for re-analysis during license renewal, the scope of safety issues that may be considered in this proceeding is limited.<sup>34</sup> A license renewal safety review therefore restricts its focus to the plant’s systems, structures, and components (SSCs) “for which current [regulatory] activities and requirements may not be sufficient to manage the effects of aging in the period of extended operation.”<sup>35</sup> Accordingly, the requirements governing renewal of operating licenses for nuclear power plants, which are found in 10 C.F.R. Part 54, center on the “detrimental effects of aging.” Those provisions also require all power reactor license renewal applicants to demonstrate how their programs and procedures will manage the effects of aging on power reactor SSCs.<sup>36</sup> Section 54.21 sets out the technical information requirements for power reactor license renewal applications, including subsequent license renewal applications. License renewal applications must “identify and list [SSCs] subject to aging management review,”<sup>37</sup> and must “demonstrate that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the [current licensing basis] for the period of extended operation,” i.e., the license renewal term.<sup>38</sup> Relevant to the issues in this proceeding, the Commission may issue a renewed license if it concludes that the licensee’s management of aging effects on the plant’s identified SSCs will provide “reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the [current licensing basis].”<sup>39</sup>

For an applicant pursuing a subsequent license renewal, the NRC Staff’s safety review under Part 54 is guided by the Standard Review Plan for Subse-

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<sup>32</sup> Final Rule, Nuclear Power Plant License Renewal, 56 Fed. Reg. 64,943, 64,947 (1991).

<sup>33</sup> Final Rule, Nuclear Power Plant License Renewal; Revisions, 60 Fed. Reg. 22,461, 22,473 (1995). For a definition of “current licensing basis,” see 10 C.F.R. § 54.3(a).

<sup>34</sup> *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-01-17, 54 NRC 3, 9-10 (2001).

<sup>35</sup> 60 Fed. Reg. at 22,469.

<sup>36</sup> *Turkey Point*, CLI-01-17, 54 NRC at 7-8.

<sup>37</sup> 10 C.F.R. § 54.21(a)(1).

<sup>38</sup> *Id.* § 54.21(a)(3).

<sup>39</sup> *Id.* § 54.29(a).

quent License Renewal Applications (SRP-SLR)<sup>40</sup> and the Generic Aging Lessons Learned for Subsequent License Renewal Report (GALL-SLR).<sup>41</sup> While the NRC does not require subsequent license renewal applicants to use or reference these documents in their applications, both the SRP-SLR and the GALL-SLR include elements the NRC Staff considers acceptable for managing the aging effects on power reactor SSCs through the licensee’s aging management programs (AMPs).<sup>42</sup>

### **3. Environmental Review Requirements for License Renewal Applications**

The National Environmental Policy Act (NEPA) requires federal agencies to prepare an environmental impact statement (EIS) for proposed major federal actions “significantly affecting the quality of the human environment,”<sup>43</sup> including a detailed discussion of “the environmental impact of the proposed action,” “any adverse environmental effects which cannot be avoided should the proposal be implemented,” and “alternatives to the proposed action.”<sup>44</sup> Although NEPA requires the agency to take a “hard look” at environmental consequences of major federal actions, it “seeks to guarantee process, not specific outcomes.”<sup>45</sup>

The NRC’s NEPA-implementing regulations are found in 10 C.F.R. Part 51.<sup>46</sup> Pursuant to these regulations, the renewal of a license to operate a nuclear power reactor constitutes a “major Federal action” triggering the NRC’s obligation un-

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<sup>40</sup> Office of Nuclear Reactor Regulation (NRR), Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants, NUREG-2192, at iii (July 2017) (ADAMS Accession No. ML17188A158).

<sup>41</sup> 1 NRR, Generic Aging Lessons Learned for Subsequent License Renewal Report, NUREG-2191, Vol. 1, at iii (July 2017) (ADAMS Accession No. ML17187A031); 2 NRR, Generic Aging Lessons Learned for Subsequent License Renewal Report, NUREG-2191, Vol. 2 at iii (ADAMS Accession No. ML17187A204). Unless specified, Volume 1 and Volume 2 of the Generic Aging Lessons Learned for Subsequent License Renewal Report will be referred to collectively as the GALL-SLR *infra*.

<sup>42</sup> 1 GALL-SLR at xxv.

<sup>43</sup> 42 U.S.C. § 4332(2)(C) (emphasis added). However, the NRC is not required to prepare an EIS under NEPA when the contemplated major Federal action before the agency is not “significantly affecting the quality of the human environment.” *Id.* In those instances “an environmental assessment, with its accompanying finding of no significant impact, constitutes an agency’s evaluation of the environmental effects of a proposed action.” *Pacific Gas and Electric Co.* (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), CLI-08-26, 68 NRC 509, 514 (2008); *see also* 10 C.F.R. § 51.14.

<sup>44</sup> 42 U.S.C. § 4332(2)(C)(i)-(iii).

<sup>45</sup> *Massachusetts v. NRC*, 708 F.3d 63, 67 (1st Cir. 2013) (quoting *Town of Winthrop v. FAA*, 535 F.3d 1, 4 (1st Cir. 2008)).

<sup>46</sup> *See* 10 C.F.R. § 51.10.

der NEPA to prepare an EIS.<sup>47</sup> Although preparing an EIS that complies with NEPA is ultimately the NRC's responsibility, the process actually begins with the license renewal applicant.<sup>48</sup> Pursuant to 10 C.F.R. §§ 51.45 and 51.53(c)(1), license renewal applicants must submit an environmental report (ER), the purpose of which is "to aid the Commission in complying with section 102(2) of NEPA."<sup>49</sup> The NRC Staff, in turn, reviews the applicant's ER and "draw[s] upon [it] to produce a draft supplemental EIS"<sup>50</sup> that addresses plant-specific issues not covered by the agency's generic environmental impact statement on NEPA issues associated with plant license renewals.<sup>51</sup>

Finally, "although environmental contentions are, in essence, challenges to the Staff's compliance with NEPA, those contentions must be raised, if possible, in response to the applicant's environmental report."<sup>52</sup> Petitioners who choose to wait to proffer environmental contentions challenging the NRC Staff's later-issued environmental document "do so at their peril" because if there is no material difference between the applicant's ER and the NRC Staff's environmental document, a contention raised at that point would be rendered "impermissibly late."<sup>53</sup>

#### 4. *New and Amended Contentions*

A petitioner who moves to file new or amended contentions after the deadline for submitting a petition to intervene and request for hearing must meet the "good cause" standard under 10 C.F.R. § 2.309(c)(1). "Good cause" exists if the petitioner demonstrates that (1) the information upon which the new or amended contention is based was not previously available; (2) the information upon which the contention is based is materially different from information previously available; and (3) the contention has been submitted in a timely fashion (generally deemed to be within 30 days) based on the availability of the subsequent information.<sup>54</sup> "Materially different" in this context concerns the "type

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<sup>47</sup> See *id.* § 51.20(a), (b)(2).

<sup>48</sup> See *Massachusetts v. NRC*, 522 F.3d 115, 120 (1st Cir. 2008).

<sup>49</sup> 10 C.F.R. § 51.14; see also *id.* § 51.45(c) ("The [ER] should contain sufficient data to aid the Commission in its development of an independent analysis [in the EIS].").

<sup>50</sup> *Massachusetts*, 522 F.3d at 120.

<sup>51</sup> See 1 NRR, Generic Environmental Impact Statement for License Renewal of Nuclear Plants, NUREG-1437 (rev. 1 June 2013) (ADAMS Accession No. ML13106A241) ("2013 GEIS").

<sup>52</sup> *DTE Electric Co.* (Fermi Nuclear Power Plant, Unit 3), CLI-15-1, 81 NRC 1, 7 (2015).

<sup>53</sup> *Id.*

<sup>54</sup> See 10 C.F.R. § 2.309(c)(1); see also *Shaw AREVA MOX Services* (Mixed Oxide Fuel Fabrication Facility), LBP-08-11, 67 NRC 460, 493 (2008) (observing that many licensing boards have found 30 days from a triggering event for proffering a new or amended contention to be timely).

or degree of difference between the new information and previously available information.”<sup>55</sup>

## **B. Analysis**

### ***1. Amended Contention***

As stated *supra*, the deadline for filing a petition to intervene and request for hearing in this proceeding was November 19, 2018. On May 1, 2019, Beyond Nuclear moved to amend its hearing request. Beyond Nuclear did not seek to amend its contentions, but rather to “amend the basis statements for Contentions 1 and 2 to include reference” to a revised Pacific Northwest National Laboratory report (Ramuhalli Revision 1)<sup>56</sup> because Beyond Nuclear’s expert, Mr. Lochbaum, had relied on a 2017 draft version of that report (Ramuhalli 2017) to support its initial petition.<sup>57</sup> Beyond Nuclear argues that its motion to amend meets the three-prong good cause standard, because (1) Ramuhalli Revision 1 “did not become available until . . . April 2” and therefore qualifies as new information;<sup>58</sup> (2) “the characterization of the significance of [the evaluated] facts and actions needed to address those facts has materially changed” between Ramuhalli 2017 and Ramuhalli Revision 1;<sup>59</sup> and (3) the motion was timely filed within thirty days of Ramuhalli Revision 1’s availability.<sup>60</sup> The NRC Staff and Exelon oppose the motion.<sup>61</sup>

We agree with Beyond Nuclear that it has met the good cause standard. That Ramuhalli Revision 1 first became available on April 2, 2019 is undisputed. We agree as well that the language within Ramuhalli Revision 1 regarding component harvesting, material degradation, and the overall conclusions did change substantially enough that Ramuhalli 2017 is materially different from Ramuhalli

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<sup>55</sup> *Florida Power & Light Co.* (Turkey Point Units 6 and 7), LBP-17-6, 86 NRC 37, 48, *aff’d*, CLI-17-12, 86 NRC 215 (2017).

<sup>56</sup> Amended Petition at 6 (referring to P. Ramuhalli et al., Pacific Northwest National Laboratory, Criteria and Planning Guidance for Ex-Plant Harvesting to Support Subsequent License Renewal (rev. 1 Mar. 2019) (ADAMS Accession No. ML19081A006)).

<sup>57</sup> Petition, attach. 4, David Lochbaum, Proposed Subsequent License Renewal of Peach Bottom Units 2 and 3: Exelon’s Aging Management Programs Fail to Provide Adequate Measures for Consideration of Operating Experience Throughout the Period of Extended Operation at 48 (Nov. 16, 2018) (“Lochbaum Report”) (citing P. Ramuhalli et al., Pacific Northwest National Laboratory, Criteria and Planning Guidance for Ex-Plant Harvesting to Support Subsequent License Renewal (Dec. 2017)).

<sup>58</sup> *Id.* at 8.

<sup>59</sup> *Id.*

<sup>60</sup> *Id.* at 9.

<sup>61</sup> See NRC Staff Answer to Amended Hearing Request at 2; Exelon Answer to Amended Hearing Request at 1.



Revision 1.<sup>62</sup> Finally, Beyond Nuclear’s motion was filed in a timely manner, i.e., twenty-nine days after Ramuhalli Revision 1 became available. We accordingly grant Beyond Nuclear’s motion to amend. Beyond Nuclear’s contentions are therefore deemed to include references both to Ramuhalli Revision 1 and to Ramuhalli 2017 in support of its contentions. Although we grant Beyond Nuclear’s motion to amend its basis statements to include references to both Ramuhalli 2017 and Ramuhalli Rev. 1, we nevertheless conclude that the contentions advanced here are deficient because they fail to meet the Commission’s six-factor admissibility standard as set forth above.

## 2. *Contention Admissibility*

### a. *Contention 1*

Exelon’s subsequent license renewal application fails to comply with NRC safety regulation 10 C.F.R. § 54.21(a)(3), nor does it meet the NRC’s standards for renewal of an operating license in 10 C.F.R. §§ 54.29(a)(1) and 54.31(a)(1), because its aging management programs for the subsequent license renewal term do not address any of the following issues:

- (a) The degree to which Exelon’s aging management programs depend on external operating experience,
- (b) How Exelon will determine what amount of operating experience information is sufficient, and
- (c) How operating experience will be augmented if it is deemed insufficient.

Exelon’s license for Peach Bottom Units 2 and 3 should not be renewed until these actions have been taken.<sup>63</sup>

As support for this contention, Beyond Nuclear provides the report by David A. Lochbaum (Lochbaum Report).<sup>64</sup> Mr. Lochbaum is an expert on nuclear power safety issues.<sup>65</sup> His report opines that there is a “vital role [to be] played

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<sup>62</sup> Amended Petition at 4-6. For example, while Ramuhalli 2017’s summary concludes that addressing materials degradation at nuclear plants after extended operation “will likely require” a combination of laboratory studies and research on harvested materials from operating and decommissioned plants, Ramuhalli Rev. 1’s summary concludes that studies on materials harvested at plants merely “can provide confirmation” of the effectiveness of aging management programs. *Compare* Ramuhalli 2017 at v, *with* Ramuhalli Rev. 1 at ii.

<sup>63</sup> Petition at 4. In its reply, Beyond Nuclear acknowledges that its citation to 10 C.F.R. § 54.31(a)(1) was in error. Beyond Nuclear Reply at 2 n.2.

<sup>64</sup> Petition, attach. 4, Decl. of David A. Lochbaum.

<sup>65</sup> *Id.* ¶ 1, 2.

by operating experience in shaping, and re-shaping, aging management programs.”<sup>66</sup> Mr. Lochbaum further claims that even though Exelon’s subsequent license renewal application considered operating experience, the application “does not explain how Exelon can continue to obtain and evaluate external operating experience if it becomes less and less available” as a result of other facility shutdowns before or during the subsequent renewal term.<sup>67</sup> Mr. Lochbaum insists that Exelon’s application “must explicitly discuss the sources of operating experience for the various aging management program[s] and the ‘critical mass’ of that information needed to maintain their effectiveness.”<sup>68</sup>

The NRC Staff argues that Contention 1 constitutes an impermissible challenge to the agency’s regulations, i.e., the sufficiency of the Part 54 aging management requirements.<sup>69</sup> The NRC Staff asserts that Contention 1’s supporting Lochbaum Report “repeatedly misstates requirements and conflates guidance documents with regulations.”<sup>70</sup> Additionally, the NRC Staff points out that Beyond Nuclear incorporates the Lochbaum Report by reference but does not explain how the Report supports its claims, as required by 10 C.F.R. § 2.309(f)(1)(v).<sup>71</sup> Both the NRC Staff and Exelon oppose Contention 1 on the ground that Beyond Nuclear fails to demonstrate a genuine dispute with Exelon’s application on a material issue of law or fact. In particular, Exelon argues that Beyond Nuclear fails to identify any aging management programs in its subsequent license renewal application that are inadequate, as required by 10 C.F.R. § 2.309(f)(1)(vi).<sup>72</sup> Further, the NRC Staff maintains that Beyond Nuclear fails to specify which reactor safety margins may be jeopardized by an alleged decline in operating experience.<sup>73</sup>

The Board concludes that this contention does not exhibit a genuine dispute with Exelon’s application on a material issue of law or fact. Contention 1 relies on the general premise that because “the number of operating plants, operating reactors, is decreasing, and is likely to decrease through the subsequent license renewal term of Peach Bottom,”<sup>74</sup> Exelon’s application is inadequate and therefore its application must be revised to account for a possible future

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<sup>66</sup> Lochbaum Report at 3.

<sup>67</sup> *Id.* at 30. At oral argument, Beyond Nuclear conceded that there is actually no decrease in the total volume of operational experience from nuclear power plants, but rather a potential decrease in the rate of accumulation of such experience. Tr. at 18.

<sup>68</sup> Lochbaum Report at 33.

<sup>69</sup> NRC Staff Answer at 35.

<sup>70</sup> *Id.* at 33.

<sup>71</sup> *Id.* at 38, 41-42.

<sup>72</sup> Exelon Answer at 14.

<sup>73</sup> NRC Staff Answer at 38.

<sup>74</sup> Tr. at 37-38.

reduction in the rate of accumulation of domestic nuclear operating experience. However, nowhere does Beyond Nuclear identify any specific deficiencies in the Peach Bottom aging management programs described in Exelon's application, much less point to any specific inadequacies anywhere else in the application.

Moreover, Beyond Nuclear's claim concerning the possibility of reduced operating experience is much too general and vague to create a genuine dispute with Exelon's application for two reasons. First, the Lochbaum Report fails to explain why an alleged reduction in the rate of accumulation of domestic nuclear operating experience will adversely affect the Peach Bottom AMPs. When asked at oral argument to cite where in its pleadings Beyond Nuclear identified this specific flaw in Exelon's application, Beyond Nuclear was unable to do so.<sup>75</sup> Beyond Nuclear stated that were a hearing granted, "the subject would be do we have a problem and what is the extent of the problem," and "if there is a problem, what do we do about it[.]"<sup>76</sup> Beyond Nuclear's approach here is not in accordance with agency precedent. Although there may have been a time when licensing boards would admit contentions based on "little more than speculation" and petitioners would try to "unearth" contentions through "cross-examination," the Commission has made clear that evidentiary hearings now are only afforded to those who "proffer at least some minimal factual and legal foundation in support of their contentions."<sup>77</sup> Because Beyond Nuclear has provided no link between its concern about a possible reduction in the accumulation of operating experience and the adequacy of the AMPs at Peach Bottom, Contention 1 falls short of being admissible for hearing. Therefore, we find no genuine dispute with Exelon's application, as required under 10 C.F.R. § 2.309(f)(1)(vi).

Second, the Lochbaum Report fails to explain at what point the "critical mass" threshold would be reached so that Exelon could no longer acquire the operating experience necessary for the effective management of aging equipment at Peach Bottom. In fact, the Lochbaum Report seems to acknowledge that this specific data point is enigmatic: "*At some point*, Operating Experience *may* become insufficient to maintain effective aging management programs."<sup>78</sup> Moreover, when afforded an opportunity at oral argument to explain the basis for this alleged "critical mass," Beyond Nuclear merely provided a conclusory statement supporting the timing of this contention, i.e., that because the possible

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<sup>75</sup> Tr. at 113-14.

<sup>76</sup> Tr. at 140-41.

<sup>77</sup> *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), CLI-99-11, 49 NRC 328, 334 (1999).

<sup>78</sup> Lochbaum Report at 20 (emphasis added); *id.* at 32 ("Permanent closures of nuclear power reactors will reduce the amount of operating experience to a point that [AMPs] *may be significantly impaired.*" (emphasis added)). The Lochbaum Report also refers to the issues asserted by Beyond Nuclear in Contention 1 as a "potential problem," rather than an established one. *Id.*

reduction in the accumulation of operating experience is “reasonably . . . capable of being anticipated[,] . . . now is the time to address it.”<sup>79</sup> Ultimately, however, when a contention is proffered, it must be based on fact or an expert opinion, not on speculation or conjecture. Because Contention 1 lacks sufficient support, the contention is also inadmissible for failing to meet the requirements in 10 C.F.R. § 2.309(f)(1)(v).

Contention 1 is not admitted.

*b. Contention 2*

Beyond Nuclear’s Contention 2 concerns Exelon’s management of the aging effects of Peach Bottom’s reactor operating equipment. While very similar to Contention 1, Contention 2 focuses not on safety concerns under Part 54, but rather on three potential environmental effects of possible design-basis accidents under Part 51. Beyond Nuclear’s main concerns in Contention 2 are: (1) the alleged omission by Exelon of accident risks posed by operating aging reactor equipment; (2) Exelon’s alleged failure to include and evaluate certain literature in its application; and (3) the alleged significance of declining operating experience. We designate these environmentally-based challenges as Contentions 2A, 2B, and 2C, and address them accordingly.

(i) CONTENTION 2A: ACCIDENT RISKS POSED BY OPERATING AGING REACTOR EQUIPMENT

Exelon’s Environmental Report for Peach Bottom Units 2 and 3 violates the National Environmental Policy Act (“NEPA”) and NRC implementing regulation 10 C.F.R. § 51.53(c)(2) by failing to address the accident risks posed by operating aging reactor equipment during a second license renewal term. Exelon incorrectly claims that the risk of operating Peach Bottom with aging equipment is a “Category 1” issue and therefore exempt from consideration under 10 C.F.R. § 51.53(c)(3) and 10 C.F.R. Part 50, Appendix A. Environmental Report at 4-12 (citing Category 1 designation of “design-basis accidents”). In taking this position, Exelon disregards the plain language of § 51.53(c)(3), which states that the regulation applies only to “initial” operating license renewal applications. Exelon’s application is governed by 10 C.F.R. § 51.53(c)(2), which contains no such exemption.<sup>80</sup>

Beyond Nuclear essentially argues that Exelon’s environmental report fails to include design-basis accident risk analysis, as required by NEPA and 10 C.F.R.

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<sup>79</sup> Tr. at 141.

<sup>80</sup> Petition at 6-7.

§ 51.53(c)(2).<sup>81</sup> In proffering this contention of omission, Beyond Nuclear also argues that Exelon, as a subsequent license renewal applicant, may not rely upon the generic environmental analyses for license renewal contained in Part 51, Appendix B to Subpart A (Table B-1) because of the plain language of 10 C.F.R. § 51.53(c)(3).<sup>82</sup> At the outset, Beyond Nuclear argues that 10 C.F.R. § 51.53(c)(3) does not apply to Exelon’s application (or, for that matter, to any other subsequent license renewal application) on the ground that the regulation only applies to *initial* license renewals.<sup>83</sup> Beyond Nuclear further asserts that Exelon, as a subsequent license renewal applicant, is barred from relying on the analyses contained in the 2013 GEIS.<sup>84</sup>

In opposition, Exelon maintains that its application may incorporate by reference<sup>85</sup> the 2013 Generic Environmental Impact Statement for License Renewal of Nuclear Plants (2013 GEIS)<sup>86</sup> and the results of the 2013 GEIS analyses codified in Table B-1 as permitted by section 51.53(a).<sup>87</sup> From this, Exelon asserts that 10 C.F.R. § 2.335 prohibits the Board from admitting Contention 2 because Contention 2 amounts to an impermissible challenge to the NRC’s codified Table B-1 generic analyses.<sup>88</sup> The NRC Staff agrees with Exelon’s assessment, arguing that Exelon “is not required to include an analysis of the impacts of [subsequent license renewal] operation at Peach Bottom for Category 1 issues because they have been determined to be similar for all plants and are not required to be evaluated in a plant-specific analysis.”<sup>89</sup>

We recognize that the issue of the applicability of 10 C.F.R. § 51.53(c)(3) to subsequent license renewal applications has been raised in another subsequent license renewal proceeding and is currently pending before the Commission.<sup>90</sup>

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<sup>81</sup> *Id.*

<sup>82</sup> *Id.* at 7.

<sup>83</sup> Petition at 11. Beyond Nuclear’s argument is based on the regulation’s introduction, which states that it is “[f]or applicants seeking an initial renewed license.” 10 C.F.R. § 51.53(c)(3).

<sup>84</sup> Petition at 11 (“[N]o environmental impact statement (“EIS”) exists that addresses the issue” of “the environmental risks of design-basis accidents . . . for twenty years beyond the initial license term.”).

<sup>85</sup> Exelon Answer at 29-30 (citing Exelon, Applicant’s Environmental Report — Operating License Renewal Stage — Subsequent License Renewal, The Second License Renewal, Peach Bottom Atomic Power Station, [Units 2 & 3] (July 2018), at 4-69 to -70 (ADAMS Accession No. ML18201A219) (“ER”).

<sup>86</sup> 2013 GEIS at S-17 to -18.

<sup>87</sup> Exelon Answer at 29-30 (citing 10 C.F.R. Part 51, subpt. A, app. B (“Table B-1”)); *id.* at 31.

<sup>88</sup> *Id.* at 30.

<sup>89</sup> NRC Staff Answer at 56 (citing *Turkey Point*, CLI-01-17, 54 NRC at 11).

<sup>90</sup> See *Turkey Point*, LBP-19-3, 89 NRC at 273 n.46 (referring to the Commission its ruling that 10 C.F.R. § 51.53(c)(3) applies to the preparation of environmental reports in subsequent license renewal proceedings).

However, for the purposes of analyzing the sufficiency of Beyond Nuclear's proffered contentions here, we need not make a determination on that issue at this juncture. We therefore proceed with analyzing the admissibility of Beyond Nuclear's contentions without deciding whether or not section 51.53(c)(3) applies to subsequent license renewal proceedings.

With respect to Beyond Nuclear's claim that Exelon's environmental report fails to address accident risks posed by aging reactor equipment through the subsequent renewal term, we first observe that the plain language of section 51.53(a) expressly permits any post-construction applicant's environmental report to "incorporate by reference . . . any information contained in a final environmental document previously prepared by the NRC staff that relates to the production or utilization facility or site."<sup>91</sup> This regulation approves the incorporation by reference of "NRC staff-prepared final generic environmental impact statements."<sup>92</sup> Here, such generic treatment would thus include both the 2013 GEIS and the promulgated analysis results from Table B-1 — *regardless* of whether the provisions of section 51.53(c)(3) apply to Exelon. So, even were we to hold that section 51.53(c)(3) did not apply to Exelon as a subsequent license renewal applicant, it would still be permitted to incorporate the 2013 GEIS analyses into its environmental report.<sup>93</sup> Accordingly, we conclude that Exelon is permitted to incorporate by reference the 2013 GEIS into its environmental report.

We also reject Beyond Nuclear's assertion that Exelon "fail[s] to address the accident risks posed by operating aging reactor equipment" for the subsequent license renewal term.<sup>94</sup> Exelon's application incorporates by reference "Issue 65, Design-basis accidents"<sup>95</sup> and the associated conclusions from the 2013 GEIS.<sup>96</sup> Aside from its general argument that subsequent license renewal applicants cannot rely on the 2013 GEIS because it fails to "expand the temporal scope of the environmental analysis" to subsequent license renewals,<sup>97</sup> Beyond Nuclear is unable to explain why section 51.53(a) does not permit Exelon to utilize the 2013 GEIS analysis in its application.<sup>98</sup> Nor does Beyond Nuclear's expert opinion, the Lochbaum Report, support Beyond Nuclear's position that the NRC Staff's

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<sup>91</sup> 10 C.F.R. § 51.53(a).

<sup>92</sup> *Id.*

<sup>93</sup> To challenge any such incorporated analyses in a licensing proceeding, a petitioner would have to obtain a waiver under 10 C.F.R. § 2.335(b).

<sup>94</sup> Petition at 6-7.

<sup>95</sup> ER at 4-69.

<sup>96</sup> 2013 GEIS at S-17; *see also* Table B-1 ("The NRC staff has concluded that the environmental impacts of design-basis accidents are of small significance for all plants.").

<sup>97</sup> Petition at 12.

<sup>98</sup> Exelon stated this defense in its answer, Exelon Answer at 30-31, and Beyond Nuclear appeared not to dispute this in its reply to the NRC Staff and Exelon.

analysis in the 2013 GEIS is deficient or that the 2013 GEIS cannot apply to subsequent license renewal applications. Simply put, there is insufficient factual support for Beyond Nuclear's claim here.

Therefore, because Exelon did incorporate by reference the 2013 GEIS analyses and the Table B-1 results concerning design-basis accidents in its environmental report (as permitted by section 51.53(a)),<sup>99</sup> we find there was no omission, and thus there is no genuine dispute as required under 10 C.F.R. § 2.309(f)(1)(vi). And because Contention 2A lacks any "alleged facts or expert opinions," as required by section 2.309(f)(1)(v), for Beyond Nuclear's argument concerning Exelon's use of the 2013 GEIS, this aspect of the contention also fails.

(ii) CONTENTION 2B: FAILURE TO REVIEW AND EVALUATE LITERATURE AND SECY MEMORANDUM

Exelon also violates NEPA by failing to review and evaluate the existing body of literature regarding reactor aging phenomena and their effects beyond 60 years. *Pacific Gas & Electric Co.* (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), CLI-11-11, 74 NRC 427, 443 (2011) (where the Environmental Report had conceded the relevance of seismic risk, holding admissible the question of whether an additional technical study should be considered). Here, there can be no question that the accident risk posed by operating Peach Bottom for an additional twenty years is a relevant environmental consideration. But Exelon does not address the significant body of studies raising concerns about how much is still unknown about the effects of aging on reactor safety equipment. See Lochbaum Expert Report, Section 4 and technical studies listed therein. Relevant studies include, for instance, the Expanded Materials Degradation Assessment (EMDA), a five-volume report prepared by the NRC and the U.S. Department of Energy ("DOE"), NUREG/CR-7153, ORNL/TM-2013/532, Oct. 2014 ("EMDA Report"). Other examples of relevant studies of aging reactor equipment are listed in Section 10 of the attached Lochbaum Expert Report.

Exelon's Environmental Report should also address the environmental implications of reactor aging issues identified by the NRC Staff in SECY-14-0016, Memorandum from Mark A. Satorius, NRC Executive Director of Operations, to NRC Commissioners, re: Ongoing Staff Activities to Assess Regulatory Considerations for Power Reactor Subsequent License Renewal (Jan. 31, 2014) (ADAMS Accession No. ML14050A306). These issues, characterized by the Staff as "the most significant technical issues challenging [reactor] operation beyond 60 years," include reactor pressure vessel embrittlement; irradiation-assisted stress corrosion cracking of reactor internals, concrete structures and containment degradation; and electrical cable qualification and condition assessment. *Id.*, Enclosure 1 at 2-3. As

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<sup>99</sup> ER at 4-69.

stated by senior NRC management, “it is the industry’s responsibility to resolve these and other issues to provide the technical bases to ensure safe operation beyond 60 years.” *Id.* at 3. Beyond Nuclear is aware of no determination that these issues have been resolved since publication of SECY-14-0016. The Environmental Report should address the degree to which a lack of information regarding the effects of aging on reactor systems and components affects the environmental risk posed by extended operation. *See* 40 C.F.R. § 1502.22, which provides “guidance” to the NRC (74 NRC at 444) that “when an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking.”<sup>100</sup>

Here, Beyond Nuclear argues that Exelon’s environmental report violates NEPA for failing to take into account a body of literature concerning aging reactor phenomena that might occur beyond the first sixty years of operation.<sup>101</sup> Such literature includes the U.S. Department of Energy’s and the NRC’s co-authored “Expanded Materials Degradation Assessment” (EMDA)<sup>102</sup> as well as other literature listed in the Lochbaum Report’s “references” section.<sup>103</sup> Additionally, Beyond Nuclear contends that Exelon should address the aging management issues that were raised by the NRC Staff in a 2014 memorandum to the Commission (SECY-14-0016).<sup>104</sup>

Exelon and the NRC Staff both dispute Beyond Nuclear’s argument, asserting among other things that the Lochbaum Report fails to provide a basis to show a genuine dispute with Exelon’s application.<sup>105</sup> The Board agrees. We conclude that Beyond Nuclear has not specified any legal basis (nor can we find one) that requires Exelon’s environmental report to address the EMDA, the issues raised in SECY-14-0016,<sup>106</sup> or the Lochbaum Report’s list of references.

Further, Beyond Nuclear does not identify the specific documents referenced in the Lochbaum Report that Exelon should have “review[ed] and evaluate[d],” much less does it offer any evidence that NEPA mandates such a document review and evaluation in Exelon’s environmental report. Therefore, the Board con-

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<sup>100</sup> Petition at 7-8.

<sup>101</sup> *Id.* at 7.

<sup>102</sup> *See generally* 1-5 U.S. Dep’t of Energy & NRC, Expanded Materials Degradation Assessment, NUREG/CR-7153, ORNL/TM-2013/532 (Oct. 2014) (ADAMS Accession Nos. ML14279A321, ML14279A331, ML14279A349, ML14279A430, ML14279A461).

<sup>103</sup> Lochbaum Report at 44-48.

<sup>104</sup> Petition at 7-8.

<sup>105</sup> Exelon Answer at 38; NRC Answer at 58-59.

<sup>106</sup> The Board also notes that Beyond Nuclear undercuts its argument that Exelon needs to address SECY-14-0016 in its environmental report with its assertion that “NRC internal memoranda do not substitute for NEPA Compliance or notice-and-comment rulemaking.” Beyond Nuclear Reply at 29.



cludes that this aspect of Contention 2 is inadmissible under 10 C.F.R. § 2.309(f)(1)(iv) for failing to raise an issue material to the findings the NRC must make.<sup>107</sup>

(iii) CONTENTION 2C: SIGNIFICANCE OF DECLINING EXTERNAL OPERATING EXPERIENCE

Finally, the environmental report should address the significance of the declining amount of external operating experience available to Exelon to assist and increase its understanding of age-related environmental risks during the subsequent license renewal term. *See* Lochbaum Expert Report, which is attached and incorporated by reference herein.<sup>108</sup>

In support of this portion of Contention 2, which is the environmental analog of Contention 1, Beyond Nuclear argues that “the body of external operating experience . . . is now in decline because of the increased rate of shutdown of operating reactors.”<sup>109</sup> Beyond Nuclear again relies on the Lochbaum Report, and seeks to require Exelon to “discuss how Exelon plans to make up for the reduced amount of external operating experience in achieving an adequate understanding of the behavior [of] the aging equipment in the Peach Bottom reactors.”<sup>110</sup>

The NRC Staff argues that this aspect of Contention 2 is “premised on speculative and incorrect assertions”<sup>111</sup> because “it is obvious that the body of external operating experience that exists today could not decline. As long as other nuclear power plants, whether here or abroad, continue to operate that body will continue to grow.”<sup>112</sup> Likewise, Exelon points out that “Beyond Nuclear has provided no information indicating that . . . the vague and speculative concern regarding the sufficiency of future operating experience would result in any significant increase in the consequences of design basis accidents (or the probability-weighted consequences of severe accidents).”<sup>113</sup>

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<sup>107</sup> Because Beyond Nuclear failed to show any legal requirement for Exelon’s subsequent license renewal application to analyze Mr. Lochbaum’s cited body of literature, Contention 2 also is not admitted because it fails to show a genuine dispute exists with the application on a material issue of law or fact. 10 C.F.R. 2.309(f)(1)(vi).

<sup>108</sup> Petition at 8.

<sup>109</sup> *Id.* at 14. As previously mentioned, at oral argument, Beyond Nuclear conceded that there is actually no decrease in the total volume of operational experience from nuclear power plants, but rather a potential decrease in the rate of accumulation of such experience. Tr. at 18.

<sup>110</sup> *Id.*

<sup>111</sup> NRC Staff Answer at 57.

<sup>112</sup> *Id.* at 58.

<sup>113</sup> Exelon Answer at 38.

The Board agrees. Because Beyond Nuclear fails to establish a genuine dispute with Exelon's application, as required under 10 C.F.R. § 2.309(f)(1)(vi), Contention 2C is not admitted.<sup>114</sup>

#### IV. CONCLUSION

The Board concludes that Contention 1 is inadmissible for failing to meet the requirements of 10 C.F.R. § 2.309(f)(1)(v) and (vi).

The Board concludes that Contention 2 is inadmissible for failing to meet the requirements of 10 C.F.R. § 2.309(f)(1)(iv), (v), and (vi).

#### V. ORDER

The Board *grants* Beyond Nuclear's May 1, 2019 motion to amend its petition, but *denies* its request for a hearing and petition for leave to intervene because the Board concludes that Contentions 1 and 2 are inadmissible. This proceeding is therefore *terminated*.

An appeal of this Memorandum and Order may be filed within twenty-five (25) days of service of this decision by filing a notice of appeal and an accompanying supporting brief under 10 C.F.R. § 2.311(b). Any party opposing an appeal may file a brief in opposition to the appeal within twenty-five (25) days after service of the appeal. All briefs must conform to the requirements of 10 C.F.R. § 2.341(c)(3).

It is so ORDERED.

THE ATOMIC SAFETY AND  
LICENSING BOARD

Michael M. Gibson, Chairman  
ADMINISTRATIVE JUDGE

Dr. Michael F. Kennedy  
ADMINISTRATIVE JUDGE

Dr. Sue H. Abreu  
ADMINISTRATIVE JUDGE

Rockville, Maryland  
June 20, 2019

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<sup>114</sup> And as this aspect of Contention 2 is the environmental parallel of Contention 1, this aspect of Contention 2 is not admitted for the same pleading deficiencies we found in Contention 1. 10 C.F.R. § 2.309(f)(1)(v).

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- Consolidated Edison Co. of New York* (Indian Point, Units 1 and 2), CLI-01-19, 54 NRC 109, 132-33 (2001)  
to adopt a contention, participant must have demonstrated standing in their own right and (have proffered an admissible contention itself; LBP-19-4, 89 NRC 418, 451 (2019)
- Consolidated Edison Co. of New York* (Indian Point, Units 1 and 2), CLI-01-19, 54 NRC 109, 133 (2001)  
wholesale incorporation by reference by a petitioner who, in a written submission, merely establishes standing and attempts, without more, to incorporate the issues of other petitioners is not permitted; LBP-19-4, 89 NRC 453 (2019)
- Consumers Energy Co.* (Big Rock Point Independent Spent Fuel Storage Installation), CLI-07-19, 65 NRC 423, 426 (2007)  
distance to establish proximity-based standing in a consolidated interim storage facility proceeding is likely less than 50 miles because such a facility is essentially a passive structure rather than an operating facility, and therefore has less chance of widespread radioactive release; LBP-19-4, 89 NRC 364 (2019)  
multiple representations for standing are not allowed because they might lead to confusion; LBP-19-4, 89 NRC 366 n.65 (2019)
- Consumers Energy Co.* (Palisades Nuclear Plant), CLI-07-18, 65 NRC 399, 409 (2007)

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- organization may try to establish representational standing based on the standing of one or more individual members; LBP-19-4, 89 NRC 364 (2019)
- to establish representational standing, organization must show that the interests it seeks to protect are germane to its own purpose, identify at least one member who qualifies for standing in his or her own right, show that it is authorized by that member to request a hearing on his or her behalf, and show that neither the claim asserted nor the relief requested requires an individual member's participation in the organization's legal action; LBP-19-4, 89 NRC 364 (2019)
- Consumers Energy Co.* (Palisades Nuclear Plant), CLI-07-18, 65 NRC 399, 409-10 (2007)
- organization invoking representational standing on behalf of members must show that at least one of its members may be affected by the Commission's approval of the license transfer by identifying the member and providing written authorization of such representation; CLI-19-6, 89 NRC 481 n.87 (2019)
- Consumers Energy Co.* (Palisades Nuclear Plant), CLI-07-18, 65 NRC 399, 411 (2007)
- organization that seeks to intervene based on its organizational purposes must satisfy the same standing requirements as individuals seeking to intervene; CLI-19-6, 89 NRC 481 n.87 (2019)
- Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-101, 6 AEC 60, 64, 65, 66 (1973)
- judges should not have preconceived beliefs about the facts, but it is not grounds for disqualification for a judge to have formed an opinion about the applicable law; CLI-19-3, 89 NRC 239 (2019)
- Crow Butte Resources, Inc.* (In Situ Leach Facility, Crawford, Nebraska), CLI-15-17, 82 NRC 33, 42 n.58 (2015)
- contention migrates when a licensing board construes a contention challenging an environmental report as a challenge to a subsequently issued Staff NEPA document without the petitioner amending the contention; LBP-19-3, 89 NRC 272 n.44 (2019); LBP-19-4, 89 NRC 376 n.134 (2019)
- Crow Butte Resources, Inc.* (In Situ Leach Facility, Crawford, Nebraska), LBP-16-13, 84 NRC 271, 287-302 (2016), *petition for review denied*, CLI-18-8, 88 NRC 141, 144-46 (2018)
- documentation of stratigraphy in one proceeding regarding a license renewal may contribute to stipulated understandings of geology and hydrogeology of another proceeding; LBP-19-2, 89 NRC 89-90 (2019)
- Crow Butte Resources, Inc.* (Marsland Expansion Area), CLI-14-2, 79 NRC 11, 26 (2014)
- Commission generally defers to the board's judgment as to whether a proposed contention has a sufficient factual basis to be admitted; CLI-19-5, 89 NRC 336 (2019)
- David Geisen*, CLI-10-23, 72 NRC 210, 224-25 & n.61 (2010)
- Commission defers to the board's findings with respect to the facts in a merits decision unless the findings are clearly erroneous; CLI-19-5, 89 NRC 336 (2019)
- District of Columbia v. Air Fla., Inc.*, 750 F.2d 1077, 1084-85 (D.C. Cir. 1984)
- where a party refrains from advancing an argument, that argument is deemed to be waived; LBP-19-3, 89 NRC 276 n.51 (2019)
- Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Unit 2), CLI-03-14, 58 NRC 207, 213 (2003)
- contention admissibility requirements are strict by design and intended to ensure that adjudicatory proceedings are triggered only by substantive safety or environmental issues, rooted in a reasonably specific factual or legal basis; CLI-19-6, 89 NRC 472 (2019)
- Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Unit 2), CLI-03-14, 58 NRC 207, 219 (2003)
- contention admissibility rules properly reserve the hearing process for genuine, material controversies between knowledgeable litigants; LBP-19-4, 89 NRC 373 (2019)
- Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Units 2 and 3), CLI-01-24, 54 NRC 349, 358 (2001)
- contention admissibility standard is strict by design; LBP-19-3, 89 NRC 260 (2019); LBP-19-4, 89 NRC 373 (2019)
- contention is inadmissible because it does not comply with NRC's strict-by-design admissibility standards; LBP-19-4, 89 NRC 450 (2019)
- Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Units 2 and 3), CLI-01-24, 54 NRC 349, 365-66 (2001)



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- to be admissible, claims of poor character or integrity must have some direct and obvious relationship between the character issues and the licensing action in dispute; CLI-19-6, 89 NRC 477 (2019)
- Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Units 2 and 3), CLI-01-24, 54 NRC 349, 366-67 (2001)
- claims of prior violations or past events that are raised for litigation must be directly germane to the challenged licensing action; CLI-19-6, 89 NRC 477 (2019)
- dispute regarding character or integrity must raise issues directly germane to the challenged licensing action; LBP-19-4, 89 NRC 401 (2019)
- DTE Electric Co.* (Fermi Nuclear Power Plant, Unit 3), CLI-14-10, 80 NRC 157, 162-63 (2014)
- where a petition for review relies primarily on claims that the board erred in weighing the evidence in a merits decision, Commission seldom grants review; CLI-19-5, 89 NRC 336 (2019)
- DTE Electric Co.* (Fermi Nuclear Power Plant, Unit 3), CLI-15-1, 81 NRC 1, 7 (2015)
- although environmental contentions are, in essence, challenges to Staff's compliance with NEPA, those contentions must be raised, if possible, in response to applicant's environmental report; LBP-19-5, 89 NRC 495 (2019)
- petitioners who choose to wait to proffer environmental contentions challenging the NRC Staff's later-issued environmental document do so at their peril because if there is no material difference between the applicant's ER and the NRC Staff's environmental document, a contention raised at that point would be rendered impermissibly late; LBP-19-5, 89 NRC 495 (2019)
- Duke Cogema Stone & Webster* (Savannah River Mixed Oxide Fuel Fabrication Facility), LBP-01-35, 54 NRC 403 (2001), *rev'd in part on other grounds*, CLI-02-24, 56 NRC 335, 417 (2002)
- standing may be based on proximity to transportation routes in unique circumstances; LBP-19-4, 89 NRC 368 (2019)
- Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), CLI-02-14, 55 NRC 278, 295 (2002)
- neither NEPA nor NRC regulations require an environmental analysis of potential actions that are merely contemplated and have not been proposed; LBP-19-4, 89 NRC 441 (2019)
- Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), CLI-99-11, 49 NRC 328, 334 (1999)
- evidentiary hearings are only afforded to those who proffer at least some minimal factual and legal foundation in support of their contentions; LBP-19-5, 89 NRC 499 (2019)
- previously, licensing boards would sometimes admit contentions that appeared to be based on little more than speculation, and petitioners would try to unearth admissible contentions through cross-examination; LBP-19-4, 89 NRC 373 (2019)
- rather than expend agency time and resources on vague and unsupported claims, NRC strengthened contention admissibility standards so that evidentiary hearings are afforded only to those who proffer at least some minimal factual and legal foundation in support of their contentions; LBP-19-4, 89 NRC 373 (2019)
- six-factor contention admission standard resulted from the Commission's effort to raise the threshold bar for an admissible contention; LBP-19-4, 89 NRC 373 (2019)
- Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), LBP-98-33, 48 NRC 381, 385 n.1 (1998)
- licensing boards routinely have applied the 50-mile proximity presumption in power reactor license renewal proceedings; LBP-19-5, 89 NRC 490 (2019)
- Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), CLI-83-19, 17 NRC 1041, 1049 (1983)
- statutory obligation for complying with NEPA rests with the NRC Staff; LBP-19-2, 89 NRC 42 (2019)
- Edmond v. United States*, 520 U.S. 651, 657 (1997)
- where a specific provision conflicts with a general one, the specific governs; LBP-19-3, 89 NRC 309 n.38 (2019)
- EnergySolutions, LLC* (Radioactive Waste Import/Export Licenses), CLI-11-3, 73 NRC 613, 623 (2011)
- petitioners' standing claim was denied for failing to show there would be any impact from transport of radioactive materials to be imported; LBP-19-4, 89 NRC 367 n.70 (2019)
- Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-14, 71 NRC 449, 471 (2010)
- license renewal applicants need not address mitigation for issues designated Category 1; LBP-19-3, 89 NRC 280-81 (2019)

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- Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-15, 71 NRC 479, 482 (2010)  
scope of a contention is limited to issues of law and fact pled with particularity; LBP-19-4, 89 NRC 420 (2019)
- Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-22, 72 NRC 202, 208 (2010)  
environmental assessment is not intended to be a research document; LBP-19-2, 89 NRC 40 (2019); LBP-19-4, 89 NRC 460 (2019)
- Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-12-1, 75 NRC 39, 45-46 (2012)  
where a petition for review relies primarily on claims that the board erred in weighing the evidence in a merits decision, Commission seldom grants review; CLI-19-5, 89 NRC 336-37 (2019)
- Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-12-10, 75 NRC 479, 493 n.70 (2012)  
new and amended contentions must be based on new facts not previously available; LBP-19-4, 89 NRC 374 (2019)
- Entergy Nuclear Operations, Inc.* (Indian Point, Unit 2), CLI-16-5, 83 NRC 131, 136 (2016)  
failure to comply with any admissibility requirement renders a contention inadmissible; LBP-19-3, 89 NRC 260 (2019); LBP-19-4, 89 NRC 373 (2019)
- Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 and 3), CLI-11-14, 74 NRC 801, 811-12 (2011)  
where board granted summary disposition in favor of intervenors on NEPA contention, neither potential board error nor need for NRC Staff to perform potentially unnecessary analysis in the environmental impact statement presented a compelling case for interlocutory review; CLI-19-5, 89 NRC 333 n.20 (2019)
- Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 and 3), CLI-11-14, 74 NRC 801, 813 (2011)  
NEPA is a procedural statute; CLI-19-1, 89 NRC 12 (2019)
- Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 and 3), CLI-15-6, 81 NRC 340, 354-55 (2015)  
Commission generally defers to board's judgment as to whether a proposed contention has a sufficient factual basis to be admitted; CLI-19-5, 89 NRC 336 (2019)
- Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 and 3), CLI-15-6, 81 NRC 340, 356 (2015)  
guidance documents that are developed to assist in compliance with applicable regulations are entitled to special weight; LBP-19-3, 89 NRC 271 n.41 (2019)  
special weight is accorded to regulatory guides; LBP-19-3, 89 NRC 271 (2019)
- Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), CLI-07-3, 65 NRC 13, 16 (2007)  
petitioner raising a challenge to a Category 1 in license renewal proceedings has to meet requirements for a rule waiver in addition to contention admissibility requirements in 10 C.F.R. 2.309; LBP-19-3, 89 NRC 312-13 (2019)
- Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), CLI-07-3, 65 NRC 13, 18 n.15 (2007)  
challenge to a Category 1 issue is not admissible because petitioners have failed to seek a rule waiver; LBP-19-3, 89 NRC 290-91 (2019)
- Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), CLI-16-12, 83 NRC 542, 558 (2016)  
Commission direction to NRC Staff generally is not reviewable in an NRC adjudication but such a petition may be considered discretionarily; CLI-19-5, 89 NRC 341 n.60 (2019)
- Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), CLI-16-17, 84 NRC 99, 123-24 (2016)  
if impacts of a planned decommissioning activity are not enveloped by previous environmental impact analyses, licensee seeking to undertake the activity should submit a license amendment request, together with a supplemental environmental report evaluating the additional impacts; CLI-19-6, 89 NRC 480 (2019)

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- Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), CLI-16-17, 84 NRC 99, 124 (2016)  
in evaluating a license amendment request for a decommissioning activity not enveloped by previous environmental impact analyses, NRC Staff would prepare either an environmental assessment or an environmental impact statement; CLI-19-6, 89 NRC 480 (2019)
- Entergy Operations, Inc.* (River Bend Station, Unit 1), LBP-18-1, 87 NRC 1, 7 n.4 (2018)  
applying the proximity presumption to reactor license renewal proceedings not only satisfies contemporaneous judicial concepts of standing, it provides clarity for litigants and licensing boards, thereby promoting efficiency in the adjudicatory process; LBP-19-3, 89 NRC 259 (2019); LBP-19-5, 89 NRC 490-91 (2019)
- Exelon Generation Co. LLC* (Early Site Permit for Clinton ESP Site), CLI-05-29, 62 NRC 801, 811 (2005)  
if there are alleged omissions in the environmental analysis, in an NRC adjudication it is intervenors' burden to show their significance and materiality; LBP-19-4, 89 NRC 460 (2019)
- Exelon Generation Co., LLC* (Limerick Generating Station, Units 1 and 2), CLI-12-19, 76 NRC 377, 384 (2012)  
new and significant information requirement of 10 C.F.R. 51.53(c)(3)(iv) does not override, for purposes of litigating issues in an adjudicatory proceeding, the exclusion of Category 1 issues in 10 C.F.R. 51.53(c)(3)(i) from site-specific review, but a rule waiver is required; LBP-19-3, 89 NRC 294 n.73 (2019)
- Exelon Generation Co., LLC* (Limerick Generating Station, Units 1 and 2), CLI-12-19, 76 NRC 377, 384, 386 (2012)  
in license renewal adjudicatory proceedings, petitioner raising a challenge to a Category 1 issue has to meet the requirements for a waiver petition in addition to the contention admissibility requirements in 10 C.F.R. 2.309; LBP-19-3, 89 NRC 312-13 (2019)
- Exelon Generation Co., LLC* (Limerick Generating Station, Units 1 and 2), CLI-13-7, 78 NRC 199, 203 (2013)  
belated opportunity to submit a waiver petition was offered after resolving an apparent ambiguity in the license renewal regulations; LBP-19-3, 89 NRC 313 n.58 (2019)
- Exelon Generation Co., LLC* (Limerick Generating Station, Units 1 and 2), CLI-13-7, 78 NRC 199, 216 (2013)  
NRC has a continuing duty to take a hard look at new and significant information for each major federal action; LBP-19-3, 89 NRC 307 (2019)
- Exelon Generation Co., LLC* (Limerick Generating Station, Units 1 and 2), LBP-12-8, 75 NRC 539, 547, *rev'd in part on other grounds*, CLI-12-19, 76 NRC 377 (2012)  
in applying the 50-mile proximity presumption in reactor license renewal proceedings, licensing boards have reasoned that renewal allows operation of a reactor over an additional period of time during which the reactor could be subject to the same equipment failures and personnel errors as during operations over the original period of the license; LBP-19-3, 89 NRC 258 (2019)  
licensing boards routinely have applied the 50-mile proximity presumption in power reactor license renewal proceedings; LBP-19-3, 89 NRC 258 (2019); LBP-19-5, 89 NRC 490 (2019)
- Exxon Nuclear Co., Inc.* (Nuclear Fuel Recovery and Recycling Center), ALAB-447, 6 NRC 873, 878 (1977)  
elementary canon of construction is that federal statutes cannot be interpreted to negate their own stated purposes; LBP-19-3, 89 NRC 266 (2019)
- Exxon Nuclear Co., Inc.* (Nuclear Fuel Recovery and Recycling Center), LBP-77-59, 6 NRC 518, 520 (1977)  
assertion of injury from spent fuel that would travel on railway track very near property was insufficient to establish standing; LBP-19-4, 89 NRC 367 n.71 (2019)
- Fansteel, Inc.* (Muskogee, Oklahoma Site), CLI-03-13, 58 NRC 195, 203 (2003)  
although petitioner need not prove its contention at the admission stage, mere notice pleading of proffered contentions is insufficient; LBP-19-4, 89 NRC 373 (2019)  
neither mere speculation nor bare or conclusory assertions, even by an expert, alleging that a matter should be considered will suffice to allow the admission of a proffered contention; LBP-19-4, 89 NRC 407, 408, 411 (2019)

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- Fansteel, Inc.* (Muskogee, Oklahoma Site), CLI-03-13, 58 NRC 195, 205 (2003)  
petitioner claiming that financial data are either inaccurate or insufficient must identify each failure and explain why the data are flawed; CLI-19-6, 89 NRC 474 (2019)
- FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (2009)  
Administrative Procedure Act's mandate that agencies use the same procedures when they amend or repeal a rule as they used to issue the rule in the first instance is discussed; LBP-19-3, 89 NRC 304 n.6 (2019)  
agency must provide more substantial justification when its new policy rests on factual findings that contradict those that underlay its prior policy, or when its prior policy has engendered serious reliance interests in the written regulation that must be taken into account; LBP-19-3, 89 NRC 312-13 (2019)
- Fed. Express Corp. v. Holowecki*, 552 U.S. 389 (2008)  
in limiting the scope of a regulatory provision in the face of regulatory silence, the Court conducted a holistic analysis that considered regulatory structure, agency's interpretative rules, and administrative efficiency, logic, and practicality; LBP-19-3, 89 NRC 265 (2019)
- Fed. Express Corp. v. Holowecki*, 552 U.S. 389, 393 (2008)  
language of the statute and implementing regulations left some room for interpretation; LBP-19-3, 89 NRC 305 (2019)
- Fed. Express Corp. v. Holowecki*, 552 U.S. 389, 399 (2008)  
agency's interpretative statements reflect a body of experience and informed judgment to which courts and litigants may properly resort for guidance, and as such, they are entitled to a measure of respect; LBP-19-3, 89 NRC 271 (2019)  
special weight accorded to regulatory guides recognizes that it reflects a body of experience and informed judgment developed by the NRC Staff; LBP-19-3, 89 NRC 271 (2019)
- Fed. Express Corp. v. Holowecki*, 552 U.S. 389, 399-400 (2008)  
in assessing the deference to be accorded to an interpretative rule, a tribunal should consider whether the agency has applied its position with consistency; LBP-19-3, 89 NRC 271 n.43 (2019)
- FirstEnergy Nuclear Operating Co.* (Davis-Besse Nuclear Power Station, Unit 1), CLI-12-8, 75 NRC 393, 396 (2012)  
contention admissibility rules properly reserve the hearing process for genuine, material controversies between knowledgeable litigants; LBP-19-4, 89 NRC 373 (2019)
- Florida Power & Light Co.* (St. Lucie Nuclear Power Plant, Unit 1), LBP-88-10A, 27 NRC 452, 454-55 (1988), *aff'd*, ALAB-893, 27 NRC 627 (1988)  
proximity-based standing of individual living within 10 miles of spent fuel pools has been allowed; LBP-19-4, 89 NRC 365 n.58 (2019)
- Florida Power & Light Co.* (St. Lucie Nuclear Power Plant, Units 1 and 2), CLI-89-21, 30 NRC 325, 329-30 (1989)  
where there is obvious potential for offsite consequences, NRC routinely grants standing to petitioners who reside within a certain distance from the power reactor under the proximity presumption, effectively dispensing with a petitioner's need to make an affirmative showing of injury, causation, and redressability; LBP-19-5, 89 NRC 490 (2019)
- Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-91-13, 34 NRC 185, 188 n.1, 190-91 (1991)  
when petitioner withdraws its petition in a contested proceeding and there are no petitions remaining, NRC terminates the proceeding; CLI-19-4, 89 NRC 242-43 n.9 (2019)
- Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-01-17, 54 NRC 3, 7-8 (2001)  
power reactor license renewal applicants must demonstrate how their programs and procedures will manage the effects of aging on power reactor structures, systems, and components; LBP-19-5, 89 NRC 493 (2019)
- Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-01-17, 54 NRC 3, 9-10 (2001)  
scope of safety issues that may be considered in an operating license renewal proceeding is limited; LBP-19-5, 89 NRC 493 (2019)

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- Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-01-17, 54 NRC 3, 11 (2001)  
applicant is not required to include an analysis of impacts of subsequent license renewal operation for Category 1 issues because they have been determined to be similar for all plants and are not required to be evaluated in a plant-specific analysis; LBP-19-5, 89 NRC 501 (2019)  
Category 1 issues are NEPA-related issues that could be addressed generically, i.e., applied to all plants, and Category 2 issues are those that need to be determined on a plant-by-plant basis; LBP-19-3, 89 NRC 262 (2019)  
environmental report must address any new and significant information regarding environmental impacts, of which the applicant is aware, that might render NRC's generic Category 1 determinations incorrect in that proceeding; LBP-19-3, 89 NRC 264 (2019)
- Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-01-17, 54 NRC 3, 12 (2001)  
NRC Staff's steps in preparation of an environmental impact statement are described; LBP-19-3, 89 NRC 262 (2019)
- Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-01-17, 54 NRC 3, 12, 23 n.14 (2001)  
any member of the public can petition the agency for a rulemaking proceeding for the purpose of changing the GEIS findings; LBP-19-3, 89 NRC 263 n.29 (2019)
- Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-01-17, 54 NRC 3, 22-23 (2001)  
in license renewal adjudicatory proceedings, petitioner raising a challenge to a Category 1 issue has to meet the requirements for a waiver petition in addition to the contention admissibility requirements in 10 C.F.R. 2.309; LBP-19-3, 89 NRC 312-13 (2019)
- Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-15-25, 82 NRC 389, 394 (2015)  
intervention petition is construed in favor of petitioner when standing is determined; LBP-19-4, 89 NRC 363 (2019)  
NRC applies contemporaneous judicial concepts of standing that require petitioner to allege an injury in fact that is fairly traceable to the challenged action and is likely to be redressed by a favorable decision; LBP-19-3, 89 NRC 257-58 (2019)  
NRC applies contemporaneous judicial concepts of standing to determine whether petitioner has a sufficient interest; LBP-19-4, 89 NRC 363 (2019)
- Florida Power & Light Co.* (Turkey Point Nuclear Generating Units 3 and 4), CLI-16-18, 84 NRC 167, 174-75 n.38 (2016)  
applicant's past violations, standing alone, do not constitute sufficient information to raise a genuine dispute with the assumption that the state will enforce, and applicant will comply with, the legally mandated mitigation measures in the permits; LBP-19-3, 89 NRC 283 (2019)
- Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), LBP-90-5, 31 NRC 73, 79 (1990)  
previously available information that is newly interpreted by the petitioner does not constitute good cause to file a new contention; LBP-19-4, 89 NRC 424 n.464 (2019)
- Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), LBP-01-6, 53 NRC 138, 150, *aff'd on other grounds*, CLI-01-17, 54 NRC 3 (2001)  
Commission implicitly endorsed application of the proximity presumption in reactor license renewal proceedings; LBP-19-3, 89 NRC 258 (2019); LBP-19-5, 89 NRC 490 (2019)
- Florida Power & Light Co.* (Turkey Point Nuclear Generating Units 3 and 4), LBP-19-3, 89 NRC 245, 258 (2019)  
fifty-mile proximity presumption has been applied in a recent subsequent license renewal proceeding; LBP-19-5, 89 NRC 491 (2019)
- Florida Power & Light Co.* (Turkey Point Nuclear Generating Units 3 and 4), LBP-19-3, 89 NRC 245, 258-59 (2019)  
applying the proximity presumption to reactor license renewal proceedings not only satisfies contemporaneous judicial concepts of standing, but also provides clarity for litigants and licensing boards, thereby promoting efficiency in the adjudicatory process; LBP-19-5, 89 NRC 490-91 (2019)

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- Florida Power & Light Co.* (Turkey Point Units 6 and 7), LBP-17-6, 86 NRC 37, 48, *aff'd*, CLI-17-12, 86 NRC 215 (2017)  
“materially different” in context of late-filed contention concerns the type or degree of difference between the new information and previously available information; LBP-19-4, 89 NRC 374 n.117 (2019); LBP-19-5, 89 NRC 495-96 (2019)
- Georgia Institute of Technology* (Georgia Tech Research Reactor, Atlanta, Georgia), CLI-95-12, 42 NRC 111, 115 (1995)  
NRC applies contemporaneous judicial concepts of standing, requiring a showing of concrete and particularized injury that is fairly traceable to the challenged action and is likely to be redressed by a favorable decision; LBP-19-5, 89 NRC 490 (2019)  
petitioner bears the burden of establishing standing, but licensing boards are to evaluate petitioner’s standing, construing the petition in favor of the petitioner; LBP-19-5, 89 NRC 489 (2019)
- Georgia Institute of Technology* (Georgia Tech Research Reactor, Atlanta, Georgia), CLI-95-12, 42 NRC 111, 116-17 (1995)  
proximity-plus standard is applied on a case-by-case basis, taking into account the nature of the proposed action and the significance of the radioactive source; LBP-19-4, 89 NRC 364 (2019)
- Griffin v. Oceanic Contractors, Inc.*, 458 U.S. 564, 575 (1982)  
court declined to ignore the plain language of a statute, observing that it has refused to nullify statutes, however hard or unexpected the particular effect; LBP-19-3, 89 NRC 310 (2019)  
interpretations of a statute that would produce absurd results are to be avoided if alternative interpretations consistent with the legislative purpose are available; LBP-19-3, 89 NRC 272 n.45 (2019)  
laws enacted with good intention, when put to the test, frequently, and to the surprise of the law maker himself, turn out to be mischievous, absurd, or otherwise objectionable, but in such case, the remedy lies with the law-making authority, and not with the courts; LBP-19-3, 89 NRC 310 (2019)
- Griffin v. Oceanic Contractors, Inc.*, 458 U.S. 564, 576 (1982)  
remedy for dissatisfaction with the results of applying section 51.53(c)(3) according to its plain text lies with the NRC in its rulemaking authority, not the board; LBP-19-3, 89 NRC 310 (2019)
- Honeywell International, Inc.* (Metropolis Works Uranium Conversion Facility), CLI-13-1, 77 NRC 1, 18-19 (2013)  
Commission defers to the board’s findings with respect to the facts in a merits decision unless the findings are clearly erroneous; CLI-19-5, 89 NRC 336 (2019)
- Hornel v. Helvering*, 312 U.S. 552, 556 (1941)  
where a party refrains from advancing an argument, that argument is deemed to be waived; LBP-19-3, 89 NRC 276 n.51 (2019)
- Houston Lighting & Power Co.* (South Texas Project, Units 1 and 2), ALAB-799, 21 NRC 360, 382 (1985)  
when petitioner withdraws its petition in a contested proceeding and there are no petitions remaining, NRC terminates the proceeding; CLI-19-4, 89 NRC 242-43 n.9 (2019)
- Houston Lighting and Power Co.* (South Texas Project, Units 1 and 2), CLI-82-9, 15 NRC 1363, 1365-67 (1982)  
NRC regulation pertaining to disqualification of a judge does not describe what circumstances justify disqualification, and so licensing board members should look to standards that apply to federal judges; CLI-19-3, 89 NRC 238 (2019)
- Hunt v. Wash. State Apple Advert. Comm’n*, 432 U.S. 333, 343 (1977)  
organization seeking to intervene on behalf of its members may establish standing by showing that a member would individually meet standing requirements, interest represented by the organization is germane to its purpose, neither asserted claim nor requested relief requires the member to participate in the lawsuit, and the member has authorized the organization to represent his or her interest; LBP-19-5, 89 NRC 489-90 (2019)
- Hydro Resources, Inc.* (2929 Coors Road, Suite 101, Albuquerque, NM 87120), CLI-98-9, 47 NRC 326, 331 (1998)  
argument that a reasonable person might believe the presiding officer would be biased in favor of a party represented by a law firm with which the presiding officer had recently discussed, but had not been offered, employment was rejected; CLI-19-3, 89 NRC 238-39 n.10 (2019)

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- even where there is no actual conflict of interest, a judge should disqualify himself or herself where a reasonable person would question the judge's impartiality; CLI-19-3, 89 NRC 238 (2019)
- Hydro Resources, Inc.* (P.O. Box 15910, Rio Rancho, NM 87174), CLI-01-4, 53 NRC 31, 48-49 (2001)  
NRC is not in the business of regulating market strategies of licensees or determining whether market strategies warrant commencing operations; LBP-19-4, 89 NRC 381 (2019)
- Hydro Resources, Inc.* (P.O. Box 15910, Rio Rancho, NM 87174), CLI-01-4, 53 NRC 31, 53 (2001)  
even if an environmental assessment prepared by NRC Staff is found to be inadequate in certain respects, the board's findings, as well as the adjudicatory record, become, in effect, part of the final EA; LBP-19-2, 89 NRC 40 (2019)
- Ind. Mich. Power Co. v. U.S. Dep't of Energy*, 88 F.3d 1272, 1274 (D.C. Cir. 1996)  
DOE has no authority under the Nuclear Waste Policy Act to provide interim storage in the absence of a facility that has been authorized, constructed, and licensed in accordance with the NWPAA; LBP-19-4, 89 NRC 382 n.169 (2019)
- Ind. Mich. Power Co. v. U.S. Dep't of Energy*, 88 F.3d 1272, 1276-77 (D.C. Cir. 1996)  
when a permanent repository failed to materialize, the power plant licensees sued and began to recover from the federal government substantial damages to cover the cost of continuing to store spent fuel at their reactor sites; LBP-19-4, 89 NRC 376 (2019)
- International Uranium (USA) Corp.* (White Mesa Uranium Mill), CLI-01-18, 54 NRC 27, 32 (2001)  
licensing boards have regularly declined to find that a mere increase in the traffic of radioactive materials near a petitioner's residence, without more, constitutes an injury traceable to a licensing decision that primarily affects a site hundreds of miles away; LBP-19-4, 89 NRC 367-68 (2019)
- International Uranium (USA) Corp.* (White Mesa Uranium Mill), LBP-01-8, 53 NRC 204, *aff'd*, CLI-01-18, 54 NRC 27 (2001)  
standing was denied where petitioner resided merely one block from route over which applicant proposed to transport radioactive materials; LBP-19-4, 89 NRC 368 n.79 (2019)
- Kansas Gas & Electric Co.* (Wolf Creek Generating Station, Unit 1), LBP-84-17, 19 NRC 878, 886 (1984)  
previously available information that is newly acquired by the petitioner does not constitute good cause for late filing; LBP-19-4, 89 NRC 374 (2019)
- Kelley v. Selin*, 42 F.3d 1501, 1508 (6th Cir. 1995)  
petitioner bears the burden of establishing standing, but licensing boards are to evaluate petitioner's standing, construing the petition in favor of the petitioner; LBP-19-5, 89 NRC 489 (2019)
- Kleppe v. Sierra Club*, 427 U.S. 390, 410 (1976)  
neither NEPA nor NRC regulations require an environmental analysis of potential actions that are merely contemplated and have not been proposed; LBP-19-4, 89 NRC 441 (2019)
- Kleppe v. Sierra Club*, 427 U.S. 390, 410 n.21 (1976)  
NEPA requires agencies to take a hard look at environmental consequences of the proposed action; LBP-19-4, 89 NRC 375 (2019)
- Limerick Ecology Action, Inc. v. NRC*, 869 F.2d 719, 754-55 (3d Cir. 1989)  
NRC need not consider remote and highly speculative events in its environmental analysis; LBP-19-4, 89 NRC 375 (2019)
- Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-156, 6 AEC 831, 836 (1973)  
NEPA hard-look requirement is subject to a rule of reason in that consideration of environmental impacts need not address all theoretical possibilities, but rather only those that have some reasonable possibility of occurring; LBP-19-2, 89 NRC 40 (2019)
- Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-777, 20 NRC 21, 34 (1984)  
to provide a basis for disqualification of a judge, the prejudgment, or appearance of prejudgment, must relate to a factual dispute rather than a legal one; CLI-19-3, 89 NRC 239 (2019)
- Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-777, 20 NRC 21, 35 (1984)  
judges should not have preconceived beliefs about the facts, but it is not grounds for disqualification for a judge to have formed an opinion about the applicable law; CLI-19-3, 89 NRC 239 (2019)
- Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-900, 28 NRC 275, 288 (1988)  
all words in a regulation must be given full effect; LBP-19-3, 89 NRC 304 (2019)  
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- conflict with the plain meaning of the wording used in that regulation; LBP-19-3, 89 NRC 313 (2019)
- interpretation of any regulation must begin with the language and structure of the provision itself; LBP-19-3, 89 NRC 304 (2019)
- Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), CLI-97-15, 46 NRC 294 (1997)
- reasonable assurance of adequate decommissioning funding is discussed; LBP-19-4, 89 NRC 425-26 (2019)
- Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 87-88 (1998)
- federal agencies must take a hard look at the environmental impacts of a proposed action; LBP-19-2, 89 NRC 40 (2019)
- Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 88 (1998)
- NEPA hard-look requirement is intended to foster both informed decisionmaking and informed public participation so as to ensure that the agency does not act upon incomplete information, only to regret its decision after it is too late to correct; LBP-19-2, 89 NRC 40 (2019)
- Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 101 (1998)
- NEPA requires that NRC consider social and economic impacts ancillary to environmental impacts, i.e., environmental justice concerns; LBP-19-4, 89 NRC 454 (2019)
- Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 103 (1998)
- agencies are given broad discretion to keep their environmental impact inquiries within appropriate and manageable boundaries; LBP-19-2, 89 NRC 40 (2019)
- Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), LBP-96-25, 44 NRC 331, 339 (1996), *rev'd on other grounds*, CLI-97-15, 46 NRC 294 (1997)
- because NRC Staff relies heavily on applicant's environmental report in preparing the environmental assessment, should applicant become a proponent of a particular challenged position set forth in the EA, applicant also has the burden on that matter; LBP-19-2, 89 NRC 42 (2019)
- Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), LBP-97-8, 45 NRC 77 (1997), *aff'd in part, rev'd in part*, CLI-98-3, 47 NRC 77 (1998)
- site selection process to possess and use nuclear material must be free from discrimination against minority and low-income populations; LBP-19-4, 89 NRC 454 (2019)
- Louisiana Energy Services, L.P.* (National Enrichment Facility), CLI-05-20, 62 NRC 523, 536 (2005)
- NEPA does not call for certainty or precision when considering reasonably foreseeable impacts, but rather an estimate of anticipated, not unduly speculative, impacts; LBP-19-2, 89 NRC 40 (2019)
- NEPA does not necessitate certainty or precision nor does it mandate particular results from the agency; LBP-19-4, 89 NRC 375 (2019)
- NEPA requires only an estimate of anticipated, not unduly speculative, impacts from the agency; LBP-19-4, 89 NRC 375 (2019)
- Louisiana Energy Services, L.P.* (National Enrichment Facility), CLI-05-28, 62 NRC 721, 726 (2005)
- NRC is not in the business of regulating market strategies of licensees or determining whether market strategies warrant commencing operations; LBP-19-4, 89 NRC 381, 422 (2019)
- Louisiana Energy Services, L.P.* (National Enrichment Facility), LBP-05-13, 61 NRC 385, 404 (2005), *aff'd*, CLI-06-22, 64 NRC 37 (2006), *petition for review denied sub nom. Nuclear Info. & Res. Serv. v. NRC*, 509 F.3d 562 (D.C. Cir. 2007)
- board's ultimate NEPA judgments can be made on the basis of the entire adjudicatory record in addition to NRC Staff's final environmental assessment; LBP-19-2, 89 NRC 40 (2019)
- Lujan v. Defs. of Wildlife*, 504 U.S. 555, 561 (1992)
- NRC applies contemporaneous judicial concepts of standing, requiring a showing of concrete and particularized injury that is fairly traceable to the challenged action and is likely to be redressed by a favorable decision; LBP-19-5, 89 NRC 490 (2019)
- Marsh v. Or. Nat. Res. Council*, 490 U.S. 360, 371 (1989)
- NEPA hard-look requirement is intended to foster both informed decision-making and informed public participation so as to ensure that the agency does not act upon incomplete information, only to regret its decision after it is too late to correct; LBP-19-2, 89 NRC 40 (2019)
- preparation of an environmental impact statement is meant to ensure that federal agencies will not act on incomplete information, only to regret their decision after it is too late to correct; LBP-19-4, 89 NRC 375 (2019)



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- Marsh v. Or. Nat. Res. Council*, 490 U.S. 360, 374 (1989)  
NRC has a continuing duty to take a hard look at new and significant information for each major federal action; LBP-19-3, 89 NRC 307 (2019)
- Massachusetts v. NRC*, 522 F.3d 115, 119 (1st Cir. 2008)  
Category 1 issues are NEPA-related issues that could be addressed generically, i.e., applied to all plants, and Category 2 issues are those that needed to be determined on a plant-by-plant basis; LBP-19-3, 89 NRC 262 (2019)  
preparing an environmental impact statement that considers all of the significant environmental issues relevant to the renewal of a nuclear power plant license on a site-specific basis is a demanding and time-consuming task; LBP-19-3, 89 NRC 261 (2019)
- Massachusetts v. NRC*, 522 F.3d 115, 120 (1st Cir. 2008)  
all NEPA issues for license renewal of nuclear power plants are listed in 10 C.F.R. Part 51, Subpart A, Appendix B and assigned to either Category 1 or Category 2; LBP-19-3, 89 NRC 262 (2019)  
although preparing an EIS that complies with NEPA is ultimately NRC's responsibility, the process actually begins with the license renewal applicant; LBP-19-5, 89 NRC 495 (2019)  
because Category 1 issues have been addressed and codified in Part 51, they cannot be litigated in individual adjudications, such as license renewal proceedings for individual plants; LBP-19-3, 89 NRC 262 n.29 (2019)  
divergent treatment of generic and site-specific issues is reasonable and consistent with the purpose of promoting efficiency in handling license renewal decisions; LBP-19-3, 89 NRC 263 n.29 (2019)  
NRC Staff reviews applicant's environmental report and draws upon it to produce a draft supplemental EIS; LBP-19-3, 89 NRC 263 (2019); LBP-19-5, 89 NRC 495 (2019)  
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- Massachusetts v. NRC*, 522 F.3d 115, 120-21 (1st Cir. 2008)  
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- Massachusetts v. NRC*, 708 F.3d 63, 67 (1st Cir. 2013)  
although NEPA requires NRC to take a hard look at environmental consequences of major federal actions, it seeks to guarantee process, not specific outcomes; LBP-19-3, 89 NRC 261, 296 (2019); LBP-19-4, 89 NRC 375 (2019); LBP-19-5, 89 NRC 494 (2019)
- Me. Yankee Atomic Power Co. v. United States*, 225 F.3d 1336, 1341-42 (Fed. Cir. 2000)  
when a permanent repository failed to materialize, the power plant licensees sued and began to recover from the federal government substantial damages to cover the cost of continuing to store spent fuel at their reactor sites; LBP-19-4, 89 NRC 376 (2019)
- N. States Power Co. v. U.S. Dep't of Energy*, 128 F.3d 754, 756 (D.C. Cir. 1997)  
DOE takes the position that it lacks statutory authority under the Nuclear Waste Policy Act to provide interim storage; LBP-19-4, 89 NRC 382 n.169 (2019)
- N.J. Dep't of Envtl. Prot. v. NRC*, 561 F.3d 132 (3d Cir. 2009)  
for all licensing actions outside the Ninth Circuit, terrorist attacks are too far removed from the natural or expected consequences of agency action to require environmental analysis; LBP-19-4, 89 NRC 448 (2019)
- N.Y. State Dep't of Social Servs. v. Dublino*, 413 U.S. 405, 419-20 (1973)  
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- Nat. Res. Def. Council v. Morton*, 458 F.2d 827, 834 (D.C. Cir. 1972)  
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- Nat. Res. Def. Council v. NRC*, 823 F.3d 641, 643 (D.C. Cir. 2016)  
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- Nat. Res. Def. Council v. NRC*, 879 F.3d 1202 (D.C. Cir. 2018)  
“no harm, no foul” rationale has been utilized in remand without vacatur of the underlying agency action; CLI-19-1, 89 NRC 5 (2019)
- Nat. Res. Def. Council v. NRC*, 879 F.3d 1202, 1209-13 (2018)  
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- Nat. Res. Def. Council v. NRC*, 879 F.3d 1202, 1211-12 (D.C. Cir. 2018)  
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court has sometimes regarded deviations from NEPA as harmless when an agency subsequently completed a comprehensive environmental review before the matter reached the circuit court; CLI-19-1, 89 NRC 7 n.31 (2019)
- Nat. Res. Def. Council v. NRC*, 879 F.3d 1202, 1212 (D.C. Cir. 2018)  
it would be preferable for the final environmental impact statement to contain all relevant information and the record of decision to be complete and adequate before the license is issued; CLI-19-1, 89 NRC 12 (2019)
- Nat’l Ass’n of Regulatory Util. Comm’rs v. U.S. Dep’t of Energy*, 736 F.3d 517, 520 (D.C. Cir. 2013)  
contract damage lawsuits under the NWPA are now commonplace, and the federal government pays out damages to power reactor licensees on a regular basis; LBP-19-4, 89 NRC 376 (2019)  
when a permanent repository failed to materialize, the power plant licensees sued and began to recover from the federal government substantial damages to cover the cost of continuing to store spent fuel at their reactor sites; LBP-19-4, 89 NRC 376 (2019)
- Nat’l Small Shipment Traffics Conference, Inc. v. Interstate Commerce Comm’n*, 725 F.2d 1442, 1450 (D.C. Cir. 1984)  
board declines to base its regulatory analysis on the notion that the NRC might engage in administrative misconduct in future adjudicatory proceedings; LBP-19-3, 89 NRC 276 (2019)
- New York v. NRC*, 681 F.3d 471 (D.C. Cir. 2012)  
contention that environmental report must consider all potential impacts if consolidated interim storage ultimately continues to operate beyond the design life and service life is inadmissible; LBP-19-4, 89 NRC 394 (2019)
- New York v. NRC*, 681 F.3d 471, 473 (D.C. Cir. 2012)  
NRC developed its Continued Storage Rule and Generic Environmental Impact Statement as a response to ruling that NRC inadequately performed its NEPA evaluation by not considering the environmental effects of failing to secure permanent storage; LBP-19-4, 89 NRC 389 (2019)
- New York v. NRC*, 681 F.3d 471, 478 (D.C. Cir. 2012)  
contention that agency must address the alternative of a permanent repository never being developed is not admissible; LBP-19-4, 89 NRC 388-89 (2019)
- New York v. NRC*, 681 F.3d 471, 478-79, 483 (D.C. Cir. 2012), *petition for review denied*, 824 F.3d 1012 (D.C. Cir. 2016)  
generic analysis must be forward looking and have enough breadth to support the Commission’s conclusions; LBP-19-3, 89 NRC 314-15 n.63 (2019)
- NextEra Energy Seabrook LLC* (Seabrook Station, Unit 1), CLI-12-5, 75 NRC 301, 332 (2012)  
Commission does not expect a litigant to merely reference large portions of material where doing so would force a tribunal to sift through it in search of asserted factual support; LBP-19-3, 89 NRC 290 n.67 (2019)  
merely referencing a report that does not identify specific portions of the license application does not comply with NRC’s specificity requirements; LBP-19-4, 89 NRC 450 (2019)
- Nieves-Villanueva v. Soto-Rivera*, 133 F.3d 92, 99-100 (1st Cir. 1997)  
exception to excluding expert testimony on purely legal issues is for questions of foreign law; LBP-19-2, 89 NRC 33 n.11 (2019)
- NLRB v. Sw. Gen., Inc.*, 580 U.S. \_\_\_, \_\_\_, 137 S. Ct. 929, 940 (2017)  
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- force of the *expressio unius* canon in a particular case, like the force of any negative implication, depends on context; LBP-19-3, 89 NRC 273 (2019)
- North Atlantic Energy Service Corp.* (Seabrook Station, Unit 1), CLI-99-6, 49 NRC 201, 219 (1999)  
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- Northeast Nuclear Energy Co.* (Millstone Nuclear Power Station, Unit 3), CLI-01-10, 53 NRC 353, 361 (2001)  
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- Northeast Nuclear Energy Co.* (Millstone Nuclear Power Station, Unit 3), LBP-00-2, 51 NRC 25, 27-28 (2000)  
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licensing board found standing based on part-time residence, even though the part-time residence was five times as distant (10 miles) from the storage facility, and the facility itself was a small fraction of the size to which the facility may grow; LBP-19-4, 89 NRC 369 (2019)
- Northeast Nuclear Energy Co.* (Millstone Nuclear Power Station, Unit 3), LBP-00-2, 51 NRC 25, 28 (2000)  
standing was granted to individual with part-time residence located 10 miles from spent fuel pool; LBP-19-4, 89 NRC 365 n.58 (2019)
- Northern States Power Co.* (Pathfinder Atomic Plant), LBP-90-3, 31 NRC 40, 43 (1990)  
mere fact that additional radioactive waste will be transported if NRC licenses a project does not ipso facto establish a reasonable opportunity for an accident or for radioactive materials to escape because of accident or nature of the substance being transported; LBP-19-4, 89 NRC 368 (2019)
- Northern States Power Co.* (Pathfinder Atomic Plant), LBP-90-3, 31 NRC 40, 43-44 (1990)  
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- Northern States Power Co.* (Pathfinder Atomic Plant), LBP-90-3, 31 NRC 40, 45 (1990)  
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- Northern States Power Co.* (Tyrone Energy Park, Unit 1), ALAB-464, 7 NRC 372, 375 (1978)  
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- NRDC & Powder River Basin Res. Council v. NRC*, 879 F.3d 1202, 1210-12 (D.C. Cir. 2018)  
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- Nuclear Energy Inst. v. EPA*, 373 F.3d 1251, 1257 (D.C. Cir. 2004)  
spent fuel disposition has vexed scientists, Congress, and regulatory agencies for the last half-century; LBP-19-4, 89 NRC 359 (2019)
- Nuclear Fuel Services, Inc.* (Erwin, Tennessee), CLI-04-13, 59 NRC 244, 248 (2004)  
because no obvious potential for harm from an independent spent fuel storage facility exists, petitioners have the burden to show specific and plausible means for how the proposed action will affect them; LBP-19-4, 89 NRC 364 (2019)  
conclusory allegations about potential radiological harm are not sufficient to establish standing; LBP-19-4, 89 NRC 364 (2019)
- Nuclear Management Co.* (Palisades Nuclear Plant), LBP-06-10, 63 NRC 314, 341, *aff'd*, CLI-06-17, 63 NRC 727 (2006)  
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- Oglala Sioux Tribe v. NRC*, 896 F.3d 520, 523 (D.C. Cir. 2018)  
National Environmental Policy Act does not permit an agency to act first and comply later or to condition performance of its obligation on a showing of irreparable harm; CLI-19-1, 89 NRC 12 (2019)
- Oglala Sioux Tribe v. NRC*, 896 F.3d 520, 532 (D.C. Cir. 2018)  
NEPA requirement that a detailed environmental impact statement be made for a proposed action makes clear that agencies must take the required hard look before taking that action; CLI-19-1, 89 NRC 13 (2019)
- Oglala Sioux Tribe v. NRC*, 896 F.3d 520, 538 (D.C. Cir. 2018)  
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- Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-763, 19 NRC 571, 577 & n.22, *petition for review declined*, CLI-84-14, 20 NRC 285 (1984)  
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- Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-03-2, 57 NRC 19, 29 (2003)  
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- Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-11-11, 74 NRC 427, 443-44 (2011)  
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- Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-15-21, 82 NRC 295, 305 n.50 (2015)  
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- Pacific Gas and Electric Co.* (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), CLI-08-26, 68 NRC 509, 514 (2008)  
when the contemplated major federal action before an agency is not significantly affecting the quality of the human environment, an environmental assessment, with its accompanying finding of no significant impact, constitutes an agency's evaluation of the environmental effects of a proposed action; LBP-19-5, 89 NRC 494 n.43 (2019)
- Pacific Gas and Electric Co.* (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), CLI-11-11, 74 NRC 427, 443 (2011)  
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- Pacific Gas and Electric Co.* (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), LBP-02-23, 56 NRC 413, 428-29 (2002)  
although 35 miles is within the 50-mile proximity presumption that applies to licensing reactors, it is nearly twice the distance that any licensing board has found sufficient to support standing in a spent fuel storage case; LBP-19-4, 89 NRC 370 (2019)
- Pacific Gas and Electric Co.* (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), LBP-02-23, 56 NRC 413, 429 (2002)  
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- Pacific Gas and Electric Co.* (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), LBP-02-23, 56 NRC 413, 433-34 (2002)  
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- Pa'ina Hawaii, LLC*, CLI-10-18, 72 NRC 56, 73 (2010)  
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- Perez v. Mortg. Bankers Ass'n*, 575 U.S. \_\_\_, 135 S. Ct. 1199, 1206 (2015)  
because NRC promulgated section 51.53(c)(3) through notice-and-comment rulemaking, it must use the same procedure if it wants to amend or repeal the rule; LBP-19-3, 89 NRC 304 (2019)  
NRC must amend a regulation the same way in which the regulation was adopted, through the rulemaking process; LBP-19-3, 89 NRC 310 (2019)
- Perez v. Mortg. Bankers Ass'n*, 575 U.S. \_\_\_, \_\_\_, 135 S. Ct. 1199, 1209 (2015)  
Administrative Procedure Act contains a variety of constraints and remedies that serve to prevent agencies from taking improper shortcuts when revising their regulations; LBP-19-3, 89 NRC 276 (2019)  
agency must provide more substantial justification when its new policy rests on factual findings that contradict those that underlay its prior policy, or when its prior policy has engendered serious reliance interests in the written regulation that must be taken into account; LBP-19-3, 89 NRC 312 (2019)  
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- Platt v. Union Pac. R.R. Co.*, 99 U.S. 48, 58 (1878)  
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- Powertech (USA), Inc.* (Dewey-Burdock In Situ Uranium Recovery Facility), CLI-16-20, 84 NRC 219, 231 (2016)  
although it is NRC Staff's responsibility to comply with NEPA in its later-issued EIS, the board analyzes contentions challenging the environmental report now as if those contentions will migrate as challenges to NRC Staff's later-issued EIS; LBP-19-4, 89 NRC 376 (2019)  
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- PPL Bell Bend, LLC* (Bell Bend Nuclear Power Plant), CLI-10-7, 71 NRC 133, 138-39 (2010)  
in context of certain reactor licensing proceedings, Commission has expressly authorized the use of a proximity presumption that petitioner has standing if he or she resides, or otherwise has frequent contacts, within approximately 50 miles of the facility in question; LBP-19-3, 89 NRC 258 (2019)  
individuals who reside within, or have frequent contacts with, a geographic zone of potential harm are deemed to be the area within a 50-mile radius of the site; LBP-19-4, 89 NRC 364 (2019)  
where there is obvious potential for offsite consequences, NRC routinely grants standing to petitioners who reside within a certain distance from the power reactor under the proximity presumption, effectively dispensing with a petitioner's need to make an affirmative showing of injury, causation, and redressability; LBP-19-5, 89 NRC 490 (2019)
- PPL Susquehanna, LLC* (Susquehanna Steam Electric Station, Units 1 and 2), CLI-15-8, 81 NRC 500, 504 (2015)  
contention admissibility requirements are strict by design and intended to ensure that adjudicatory proceedings are triggered only by substantive safety or environmental issues, rooted in a reasonably specific factual or legal basis; CLI-19-6, 89 NRC 472 (2019)
- PPL Susquehanna, LLC* (Susquehanna Steam Electric Station, Units 1 and 2), CLI-15-8, 81 NRC 500, 506 (2015)  
pointing to responses to a request for additional information, without more, will rarely provide sufficient support for an admissible contention; LBP-19-4, 89 NRC 407 (2019)
- Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-98-7, 47 NRC 307, 311 (1998)  
Chief Administrative Judge may substitute board members, or replace an entire board, if necessary for workload reasons; CLI-19-3, 89 NRC 239 (2019)

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- Chief Judge of the Atomic Safety and Licensing Board Panel has broad authority to manage the Panel's docket efficiently, including such matters as splitting an adjudication between two boards; CLI-19-3, 89 NRC 238 (2019)
- Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-99-10, 49 NRC 318, 323 (1999)  
to demonstrate representational standing, an organization must show that at least one member would otherwise have standing to sue in his or her own right, has authorized representation of his or her interest which is germane to the organization's purpose, and neither the claim asserted nor the relief requested requires the member to participate in the adjudicatory proceeding; LBP-19-3, 89 NRC 259 (2019); LBP-19-5, 89 NRC 489-90 (2019)
- Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-99-10, 49 NRC 318, 325 (1999)  
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- Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-00-13, 52 NRC 23 (2000)  
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- Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-01-9, 53 NRC 232, 235 (2001)  
absent evidence to the contrary, NRC does not presume that a licensee will violate agency regulations wherever the opportunity arises; LBP-19-4, 89 NRC 422 n.453, 425 (2019)
- Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-01-22, 54 NRC 255, 264 (2001)  
while recognizing the guidance nature of standard review plans, the Commission has indicated that, having been developed to assist an applicant in complying with applicable regulations, such plans are entitled to special weight; LBP-19-2, 89 NRC 39-40 n.54 (2019)
- Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-02-25, 56 NRC 340, 347 (2002)  
purpose of NRC's environmental review is to inform the decisionmaking agency and the public of a broad range of environmental impacts that will result, with a fair degree of likelihood, from a proposed project, rather than to speculate about worst-case scenarios and how to prevent them; LBP-19-4, 89 NRC 388 (2019)
- Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-02-25, 56 NRC 340, 349 (2002)  
NEPA's hard-look mandate notwithstanding, the agency is not obliged to analyze every conceivable aspect of the project before it; LBP-19-4, 89 NRC 375 (2019)
- Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-02-25, 56 NRC 340, 352 (2002)  
NEPA does not require a worst-case analysis, which creates a distorted picture of a project's impacts and wastes agency resources; LBP-19-4, 89 NRC 375, 388 (2019)
- Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-03-8, 58 NRC 11, 26 (2003)  
Commission defers to the board's findings with respect to the facts in a merits decision unless the findings are clearly erroneous; CLI-19-5, 89 NRC 336 (2019)
- Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-04-22, 60 NRC 125, 136-37, 138 (2004)  
contention that applicant's policy of rejecting and returning canisters that have unacceptable external radioactive or structural damage will create potential exposure routes that pose radioactive contamination threats to the public, nuclear workers, and the environment is inadmissible; LBP-19-4, 89 NRC 444 (2019)
- Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-04-22, 60 NRC 125, 138-39 (2004)  
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- Progress Energy Florida, Inc.* (Levy County Nuclear Power Plant, Units 1 and 2), CLI-10-2, 71 NRC 27, 34 (2010)  
NRC Staff has the burden of proof on NEPA-based contentions; LBP-19-2, 89 NRC 42 (2019)
- Pub. Emp. for Envtl. Responsibility v. Hopper*, 827 F.3d 1077, 1084 (D.C. Cir. 2016)  
remand without vacatur of the underlying agency action required the agency to supplement the relevant environmental impact statement before the project moved forward; CLI-19-1, 89 NRC 5 n.19 (2019)
- Pub. Util. Comm'n v. FERC*, 900 F.2d 269, 282 (D.C. Cir. 1990)  
court upheld agency's issuance of a conditional approval before completing a hearing on environmental issues, based on agency not allowing that conditional approval to take effect until completion of the environmental hearing; CLI-19-1, 89 NRC 6 (2019)
- Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-471, 7 NRC 477, 489 n.8 (1978)  
because NRC Staff relies heavily on applicant's environmental report in preparing the environmental assessment, should applicant become a proponent of a particular challenged position set forth in the EA, applicant also has the burden on that matter; LBP-19-2, 89 NRC 42 (2019)
- Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-916, 29 NRC 434, 438 (1989)  
Chief Judge of the Atomic Safety and Licensing Board Panel has broad authority to manage the Panel's docket efficiently, including such matters as splitting an adjudication between two boards; CLI-19-3, 89 NRC 238 (2019)  
for the prospect that the judges may be overworked, the Chief Administrative Judge appoints members of each board and has the discretion to manage the boards if the complexity of the issues involved makes it expedient to do so; CLI-19-3, 89 NRC 239-40 (2019)
- Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-77-8, 5 NRC 503, 527 (1977)  
finding of environmental acceptability by a competent state authority pursuant to a thorough hearing is properly entitled to substantial weight in the conduct of NRC's own NEPA analysis; LBP-19-3, 89 NRC 282 (2019)
- Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989)  
NEPA requires agencies to take a hard look at environmental consequences of the proposed action; LBP-19-4, 89 NRC 375 (2019)
- Rubin v. United States*, 449 U.S. 424, 430 (1981)  
courts must presume that a legislature says in a statute what it means and means in a statute what it says; LBP-19-3, 89 NRC 304 n.4 (2019)  
when the words of a statute are unambiguous, judicial inquiry is complete; LBP-19-3, 89 NRC 304 n.4 (2019)
- S. Pac. Commc'ns Co. v. AT&T*, 740 F.2d 980, 990-91 (D.C. Cir. 1984)  
judges should not have preconceived beliefs about the facts, but it is not grounds for disqualification for a judge to have formed an opinion about the applicable law; CLI-19-3, 89 NRC 239 (2019)
- Sacramento Municipal Utility District* (Rancho Seco Nuclear Generating Station), CLI-94-2, 39 NRC 91, 93-94 (1994)  
mere expansion of issues due to admission of a contention rarely, if ever, warrants interlocutory review; CLI-19-5, 89 NRC 333 n.20 (2019)
- San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016, 1030 (9th Cir. 2006)  
it is unreasonable for NRC to categorically dismiss the possibility of terrorist attack on the storage installation as too remote and highly speculative to warrant consideration under NEPA; LBP-19-4, 89 NRC 448 (2019)
- San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016, 1032 (9th Cir. 2006)  
terrorist attacks are not so remote and highly speculative an environmental impact; LBP-19-4, 89 NRC 447 (2019)
- Sequoyah Fuels Corp. and General Atomics* (Gore, Oklahoma Site), CLI-94-12, 40 NRC 64, 75 n.22 (1994)  
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- presumption of standing based on geographic proximity is not confined solely to Part 50 reactor licenses, but is also applicable to materials cases where the potential for offsite consequences is obvious; LBP-19-4, 89 NRC 364 (2019)
- Shaw AREVA MOX Services, LLC* (Mixed Oxide Fuel Fabrication Facility), CLI-15-9, 81 NRC 512, 519 (2015)  
standard for showing clear error is deliberately high, requiring that petitioner must show that, in light of the record as a whole, the board's determination is not even plausible; CLI-19-5, 89 NRC 336 (2019)
- Shaw AREVA MOX Services, LLC* (Mixed Oxide Fuel Fabrication Facility), LBP-08-11, 67 NRC 460, 493 (2008)  
licensing boards have found 30 days from a triggering event for proffering a new or amended contention to be timely; LBP-19-4, 89 NRC 374 n.118, 419 (2019); LBP-19-5, 89 NRC 495 n.54 (2019)
- Shook v. D.C. Fin. Responsibility & Mgmt. Assistance Auth.*, 132 F.3d 775, 782 (D.C. Cir. 1998)  
analysis under the *expressio unius* principle will turn on whether, looking at the structure of the statute and perhaps its legislative history, one can be confident that a normal draftsman when he expressed the one thing would have likely considered the alternatives that are arguably precluded; LBP-19-3, 89 NRC 305 (2019)  
*expressio unius* canon is not an inflexible rule of law commanding that the mere mention of one thing means the exclusion of another but rather is used as a starting point in regulatory construction to ascertain intent of the drafter; LBP-19-3, 89 NRC 273 (2019)  
force of the *expressio unius* principle depends on context; LBP-19-3, 89 NRC 304-05 n.15 (2019)  
mention of one thing implies the exclusion of another; LBP-19-3, 89 NRC 273 (2019)  
sometimes Congress drafts statutory provisions that appear preclusive of other unmentioned possibilities without meaning to exclude the unmentioned ones; LBP-19-3, 89 NRC 265 n.32 (2019)  
whether the word "initial" in section 51.53(c)(3) necessarily excludes subsequent license renewals from the regulation's scope is a matter of Commission intent, to be determined by considering whether or not the Commission's mention of one thing does really necessarily, or at least reasonably, imply the preclusion of alternatives; LBP-19-3, 89 NRC 273 (2019)
- Sierra Club v. Marsh*, 976 F.2d 763, 767 (1st Cir. 1992)  
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- South Carolina Electric & Gas Co. and South Carolina Public Service Authority* (Virgil C. Summer Nuclear Station, Units 2 and 3), CLI-10-1, 71 NRC 1, 7 (2010)  
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- Southern California Edison Co.* (San Onofre Nuclear Generating Station, Units 2 and 3), CLI-13-9, 78 NRC 551 (2013)  
Commission will vacate unreviewed Board decisions when appellate review is cut short by mootness; CLI-19-5, 89 NRC 340 n.59 (2019)
- Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), CLI-07-17, 65 NRC 392, 395 (2007)  
whereas NRC hearings on safety issues concern adequacy of the license application, not NRC Staff's work, NRC hearings on NEPA issues focus entirely on adequacy of NRC Staff's work; LBP-19-2, 89 NRC 42 n.68 (2019)
- Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), LBP-07-3, 65 NRC 237, 253 (2007)  
neither mere speculation nor bare or conclusory assertions, even by an expert, alleging that a matter should be considered will suffice to allow the admission of a proffered contention; LBP-19-4, 89 NRC 407, 408, 411 (2019)



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- Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), LBP-07-3, 65 NRC 237, 259-61, 280 (2007)  
contention regarding dry cooling as a NEPA alternative in light of the sensitive biological resources affected was admissible; LBP-19-3, 89 NRC 284 (2019)
- Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), LBP-09-7, 69 NRC 613, 632 (2009), *petition for review denied*, CLI-10-5, 71 NRC 90 (2010)  
board's ultimate NEPA judgments can be made on the basis of the entire adjudicatory record in addition to NRC Staff's final environmental assessment; LBP-19-2, 89 NRC 40 (2019)  
even if an environmental assessment prepared by NRC Staff is found to be inadequate in certain respects, the board's findings, as well as the adjudicatory record, become, in effect, part of the final EA; LBP-19-2, 89 NRC 40 (2019)
- Southern Nuclear Operating Co.* (Vogtle Electric Generating Plant, Units 3 and 4), CLI-09-16, 70 NRC 33, 35 (2009)  
Commission defers to boards on issues of contention admissibility unless the board made an error of law or abused its discretion; CLI-19-5, 89 NRC 336 (2019)
- Southern Nuclear Operating Co.* (Vogtle Electric Generating Plant, Units 3 and 4), CLI-12-2, 75 NRC 63, 122 (2012)  
although NRC amended the regulation in 2007 to include combined licenses, section 51.53(c)(3) is limited to license holders as of June 30, 1995, at which time no combined license had been issued, thereby precluding its use for those licensees; LBP-19-3, 89 NRC 314 n.62 (2019)
- Southern Nuclear Operating Co.* (Vogtle Electric Generating Plant, Units 3 and 4), LBP-16-5, 83 NRC 259, 281 (2016)  
vague allegations will not support admission of contentions; LBP-19-4, 89 NRC 440 (2019)
- Strata Energy, Inc.* (Ross In Situ Uranium Recovery Project), CLI-16-13, 83 NRC 566, 570-71 (2016), *petition for review denied sub nom. Nat. Res. Def. Council v. NRC*, 879 F.3d 1202 (2018)  
new in situ uranium recovery facility license application triggers preparation of an environmental impact statement; LBP-19-2, 89 NRC 36 n.34 (2019)
- Strata Energy, Inc.* (Ross In Situ Uranium Recovery Project), CLI-16-13, 83 NRC 566, 573 (2016), *aff'd sub nom. NRDC & Powder River Basin Res. Council v. NRC*, 879 F.3d 1202 (D.C. Cir. 2018)  
where a petition for review relies primarily on claims that the board erred in weighing the evidence in a merits decision, Commission seldom grants review; CLI-19-5, 89 NRC 336 (2019)
- Strata Energy, Inc.* (Ross In Situ Uranium Recovery Project), CLI-16-13, 83 NRC 566, 577 (2016), *petition for review denied sub nom., Nat. Res. Def. Council v. NRC*, 879 F.3d 1202 (D.C. Cir. 2018)  
neither NEPA nor NRC regulations require an environmental analysis of potential actions that are merely contemplated and have not been proposed; LBP-19-4, 89 NRC 441 (2019)
- Strata Energy, Inc.* (Ross In Situ Uranium Recovery Project), CLI-16-13, 83 NRC 566, 583-84 (2016), *petition for review denied sub nom. Nat. Res. Def. Council*, 879 F.3d 1202, 1214 (2018)  
it is at best questionable that water quality data should be obtained before in situ recovery operations begin; LBP-19-2, 89 NRC 126 (2019)
- Strata Energy, Inc.* (Ross In Situ Uranium Recovery Project), CLI-16-13, 83 NRC 566, 586 (2016), *aff'd sub nom. NRDC & Powder River Basin Res. Council v. NRC*, 879 F.3d 1202 (D.C. Cir. 2018)  
mere disagreement on how the board weighed conflicting evidence does not raise a substantial question for Commission review; CLI-19-5, 89 NRC 350 (2019)
- Strata Energy, Inc.* (Ross In Situ Uranium Recovery Project), CLI-16-13, 83 NRC 566, 595 (2016), *aff'd sub nom. NRDC & Powder River Basin Res. Council v. NRC*, 879 F.3d 1202 (D.C. Cir. 2018)  
board's hearing, hearing record, and subsequent decision on a contested environmental record augment the environmental record of decision developed by NRC Staff; CLI-19-5, 89 NRC 341 (2019)
- Strata Energy, Inc.* (Ross In Situ Recovery Uranium Project), LBP-12-3, 75 NRC 164, 186 (2012)  
petitioner is allowed some latitude to supplement or cure a standing showing in its reply pleading as long as any additional arguments are supported by a supplemental affidavit; LBP-19-4, 89 NRC 369 n.80 (2019)

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- Town of Winthrop v. FAA*, 535 F.3d 1, 4 (1st Cir. 2008)  
although NEPA requires NRC to take a hard look at environmental consequences of major federal actions, it seeks to guarantee process, not specific outcomes; LBP-19-5, 89 NRC 494 (2019)
- Town of Winthrop v. FAA*, 535 F.3d 1, 13 (1st Cir. 2008)  
environmental assessment is not intended to be a research document; LBP-19-2, 89 NRC 40 (2019)
- Transnuclear, Inc.* (Export of 93.15% Enriched Uranium), CLI-94-1, 39 NRC 1, 6 (1994)  
export license hearing petitioners have not shown that they possess special knowledge or that they would be in a position to present information at a hearing that the Commission does not otherwise possess; CLI-19-2, 89 NRC 233 (2019)
- Transnuclear, Inc.* (Export of 93.3% Enriched Uranium), CLI-00-16, 52 NRC 68, 72 (2000)  
nothing in petitioner's filings indicates petitioner will be able to present significant information not already available to and considered by the Commission; CLI-19-2, 89 NRC 233 n.17 (2019)
- TVA v. Hill*, 437 U.S. 153, 187 (1978)  
use of a federally funded multi-million-dollar dam project was halted to protect a small fish, although not operating the dam similarly could have been described as a wasteful expenditure, but the court declined to use such an excuse to go beyond the plain meaning of the Endangered Species Act; LBP-19-3, 89 NRC 312 n.54 (2019)
- U.S. Department of Energy* (Export of 93.20% Enriched Uranium), CLI-16-15, 84 NRC 53, 56 (2016)  
hearing will be granted on an export license application when NRC finds that such a hearing will be in the public interest and will assist in making the statutory determinations required by the Atomic Energy Act; CLI-19-2, 89 NRC 231 (2019)
- U.S. Department of Energy* (Export of 93.20% Enriched Uranium), CLI-16-15, 84 NRC 53, 58 n.25 (2016)  
to satisfy the public interest requirement for a hearing on an export license application, petitioner must show how a hearing would bring new information to light; CLI-19-2, 89 NRC 232-33 (2019)  
where petitioners have already submitted detailed information as to the basis for their position, a hearing will not result in significant new information that is not already available to and considered by the Commission in making the requisite statutory determinations; CLI-19-2, 89 NRC 233 n.17 (2019)
- U.S. Department of Energy* (High-Level Waste Repository), CLI-09-14, 69 NRC 580, 588-91 (2009)  
requiring a petitioner to allege facts under section 2.309(f)(1)(v) or to provide an affidavit that sets out the factual and/or technical bases under section 51.109(a)(2) in support of a legal contention as opposed to a *factual* contention is not necessary; LBP-19-4, 89 NRC 379 n.155 (2019)
- U.S. Department of Energy* (High-Level Waste Repository), CLI-14-1, 79 NRC 1, 2 (2014)  
Commission considers, as an exercise of its inherent supervisory authority over the NRC Staff, whether any additional information developed during the adjudication necessitates further NEPA activities; CLI-19-5, 89 NRC 340-41 n.60 (2019)
- U.S. Department of Energy* (High-Level Waste Repository), LBP-11-24, 74 NRC 368 (2011)  
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- U.S. Department of Energy* (Plutonium Export License), CLI-04-17, 59 NRC 357, 364 n.11 (2004)  
mere geographical proximity to potential transportation routes is insufficient to confer standing; LBP-19-4, 89 NRC 367 n.70 (2019)
- U.S. Department of Energy* (Plutonium Export License), CLI-04-17, 59 NRC 357, 365 (2004)  
in export cases, the alleged harm must result from the grant or denial of the export license; CLI-19-2, 89 NRC 232 n.16 (2019)  
to show an interest that may be affected by an export license proceeding, petitioners must assert that the proposed export itself could cause them harm; CLI-19-2, 89 NRC 232 (2019)
- U.S. Department of Energy* (Plutonium Export License), CLI-04-17, 59 NRC 357, 367 (2004)  
persons without an affected interest are not as likely as persons with an affected interest to contribute to decisionmaking and are also less likely to be able to show that a hearing would be in the public interest and would assist us in making the requisite statutory and regulatory determinations; CLI-19-2, 89 NRC 231 (2019)
- U.S. Department of Energy* (Plutonium Export License), CLI-04-17, 59 NRC 357, 369 (2004)  
where petitioners have already submitted detailed information as to the basis for their position, a hearing will not result in significant new information that is not already available to and considered

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- by the Commission in making the requisite statutory determinations; CLI-19-2, 89 NRC 233 n.17 (2019)
- Union of Concerned Scientists v. NRC*, 711 F.2d 370, 381 (D.C. Cir. 1983)  
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- United States v. Armstrong*, 517 U.S. 456, 464 (1996)  
presumption of regularity applies to federal agencies, which should be assumed to act properly in the absence of evidence to the contrary; LBP-19-4, 89 NRC 382 n.168, 422 (2019)
- United States v. Chem. Found., Inc.*, 272 U.S. 1, 14-15 (1926)  
presumption of regularity applies to federal agencies, which should be assumed to act properly in the absence of evidence to the contrary; LBP-19-4, 89 NRC 382 n.168, 422 (2019)
- United States v. McIver*, 470 F.3d 550, 561-62 (4th Cir. 2006)  
opinion testimony that states a legal standard or draws a legal conclusion by applying law to the facts is generally inadmissible; LBP-19-2, 89 NRC 33 n.11 (2019)
- USEC Inc. (American Centrifuge Plant)*, CLI-06-10, 63 NRC 451, 456 (2006)  
contention asserting that applicant omitted discussion of high burnup fuel storage from the environmental report is inaccurate and inadmissible; LBP-19-4, 89 NRC 413 (2019)  
contention of omission must be summarily rejected if the topic that allegedly is omitted is in fact included with the application; LBP-19-4, 89 NRC 413 (2019)
- Vermont Yankee Nuclear Power Corp. v. Nat. Res. Def. Council*, 435 U.S. 519, 553 (1978)  
NEPA imposes a duty upon the agency to both consider every significant aspect of the environmental impact of a proposed action and inform the public of its analysis and conclusion; LBP-19-4, 89 NRC 375 (2019)
- Virginia Electric and Power Co. d/b/a Dominion Virginia Power and Old Dominion Electric Cooperative (North Anna Power Station, Unit 3)*, CLI-12-14, 75 NRC 692 (2012)  
when the board has ruled on all pending contentions in the matter, ordinarily its jurisdiction in the case would be terminated; CLI-19-5, 89 NRC 350-51 n.37 (2019)
- Yankee Atomic Electric Co. (Yankee Nuclear Power Station)*, CLI-98-21, 48 NRC 185, 195 (1998)  
NRC applies contemporaneous judicial concepts of standing, requiring a showing of concrete and particularized injury that is fairly traceable to the challenged action and is likely to be redressed by a favorable decision; LBP-19-5, 89 NRC 490 (2019)
- Yankee Atomic Electric Co. (Yankee Nuclear Power Station)*, LBP-96-2, 43 NRC 61, 90, *rev'd in part on other grounds*, CLI-96-7, 43 NRC 235 (1996)  
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- 10 C.F.R. 2.103(b)(2)  
senior reactor operator applicant who has been denied a license has the right to demand a hearing;  
LBP-19-1, 89 NRC 16 (2019)
- 10 C.F.R. 2.206  
request to issue demands for information is denied because licensees are required to provide the  
information requested, as applicable, in their decommissioning funding status reports; DD-19-1, 89 NRC  
317-28 (2019)
- 10 C.F.R. 2.309(a)  
intervention petitioner must establish standing and proffer at least one admissible contention; CLI-19-6, 89  
NRC 471 (2019); LBP-19-3, 89 NRC 257 (2019); LBP-19-4, 89 NRC 372 (2019); LBP-19-5, 89 NRC  
489, 491 (2019)
- 10 C.F.R. 2.309(b)  
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the good cause standard; LBP-19-4, 89 NRC 374 (2019)
- 10 C.F.R. 2.309(b)(3)(i)  
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LBP-19-5, 89 NRC 491-92 (2019)
- 10 C.F.R. 2.309(c)  
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considering whether to allow petitioner to amend its contention after the deadline for filing petitions;  
LBP-19-4, 89 NRC 423, 425, 426 (2019)  
new contention filed on NRC Staff document prepared pursuant to NEPA must still meet the timeliness  
requirements; CLI-19-5, 89 NRC 332 (2019)
- 10 C.F.R. 2.309(c)(1)  
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demonstrates good cause under the three-pronged test; CLI-19-5, 89 NRC 338, 345 (2019); LBP-19-4,  
89 NRC 374, 406, 423, 436 (2019); LBP-19-5, 89 NRC 495 (2019)  
good cause for late filing exists if petitioner demonstrates that information on which a new or amended  
contention is based was not previously available, is materially different, and has been submitted in a  
timely fashion based on the availability of the subsequent information; LBP-19-4, 89 NRC 374 (2019);  
LBP-19-5, 89 NRC 495 (2019)  
motion to amend contention is denied for failure to meet the good cause standard; LBP-19-4, 89 NRC  
407 (2019)
- 10 C.F.R. 2.309(c)(1)(i)  
environmental assessment's clarification that land disposal is not currently being used did not change the  
fact that such disposal could occur during the license term; CLI-19-5, 89 NRC 339 (2019)
- 10 C.F.R. 2.309(c)(1)(i)-(iii)  
board must first consider whether motion to file a contention satisfies the three-prong test before  
considering whether to allow petitioner to amend its contention after the deadline for filing petitions;  
LBP-19-4, 89 NRC 380, 429 (2019)  
late-filed contention must satisfy a three-prong test; LBP-19-4, 89 NRC 419 (2019)
- 10 C.F.R. 2.309(c)(1)(ii)  
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available; LBP-19-4, 89 NRC 419 (2019)

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- “materially different” requirement necessary to file a contention after the initial deadline is contrasted with “material to the findings the NRC must make” requirement of section 2.309(f)(1)(iv); LBP-19-4, 89 NRC 419-20 (2019)
- 10 C.F.R. 2.309(d)  
information that petitioner should include in its petition to establish standing is included in this regulation, but it does not set the standard the board must apply when deciding whether that information is sufficient; LBP-19-4, 89 NRC 363 (2019)  
organization invoking representational standing on behalf of members must show that at least one of its members may be affected by the Commission’s approval of the license transfer by identifying the member and providing written authorization of such representation; CLI-19-6, 89 NRC 481 (2019)  
to intervene in NRC licensing proceedings, petitioner must show standing to intervene and submit at least one admissible contention; CLI-19-6, 89 NRC 471 (2019)
- 10 C.F.R. 2.309(d)(1)  
required content of petitioner’s hearing request is described; LBP-19-3, 89 NRC 258 n.21 (2019); LBP-19-5, 89 NRC 489 (2019)
- 10 C.F.R. 2.309(d)(2)  
fifty-mile proximity presumption has been applied in a subsequent license renewal proceeding; LBP-19-5, 89 NRC 491 (2019)
- 10 C.F.R. 2.309(e)(2)  
board denies petitioner’s alternative request for discretionary intervention because petitioner’s further participation would significantly and improperly broaden the scope of the proceeding; LBP-19-4, 89 NRC 372 (2019)
- 10 C.F.R. 2.309(f)  
contention admissibility requirements are provided; CLI-19-6, 89 NRC 471 (2019)  
to intervene in NRC licensing proceedings, petitioner must show standing to intervene and submit at least one admissible contention; CLI-19-6, 89 NRC 471 (2019)
- 10 C.F.R. 2.309(f)(1)  
admissible contention must satisfy the requirements of this regulation; LBP-19-5, 89 NRC 492 (2019)  
contention that in light of adverse impact of continued cooling canal system operations on the threatened American crocodile and its critical seagrass habitat, the environmental report is deficient for failing to consider alternative in connection with license renewal is admissible; LBP-19-3, 89 NRC 285 n.59 (2019)  
contention that relates to impact of ammonia releases during the renewal period on endangered and threatened species and their critical habitat is admissible; LBP-19-3, 89 NRC 293 (2019)  
requests for extensions of time do not constitute contentions; LBP-19-3, 89 NRC 295-96 (2019)
- 10 C.F.R. 2.309(f)(1)(i)  
contention may state an issue of law or fact; LBP-19-4, 89 NRC 379 n.155 (2019)
- 10 C.F.R. 2.309(f)(1)(i)-(vi)  
timely filed contention is admissible if it satisfies the six-factor criteria; LBP-19-3, 89 NRC 259 (2019)
- 10 C.F.R. 2.309(f)(1)(ii)  
contention that environmental report fails to comply with 10 C.F.R. 52.99(c) because the alternative energy sources review does not include solar or wind power in its analysis is inadmissible; LBP-19-3, 89 NRC 297 (2019)  
contention that environmental report is incomplete because it fails to include a discussion of whether applicant intends to seek any power uprates during the renewal period is inadmissible; LBP-19-3, 89 NRC 297-98 (2019)
- 10 C.F.R. 2.309(f)(1)(iii)  
amended contention that applicant refuses to publicize emergency and contingency plans is inadmissible; LBP-19-4, 89 NRC 443 n.574 (2019)  
challenge to Continued Storage Rule and impact evaluations in the Continued Storage GEIS requires grant of a rule waiver; LBP-19-4, 89 NRC 447 (2019)  
contention alleging that rising sea levels pose a potential risk to safe plant operations, including spent fuel storage, raises a current licensing basis safety issue that is outside the scope of license renewal proceeding; LBP-19-3, 89 NRC 298 (2019)

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- contention challenging any aspect of an NRC-approved canister or cask is outside the scope of an independent spent fuel storage installation proceeding; LBP-19-4, 89 NRC 417 (2019)
- contention contesting license renewal application projections of sea level rise by 2100 is inadmissible; LBP-19-3, 89 NRC 300 (2019)
- contention is subject to summary dismissal on grounds that it was outside the scope of the proceeding; LBP-19-3, 89 NRC 272 (2019)
- contention that applicant cannot provide reasonable assurances that it can obtain the necessary funds to cover the costs of construction, operation, maintenance, and decommissioning of the consolidated interim storage facility is inadmissible; LBP-19-4, 89 NRC 432 (2019)
- contention that environmental report fails to address the cumulative impacts related to hypersalinity and mitigation measures is inadmissible; LBP-19-3, 89 NRC 282 (2019)
- contention that environmental report fails to analyze new and significant information regarding the effect of sea level rise on Category 1 and 2 issues is inadmissible; LBP-19-3, 89 NRC 290 (2019)
- contention that environmental report fails to comply with 10 C.F.R. 52.99(c) because alternative energy sources review does not include solar or wind power in its analysis is inadmissible; LBP-19-3, 89 NRC 297 (2019)
- contention that environmental report fails to consider the impact of salinization on surface waters and freshwater wetlands caused by the cooling canal system is inadmissible; LBP-19-3, 89 NRC 294 (2019)
- contention that environmental report fails to include a discussion of whether applicant intends to seek any power uprates during the renewal period is inadmissible; LBP-19-3, 89 NRC 297-98 (2019)
- contention that environmental report must conduct an analysis concerning terrorism under NEPA is inadmissible as outside the scope of the proceeding; LBP-19-4, 89 NRC 448 (2019)
- 10 C.F.R. 2.309(f)(1)(iv)
- contention that application does not address liability coverage is inadmissible for failure to demonstrate why this issue is material or relates to financial qualifications; LBP-19-4, 89 NRC 433 (2019)
- contention that fails to identify specific documents referenced in a cited report that applicant should have reviewed and evaluated and to offer any evidence that NEPA mandates such a document review and evaluation in an environmental report is inadmissible; LBP-19-5, 89 NRC 504-05 (2019)
- legal error renders contention inadmissible for failing to show that the issue raised is material to the findings NRC must make to support the action in this proceeding; LBP-19-3, 89 NRC 292 n.71 (2019)
- “material to the findings the NRC must make” requirement for contention admission is contrasted with “materially different” requirement of section 2.309(c)(1)(ii) necessary to file a contention after the initial deadline; LBP-19-4, 89 NRC 419-20 (2019)
- 10 C.F.R. 2.309(f)(1)(v)
- challenges to methodology of endangered dunes sagebrush lizard surveys are not supported by any information that genuinely disputes their sufficiency; LBP-19-4, 89 NRC 400 (2019)
- contention alleging that a federal lawsuit is in play related to potential EPA violations and that plume migration threatens the water supply and federally protected bay is inadmissible; LBP-19-3, 89 NRC 398-99 (2019)
- contention asserting that use of wastewater to recharge the cooling canals may present a threat to drinking water, groundwater, and safe operation of the plant is inadmissible; LBP-19-3, 89 NRC 299 (2019)
- contention claiming that environmental report underestimates impacts related to tritium releases to groundwater is inadmissible because it lacks the requisite support; LBP-19-3, 89 NRC 279-80 (2019)
- contention concerning impacts of salinization on threatened and endangered species in the wetlands is inadmissible; LBP-19-3, 89 NRC 294-95 (2019)
- contention contesting license renewal application projections of sea level rise by 2100 is inadmissible; LBP-19-3, 89 NRC 300 (2019)
- contention that brine, contaminated groundwater, soil, and wind-blown dust could potentially degrade the HI-STORE vault and spent fuel storage canisters stored therein is inadmissible; LBP-19-4, 89 NRC 439 (2019)
- contention that environmental report fails to address the effects of climate change during the license renewal period is inadmissible; LBP-19-3, 89 NRC 292 (2019)
- contention that environmental report fails to consider cumulative impacts of continued operation on water resources from the reasonably foreseeable effects of climate change on the cooling canal system, including sea level rise is inadmissible; LBP-19-3, 89 NRC 287 n.63 (2019)

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- contention that environmental report lacks experimental support for the safe transportation and storage of high burnup fuel is inadmissible; LBP-19-4, 89 NRC 414 (2019)
- contention that environmental report should address significance of declining amount of external operating experience available to applicant to assist and increase its understanding of age-related environmental risks during the subsequent license renewal term is inadmissible; LBP-19-5, 89 NRC 506 n.114 (2019)
- contention that external operating experience is insufficient for the aging management programs for subsequent license renewal term is inadmissible; LBP-19-5, 89 NRC 500 (2019)
- contention that omission of accident risks posed by operating aging reactor equipment from environmental report is inadmissible; LBP-19-5, 89 NRC 503 (2019)
- legal issue contention need not address every requirement of section 2.309(f)(1), such as providing a concise statement of the alleged facts or expert opinions that support the requestor's/petitioner's position on the issue; LBP-19-4, 89 NRC 379 n.155 (2019)
- 10 C.F.R. 2.309(f)(1)(vi)
- admissible contention must fall within the scope of the proceeding and be material to the findings that NRC must make regarding the proposed licensing action; CLI-19-6, 89 NRC 472 (2019)
- challenge to applicant's environmental cost-benefit analysis and its analysis of alternatives is inadmissible for failure to address or controvert applicants environmental report; LBP-19-4, 89 NRC 433 (2019)
- contention alleging that a federal lawsuit is in play related to potential EPA violations and that plume migration threatens the water supply and federally protected bay is inadmissible; LBP-19-3, 89 NRC 398-99 (2019)
- contention alleging that rising sea levels pose a potential risk to safe plant operations, including spent fuel storage, raises a current licensing basis safety issue that is outside the scope of this proceeding; LBP-19-3, 89 NRC 298 (2019)
- contention asserting that use of wastewater to recharge the cooling canals may present a threat to drinking water, groundwater, and safe operation of the plant is inadmissible; LBP-19-3, 89 NRC 299 (2019)
- contention challenging credibility of environmental report preparer is inadmissible; LBP-19-4, 89 NRC 401 (2019)
- contention challenging the thermal evaluation of the HI-STORM UMAX system is inadmissible because it challenges an NRC rule; LBP-19-4, 89 NRC 402 (2019)
- contention claiming that environmental report underestimates impacts related to tritium releases to groundwater is inadmissible because it lacks the requisite support; LBP-19-3, 89 NRC 279-80 (2019)
- contention concerning impacts of salinization on threatened and endangered species in wetlands is inadmissible; LBP-19-3, 89 NRC 294-95 (2019)
- contention contesting license renewal application projections of sea level rise by 2100 is inadmissible; LBP-19-3, 89 NRC 300 (2019)
- contention must demonstrate a genuine dispute with applicant on a material issue of law or fact; CLI-19-6, 89 NRC 472 (2019)
- contention that attacks adequacy of environmental report's analysis of cumulative impacts in light of applicant's history of noncompliance with its permits relating to the cooling canal system is inadmissible; LBP-19-3, 89 NRC 282 (2019)
- contention that brine, contaminated groundwater, soil, and wind-blown dust could potentially degrade the HI-STORE vault and spent fuel storage canisters stored therein is inadmissible; LBP-19-4, 89 NRC 439 (2019)
- contention that environmental report fails to address the effects of climate change during the license renewal period is inadmissible; LBP-19-3, 89 NRC 292 (2019)
- contention that environmental report fails to comply with 10 C.F.R. 52.99(c) because the alternative energy sources review does not include solar or wind power in its analysis is inadmissible; LBP-19-3, 89 NRC 297 (2019)
- contention that environmental report ignores water resource conflicts insofar as it fails to account for the effect sea level rise will have on freshwater availability, groundwater resources, and release of polluted cooling water into Biscayne Bay is inadmissible; LBP-19-3, 89 NRC 291 (2019)
- contention that environmental report is incomplete because it fails to include a discussion of whether applicant intends to seek any power uprates during the renewal period is inadmissible; LBP-19-3, 89 NRC 297-98 (2019)



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- contention that environmental report mischaracterizes both the Blue Ribbon Commission report's conclusions and the relative risks of consolidated interim storage versus onsite storage is inadmissible; LBP-19-4, 89 NRC 392-93 (2019)
- contention that environmental report should address significance of declining amount of external operating experience available to applicant to assist and increase its understanding of age-related environmental risks during the subsequent license renewal term is inadmissible; LBP-19-5, 89 NRC 506 (2019)
- contention that environmental report's cumulative effects analysis fails entirely to discuss the sea level rise-related impacts upon affected resources is inadmissible; LBP-19-3, 89 NRC 291 (2019)
- contention that environmental report's earthquake data are historical and do not take into account recent fracking activity around the proposed project site is inadmissible; LBP-19-4, 89 NRC 398 (2019)
- contention that expresses concerns about overtopping and increased salinity of the cooling canal system is inadmissible; LBP-19-3, 89 NRC 289 (2019)
- contention that external operating experience is insufficient for the aging management programs for subsequent license renewal term is inadmissible; LBP-19-5, 89 NRC 498 (2019)
- contention that fails to identify specific documents referenced in a cited report that applicant should have reviewed and evaluated and to offer any evidence that NEPA mandates such a document review and evaluation in an environmental report is inadmissible; LBP-19-5, 89 NRC 504-05 & n.107 (2019)
- contention that information on a historic property was withheld from environmental report is inadmissible; LBP-19-4, 89 NRC 427 (2019)
- contention that omission of accident risks posed by operating aging reactor equipment from environmental report is inadmissible; LBP-19-5, 89 NRC 503 (2019)
- contention that spent fuel cladding will not be protected against degradation that leads to gross ruptures in the fuel is inadmissible; LBP-19-4, 89 NRC 416 (2019)
- general speculation about potential future costs, without specifying how they make incorrect the financial analysis for the only phase covered by the application, does not raise a genuine dispute with the application; LBP-19-4, 89 NRC 432 (2019)
- petitioner must identify specific disputed portions of the application with supporting reasons for each dispute, or identify each failure to contain information required by law and provide supporting reasons for petitioner's belief; CLI-19-6, 89 NRC 472 (2019)
- unsupported claims of insufficient information do not establish a genuine, material dispute with the application; CLI-19-6, 89 NRC 474 (2019)
- 10 C.F.R. 2.309(f)(2)
- good cause for late filing exists if petitioner can show that information upon which the amended or new contention is based was not previously available and is materially different from information previously available and the filing has been submitted in a timely fashion based on the availability of the subsequent information; LBP-19-4, 89 NRC 374 (2019)
- new contention filed on NRC Staff document prepared pursuant to the NEPA must still meet the timeliness requirements; CLI-19-5, 89 NRC 332 (2019)
- participant in an adjudication may file a new environmental contention after the deadline for initial intervention petitions based on a draft or final environmental review document if that contention complies with the requirements of section 2.309(c); CLI-19-5, 89 NRC 338 (2019)
- petitioners are required to file environmental contentions based on documents or other information available at the time the petition is to be filed; LBP-19-4, 89 NRC 375 (2019)
- 10 C.F.R. 2.309(f)(3)
- petitioners' motion to adopt all contentions filed by another party in the proceeding and to reallege them as their own as if written herein is denied; LBP-19-4, 89 NRC 451 (2019)
- 10 C.F.R. 2.309(f)(i)-(vi)
- admissible contention must satisfy six pleading requirements; LBP-19-4, 89 NRC 372-73 (2019)
- 10 C.F.R. 2.313(a)
- if the Commission itself does not designate the presiding officer, then the Chief Administrative Judge of the Atomic Safety and Licensing Board Panel will do so; CLI-19-3, 89 NRC 238 (2019)
- 10 C.F.R. 2.313(b)(2)
- licensing board denial of motion for disqualification must be referred to the Commission; CLI-19-3, 89 NRC 237 (2019)

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- 10 C.F.R. 2.315(c)  
demonstration of standing from an entity that seeks to participate as an interested governmental participant is not required; LBP-19-3, 89 NRC 300-01 (2019); LBP-19-4, 89 NRC 461 (2019)  
entity that seeks to participate as an interested governmental participant must identify contentions on which it intends to participate and designate a single representative for the hearing; LBP-19-3, 89 NRC 301 (2019); LBP-19-4, 89 NRC 461 (2019)  
licensing board will afford an interested local governmental body (county, municipality, or other subdivision) that has not been admitted as a party under section 2.309, a reasonable opportunity to participate in a hearing; LBP-19-3, 89 NRC 256-57, 300 (2019); LBP-19-4, 89 NRC 461 (2019)  
scope of participation by interested governmental entity is discussed; LBP-19-3, 89 NRC 301 (2019)
- 10 C.F.R. 2.323(f)(1)  
ruling on legal issue of first impression that is also pending before a licensing board, signifying that it will likely be a recurring issue, is referred to the Commission; LBP-19-3, 89 NRC 273 n.46 (2019)  
ruling that 10 C.F.R. 51.53(c)(3) applies to the preparation of environmental reports in subsequent license renewal proceedings is referred to the Commission; LBP-19-3, 89 NRC 254 (2019)
- 10 C.F.R. 2.325  
as proponent of agency action, applicant generally has the burden of proof in a licensing proceeding; LBP-19-2, 89 NRC 41 (2019)
- 10 C.F.R. 2.335  
because Category 1 issues have been addressed and codified in Part 51, they cannot be litigated in individual adjudications, such as license renewal proceedings for individual plants; LBP-19-3, 89 NRC 262-63 n.29 (2019)  
board proceedings regarding application for an NRC-issued license are not a proper forum for contentions that comprise broad policy recommendations and challenges to agency rules; LBP-19-4, 89 NRC 449 (2019)  
challenge to a Category 1 issue is not admissible because petitioners have failed to seek a rule waiver; LBP-19-3, 89 NRC 290-91 (2019)  
challenges to adequacy of the environmental report's discussions related to altered salinity gradients in surface waters and groundwater quality degradation are Category 1 issues and therefore not subject to direct or indirect challenge absent a waiver; LBP-19-3, 89 NRC 279-80 (2019)  
contention challenging any aspect of an NRC-approved canister or cask would be an impermissible attack on the Commission's regulations absent a waiver; LBP-19-4, 89 NRC 417 (2019)  
contention that challenges a Commission rule or regulation will be rejected unless petitioner makes a prima facie showing supporting a rule waiver before the licensing board, which then must certify the waiver request to the Commission; LBP-19-3, 89 NRC 259 (2019)  
contention that constitutes an impermissible challenge to NRC regulations is precluded; LBP-19-4, 89 NRC 383 (2019)  
contention that environmental report fails to address the cumulative impacts related to hypersalinity and mitigation measures is inadmissible; LBP-19-3, 89 NRC 282 (2019)  
contention that environmental report fails to consider the impact of salinization on surface waters and freshwater wetlands caused by the cooling canal system is inadmissible; LBP-19-3, 89 NRC 294 (2019)  
contention that environmental report underestimates the volume of low-level radioactive waste that will be generated by the consolidated interim storage facility is inadmissible; LBP-19-4, 89 NRC 435 (2019)  
HI-STORM UMAX spent fuel storage system was added to the list of approved spent fuel storage casks in a final rule and is not subject to challenge in NRC proceedings; LBP-19-4, 89 NRC 402 (2019)  
in license renewal adjudicatory proceedings, petitioner raising a challenge to a Category 1 issue has to meet the requirements for a waiver petition in addition to the contention admissibility requirements in 10 C.F.R. 2.309; LBP-19-3, 89 NRC 312 (2019)  
no NRC rule or regulation may be challenged in a contention unless petitioner seeks and obtains a waiver from the Commission; LBP-19-4, 89 NRC 373 (2019)  
party to an adjudicatory proceeding can invoke this regulation and request that a GEIS finding for a Category 1 issue be waived with respect to that proceeding; LBP-19-3, 89 NRC 263 n.29 (2019)
- 10 C.F.R. 2.335(a)  
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- contention challenging the thermal evaluation of the HI-STORM UMAX system is inadmissible because it challenges a Commission rule; LBP-19-4, 89 NRC 402 (2019)
- contention is subject to summary dismissal on grounds that it was an impermissible challenge to an agency regulation; LBP-19-3, 89 NRC 272 (2019)
- NRC regulations bar challenges to the Continued Storage Rule; LBP-19-4, 89 NRC 389 (2019)
- petitioner's request for an environmental analysis under NEPA of a license transfer application constitutes an impermissible challenge to the categorical exclusion rule and does not meet contention standards; CLI-19-6, 89 NRC 480 (2019)
- 10 C.F.R. 2.335(b)  
NRC regulations bar challenges to the Continued Storage Rule; LBP-19-4, 89 NRC 389 (2019)  
to challenge incorporated analyses from Staff generic environmental impact statement in a licensing proceeding, petitioner would have to obtain a rule waiver; LBP-19-5, 89 NRC 502 n.93 (2019)
- 10 C.F.R. 2.337(f)  
board takes official notice that the term "homogeneity" is synonymous with uniformity in space; LBP-19-2, 89 NRC 51 n.140 (2019)
- 10 C.F.R. 2.340(e)(2)(ii)  
for certain types of applications, NRC Staff may issue its approval or denial of an application before the presiding officer has issued an initial decision; CLI-19-1, 89 NRC 2 n.1 (2019)
- 10 C.F.R. 2.341(b)(4)  
Commission will grant a petition for review at its discretion, upon a showing that petitioner has raised a substantial question as to five considerations; CLI-19-5, 89 NRC 335-36 (2019)
- 10 C.F.R. 2.341(f)(2)(ii)  
interlocutory review sought on grounds that board's timeliness rulings were so overbroad as to affect the basic structure of the proceeding in a pervasive or unusual manner was denied; CLI-19-5, 89 NRC 332 (2019)
- 10 C.F.R. 2.1202(a)  
Commission declines to set forth a comprehensive formula for addressing future circumstances in which significant NEPA deficiencies are found through the NRC hearing process after Staff issuance of a license; CLI-19-1, 89 NRC 10-11 (2019)
- during pendency of any materials licensing hearing, consistent with NRC Staff's findings in its review of the application or matter that is the subject of the hearing and as authorized by law, NRC Staff is expected to promptly issue its approval or denial of the application; CLI-19-1, 89 NRC 14 (2019)
- for certain types of applications, NRC Staff may issue its approval or denial of an application before the presiding officer has issued an initial decision; CLI-19-1, 89 NRC 2 n.1 (2019)
- stay standard is applicable to requests to stay a Staff action taken under this rule that is filed before the presiding officer has decided the pertinent contention(s) on the merits; CLI-19-1, 89 NRC 11 n.45 (2019)
- with publication of final environmental assessment, NRC Staff notified the board and parties that license amendment authorizing construction and operation had been issued, effective immediately; LBP-19-2, 89 NRC 36 n.35 (2019)
- 10 C.F.R. 2.1213(a)  
intervenor may seek a stay of NRC Staff authorization of a license amendment issued during pendency of evidentiary hearing; LBP-19-2, 89 NRC 36 n.35 (2019)
- use of stay standard is restricted where a significant NEPA deficiency has already been found through the hearing process; CLI-19-1, 89 NRC 11 n.45 (2019)
- 10 C.F.R. 2.1213(d)  
stay standard considers irreparable injury to the stay requestor, likelihood of the stay requestor prevailing on the merits, harm a stay would inflict on the other participants in the adjudication, and public interest; CLI-19-1, 89 NRC 5 (2019)
- 10 C.F.R. 2.1213(d)(1)  
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- 10 C.F.R. Part 20  
NRC must ensure that facilities associated with the licensed possession and use of source and byproduct materials meet regulatory requirements developed to protect public health and safety from radiological hazards; LBP-19-2, 89 NRC 38 (2019)
- 10 C.F.R. Part 40, Appendix A  
in situ uranium recovery license amendment applications must meet safety requirements including specific standards for uranium mill operation and waste material disposal; LBP-19-2, 89 NRC 38 (2019)
- 10 C.F.R. Part 40, Appendix A, Criterion 4(e)  
application and final environmental assessment must provide sufficient information about geological setting of the area to meet regulatory requirements; LBP-19-2, 89 NRC 31 (2019)  
criterion relates to tailings disposal system proposals at conventional uranium mines and so has no application to in situ uranium recovery facility; LBP-19-2, 89 NRC 39 n.52 (2019)  
in situ uranium recovery license amendment application must provide sufficient information about the ability of the underlying geologic strata to control contaminant and solution transport; LBP-19-2, 89 NRC 39 (2019)
- 10 C.F.R. Part 40, Appendix A, Criterion 5B(5)  
concentration limits for hazardous constituent in groundwater are specified; LBP-19-2, 89 NRC 133 (2019)  
groundwater quality standards for all restored aquifers must conform to the standards promulgated by EPA in 40 C.F.R. 192.32(a)(2); LBP-19-2, 89 NRC 134 (2019)  
groundwater sampling results will be used to define background groundwater protection standards for restoration; LBP-19-2, 89 NRC 123-24 (2019)  
if applicant cannot meet either of the Part 40 standards, it may seek NRC approval for an alternate concentration limit; LBP-19-2, 89 NRC 137 (2019)  
if background concentrations are less than the UMTRCA levels in the Criterion 5C table, applicant must meet the groundwater protection standard listed for that constituent in the Criterion 5C table; LBP-19-2, 89 NRC 137 (2019)  
using diligent application of best practicable technologies and efforts, applicant must first attempt to return a constituent in the aquifer to the NRC-approved background concentration for that constituent; LBP-19-2, 89 NRC 136-37 (2019)
- 10 C.F.R. Part 40, Appendix A, Criterion 5B(5)(a)-(c)  
alternate concentration limits for hazardous constituents in groundwater are established by the Commission; LBP-19-2, 89 NRC 133 (2019)
- 10 C.F.R. Part 40, Appendix A, Criterion 5B(5)(b)  
groundwater restoration at ISR facilities must meet Uranium Mill Tailings Radiation Control Act standards rather than those associated with the Safe Drinking Water Act or analogous state regulations; LBP-19-2, 89 NRC 134 (2019)
- 10 C.F.R. Part 40, Appendix A, Criterion 5B(6)  
applicant may request a license amendment for an alternate concentration limit where ACL value would be the same as the NDEQ Title 118 water quality standards as long as the request meets all the requirements of this criterion; LBP-19-2, 89 NRC 137 (2019)  
if background concentrations are less than the UMTRCA levels in the Criterion 5C table, applicant must meet the groundwater protection standard listed for that constituent in the Criterion 5C table; LBP-19-2, 89 NRC 137 (2019)  
in assessing adequacy of the effort in establishing an alternate concentration limit, licensee must achieve a value that is as low as reasonably achievable, after considering practicable corrective actions; LBP-19-2, 89 NRC 137 (2019)  
in making constituent hazard finding, NRC Staff will consider nine factors regarding potential adverse effects on groundwater quality and the 10 factors relating to potential adverse effects on hydraulically connected surface water quality; LBP-19-2, 89 NRC 137 (2019)
- 10 C.F.R. Part 40, Appendix A, Criterion 5C  
if background concentrations are less than the UMTRCA levels in the Criterion 5C table, applicant must meet the groundwater protection standard listed for that constituent in the Criterion 5C table; LBP-19-2, 89 NRC 137 (2019)

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- 10 C.F.R. Part 40, Appendix A, Criterion 5G(2)  
application and final environmental assessment must provide sufficient information about geological setting of the area to meet regulatory requirements; LBP-19-2, 89 NRC 31 (2019)  
criterion is inapplicable to in situ uranium recovery because it concerns the location of permanent tailings or waste disposal impoundments relative to a capable earthquake fault and applicant does not propose any surface impoundments nor is there any evidence of capable faults in the vicinity; LBP-19-2, 89 NRC 39 n.52 (2019)  
in situ uranium recovery license amendment application must provide sufficient information about the ability of the underlying geologic strata to control contaminant and solution transport; LBP-19-2, 89 NRC 39 (2019)
- 10 C.F.R. 50.33(f)  
for license transfer, NRC requires power reactor applicants to demonstrate reasonable assurance of having, or being able to obtain, the necessary funding for decommissioning and spent fuel management; CLI-19-6, 89 NRC 471, 475 (2019)
- 10 C.F.R. 50.33(f)(2)  
applicants need not demonstrate financial qualifications to cover power reactor operating costs if power operations have permanently ceased; CLI-19-6, 89 NRC 471 n.23 (2019)
- 10 C.F.R. 50.33(k)(1)  
for license transfer, NRC requires power reactor applicants to demonstrate reasonable assurance of having, or being able to obtain, the necessary funding for decommissioning and spent fuel management; CLI-19-6, 89 NRC 471, 475 (2019)
- 10 C.F.R. 50.54(w)  
licensees in decommissioning continue to carry onsite property damage insurance and offsite nuclear liability insurance, in amounts the NRC requires for a defueled plant; CLI-19-6, 89 NRC 476 n.56 (2019)
- 10 C.F.R. 50.54(bb)  
licensee must submit for Commission review and preliminary approval the program by which licensee intends to manage and provide funding for management of all irradiated fuel at the reactor following cessation of operations and until the fuel is transferred for its ultimate disposition in a repository; CLI-19-6, 89 NRC 475 n.52 (2019)
- 10 C.F.R. 50.75  
license transfer applicant must provide reasonable assurance that sufficient funds will be available to decommission the facility and to carry out applicable activities under the license; CLI-19-6, 89 NRC 471 (2019)  
throughout the license term, licensees are required to plan financially for the eventual need to decommission a power reactor or ISFSI; CLI-19-6, 89 NRC 475 (2019)
- 10 C.F.R. 50.75(e)  
acceptable methods of demonstrating financial assurance for decommissioning are outlined; CLI-19-6, 89 NRC 471 (2019)
- 10 C.F.R. 50.75(e)(1)(i)  
licensee that has set aside prepaid funds based on a site-specific decommissioning cost estimate may take credit for projected earnings on decommissioning funds, up to a 2% annual real rate of return, through the projected decommissioning period; CLI-19-6, 89 NRC 471 (2019)  
prepayment method of financial assurance for decommissioning involves depositing funds into an account kept segregated from the licensee's assets and outside of the licensee's administrative control, in an amount sufficient to pay decommissioning costs at the time permanent termination of operations is expected; CLI-19-6, 89 NRC 471 (2019)
- 10 C.F.R. 50.75(e)(1)(iii)  
methods to demonstrate financial assurance for decommissioning include surety bond, letter of credit, insurance, or parent company guarantee; CLI-19-6, 89 NRC 471 (2019)
- 10 C.F.R. 50.75(e)(2)  
for operating power reactors, NRC has the right to review the rate of accumulation of decommissioning funds, and to take additional actions, either independently or in cooperation with the Federal Energy Regulatory Commission and the licensee's state public utility commission; DD-19-1, 89 NRC 322, 325-26 (2019)

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- 10 C.F.R. 50.80(a)  
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- 10 C.F.R. 50.80(b)(1)(i)  
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- 10 C.F.R. 50.80(c)  
NRC will approve a license transfer application if it finds the proposed transferee to be qualified to hold the license and the transfer is otherwise consistent with applicable law, regulations, and Commission orders; CLI-19-6, 89 NRC 471 (2019)
- 10 C.F.R. 50.82(a)  
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- 10 C.F.R. 50.82(a)(2)  
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- 10 C.F.R. 50.82(a)(4)(i)  
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- 10 C.F.R. 50.82(a)(6)(ii)  
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- 10 C.F.R. 50.82(a)(7)  
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- 10 C.F.R. 50.82(a)(8)(i)(B)-(C)  
licensee must notify NRC in writing, with a copy sent to the affected state(s), prior to performing any decommissioning activities that would significantly increase the facility's decommissioning cost; CLI-19-6, 89 NRC 476 (2019)
- 10 C.F.R. 50.82(a)(8)(iii)  
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- 10 C.F.R. 50.82(a)(8)(v)  
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- 10 C.F.R. 50.82(a)(8)(v)-(vii)  
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- 10 C.F.R. 50.82(a)(8)(vi)  
if new developments point to a projected funding shortfall, NRC requires additional financial assurance to cover the estimated cost to complete the decommissioning; CLI-19-6, 89 NRC 476 n.56 (2019)
- 10 C.F.R. 50.82(a)(8)(vii)  
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- 10 C.F.R. 50.82(c)  
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- 10 C.F.R. Part 50, Appendix A  
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- 10 C.F.R. 51.10  
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- 10 C.F.R. 51.14  
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- 10 C.F.R. 51.20(a), (b)(2)  
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- 10 C.F.R. 51.21  
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- 10 C.F.R. 51.22(b)  
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- 10 C.F.R. 51.22(c)(21)  
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- 10 C.F.R. 51.23  
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- 10 C.F.R. 51.23(b)  
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- 10 C.F.R. 51.30(a)(1)(iii)  
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- 10 C.F.R. 51.31  
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- 10 C.F.R. 51.41  
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- 10 C.F.R. 51.45  
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- 10 C.F.R. 51.45(b)(1)-(3)  
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- 10 C.F.R. 51.45(b)(3)  
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- 10 C.F.R. 51.45(b)(5)  
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- 10 C.F.R. 51.45(c)  
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- 10 C.F.R. 51.52, tbl. S-4  
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- 10 C.F.R. 51.53(a)  
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- 10 C.F.R. 51.53(c)  
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- 10 C.F.R. 51.53(c)(1)  
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- 10 C.F.R. 51.53(c)(2)  
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- 10 C.F.R. 51.53(c)(3)  
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- 10 C.F.R. 51.53(c)(3)(ii)  
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- 10 C.F.R. 51.53(c)(3)(ii)(E)  
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- 10 C.F.R. 51.61  
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- 10 C.F.R. 51.71(d)  
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- 10 C.F.R. 51.95(c)(4)  
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- 10 C.F.R. Part 51, Subpart A, Appendix B  
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- 10 C.F.R. Part 51, Subpart A, Appendix B, table B-1  
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- 10 C.F.R. 52.99(c)  
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- 10 C.F.R. 54.4  
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- 10 C.F.R. 54.21(a)(1)  
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- 10 C.F.R. 54.21(a)(3)  
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- 10 C.F.R. 54.29(a)  
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- 10 C.F.R. 55.33(a)(2)  
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- 10 C.F.R. 61.55(a)(2)(iv)  
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- 10 C.F.R. 63.302  
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- 10 C.F.R. Part 71  
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- 10 C.F.R. 71.71(c)(1)(5)  
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- 10 C.F.R. 72.22(e)  
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- 10 C.F.R. 72.24  
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- 10 C.F.R. 72.30  
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- 10 C.F.R. 72.30(b)-(c)  
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- 10 C.F.R. 72.30(c)(3)  
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- 10 C.F.R. 72.32(a)  
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- 10 C.F.R. 72.42  
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- 10 C.F.R. 72.42(a)  
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- 10 C.F.R. 72.45(d)  
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- 10 C.F.R. 72.46(d)  
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- 10 C.F.R. 72.46(e)  
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- 10 C.F.R. 72.50(a)  
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- 10 C.F.R. 72.90  
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- 10 C.F.R. 72.94  
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- 10 C.F.R. 72.103(f)  
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- 10 C.F.R. 72.103(f)(1)  
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- 10 C.F.R. 72.108  
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discussion of adverse environmental effects that cannot be avoided, of alternatives, and of any irreversible and irretrievable commitments of resources that would be involved in the proposed action is required in the environmental report; LBP-19-4, 89 NRC 445 (2019)
- 10 C.F.R. 72.122(h)(1)  
fuel stored in the UMAX system that is maintained at a temperature below standards is in compliance; LBP-19-4, 89 NRC 416 (2019)  
spent fuel cladding must be protected against degradation that leads to gross ruptures in the fuel or the fuel must be otherwise confined so that degradation during storage will not pose operational safety problems when the fuel is retrieved from storage; LBP-19-4, 89 NRC 416 (2019)
- 10 C.F.R. 72.214  
canisters and casks for the interim storage facility that have been separately approved by the NRC are not part of the license application; LBP-19-4, 89 NRC 360-61 (2019)  
HI-STORM UMAX spent fuel storage system was added to the list of approved spent fuel storage casks in a final rule and is not subject to challenge in NRC proceedings; LBP-19-4, 89 NRC 402 (2019)  
petitioner is barred by regulation from challenging either the Staff's safety evaluation report or the UMAX SAR analyses in an adjudication; LBP-19-4, 89 NRC 416-17 (2019)
- 10 C.F.R. Part 73  
spent nuclear fuel transportation route identification requires separate review and approval by NRC and the Department of Transportation, as well as by applicable states or tribes; LBP-19-4, 89 NRC 446 (2019)
- 10 C.F.R. 110.42(c)-(d)  
for export licensing of byproduct material, NRC will consider whether the export is inimical to the common defense and security; CLI-19-2, 89 NRC 233 n.20 (2019)
- 10 C.F.R. 110.81  
written comments from the public regarding export license applications are encouraged and NRC will consider and, if appropriate, respond to any comments received; CLI-19-2, 89 NRC 233 (2019)
- 10 C.F.R. 110.81(a)  
amended intervention petition on export license is properly considered as a public comment on the application and is therefore referred to the Office of International Programs as a public comment; CLI-19-2, 89 NRC 233 (2019)
- 10 C.F.R. 110.82(b)(3)  
hearing request in an export case must explain why a hearing or an intervention would be in the public interest and how a hearing or intervention would assist the Commission in making the required statutory determinations; CLI-19-2, 89 NRC 231 (2019)
- 10 C.F.R. 110.82(b)(4)  
export license hearing request must specify, when a person asserts that his interest may be affected, both the facts pertaining to his interest and how it may be affected; CLI-19-2, 89 NRC 231 (2019)

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**REGULATIONS**

- 10 C.F.R. 110.84(a)  
Commission considers whether an export license would be in the public interest and whether a hearing would assist the Commission in deciding whether to grant or deny the request; CLI-19-2, 89 NRC 231 (2019)
- 10 C.F.R. 110.84(b)  
when determining whether petitioner identifies an interest that may be affected on an export license, Commission considers nature of alleged interest, how that interest relates to issuance or denial, and possible effect of any order on that interest, including whether the relief requested is within the Commission's authority, and, if so, whether granting relief would redress the alleged injury; CLI-19-2, 89 NRC 231 (2019)
- 10 C.F.R. 140.11  
licensees in decommissioning continue to carry onsite property damage insurance and offsite nuclear liability insurance, in amounts the NRC requires for a defueled plant; CLI-19-6, 89 NRC 476 n.56 (2019)
- 40 C.F.R. 141.62  
maximum contaminant levels for selenium in groundwater is 50 µg/L; CLI-19-5, 89 NRC 334 n.27 (2019)
- 40 C.F.R. Part 192  
groundwater restoration at ISR facilities must meet Uranium Mill Tailings Radiation Control Act standards rather than those associated with the Safe Drinking Water Act or analogous state regulations; LBP-19-2, 89 NRC 134 (2019)
- 40 C.F.R. 192.32(a)(2)  
groundwater quality standards for all restored aquifers must conform to the standards promulgated by EPA; LBP-19-2, 89 NRC 134 (2019)
- 40 C.F.R. 401.15  
selenium and its compounds are included in the list of toxic pollutants; CLI-19-5, 89 NRC 334 n.27 (2019)
- 40 C.F.R. 1500.2(e)  
NEPA calls for consideration of reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment; LBP-19-4, 89 NRC 460 (2019)
- 40 C.F.R. 1501.2(c), 1502.1  
NEPA requires consideration of reasonable alternatives to proposed actions that involve unresolved conflicts concerning alternative users of available resources; LBP-19-4, 89 NRC 460 (2019)
- 40 C.F.R. 1502.22  
when information on reasonably foreseeable significant adverse effects on the human environment is incomplete or unavailable in an environmental impact statement, the agency shall always make clear that such information is lacking; LBP-19-5, 89 NRC 504 (2019)
- 40 C.F.R. 1508.27  
agencies should consider both the context and intensity of environmental impacts; LBP-19-2, 89 NRC 41 (2019)
- 49 C.F.R. Parts 107, 171-180, 390-397  
spent nuclear fuel transportation route identification requires separate review and approval by NRC and the Department of Transportation, as well as by applicable states or tribes; LBP-19-4, 89 NRC 446 (2019)

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- 28 U.S.C. § 455(a)-(b)  
federal standards hold that a judge must disqualify himself or herself whenever the judge's impartiality in the proceeding might reasonably be questioned, as well as in specific circumstances in which conflict of interest is shown; CLI-19-3, 89 NRC 238 (2019)
- Administrative Procedure Act, 5 U.S.C. § 706  
standard for judicial review of agency action is provided; CLI-19-1, 89 NRC 4 (2019)
- Administrative Procedure Act, 5 U.S.C. § 706(2)(A)  
had NRC abandoned its one-renewal limit on the 1991 Part 51 amendments without expressly explaining why, the agency's action would have been subject to challenge as arbitrary and capricious; LBP-19-3, 89 NRC 307 (2019)
- Atomic Energy Act §§ 62, 81, 42 U.S.C. §§ 2092, 2111  
NRC has authority to issue licenses for the possession and use of source and byproduct material; LBP-19-2, 89 NRC 38 (2019)
- Atomic Energy Act, 42 U.S.C. § 2155a  
hearing will be granted on an export license application when NRC finds that such a hearing will be in the public interest and will assist in making the statutory determinations required by the Act; CLI-19-2, 89 NRC 231 (2019)
- Atomic Energy Act, 184, 42 U.S.C. § 2234  
NRC must provide prior written consent for a license transfer; CLI-19-6, 89 NRC 470-71 n.20 (2019)
- Atomic Energy Act, 186, 42 U.S.C. § 2236  
license issued by NRC may be revoked for any material false statement in the license application; LBP-19-4, 89 NRC 418, 421, 451 (2019)  
violation of this section requires a willful misrepresentation; LBP-19-4, 89 NRC 421 (2019)
- Atomic Energy Act, 189a, 42 U.S.C. § 2239(a)(1)(A)  
NRC is required to grant a hearing upon the request of any person whose interest may be affected by the proceeding; LBP-19-3, 89 NRC 258 n.21 (2019); LBP-19-4, 89 NRC 363 (2019)
- Clean Water Act, 307(a)  
compliance with effluent standards established for toxic pollutants is required in NPDES permits; CLI-19-5, 89 NRC 334 n.27 (2019)
- National Environmental Policy Act, 42 U.S.C. §§ 4321 *et seq.*  
it is NRC Staff's responsibility to comply with NEPA in its later-issued EIS; LBP-19-4, 89 NRC 375-76 (2019)
- National Environmental Policy Act, 42 U.S.C. § 4332(2)(C)  
federal agencies must prepare an environmental impact statement before undertaking any major federal actions significantly affecting the quality of the human environment; LBP-19-4, 89 NRC 375 (2019); LBP-19-5, 89 NRC 494 (2019)
- National Environmental Policy Act, 42 U.S.C. § 4332(C)(i)-(iii)  
environmental impact statement must include a detailed discussion of the environmental impact of the proposed action, any adverse environmental effects that cannot be avoided, and alternatives to the proposed action; LBP-19-3, 89 NRC 261 (2019); LBP-19-5, 89 NRC 494 (2019)  
federal agencies must prepare an environmental impact statement for proposed major federal actions significantly affecting the quality of the human environment; LBP-19-3, 89 NRC 261 (2019)

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- National Historic Preservation Act, 54 U.S.C. §§300101-307108 (previously codified at 16 U.S.C. §§ 470(a)-470x-6)  
NRC Staff has a duty to consult with local Native American tribes during its environmental review; CLI-19-5, 89 NRC 340 n.57 (2019)
- National Historic Preservation Act, 54 U.S.C. § 307103(a)  
NRC Staff may withhold information from an environmental document if they determine that public disclosure might risk harm to a potential historic resource; LBP-19-4, 89 NRC 427 (2019)
- New Mexico Open Meetings Act, N.M. Stat. Ann. § 10-15-1 (1978)  
claims under state law against an entity that is not seeking a license from the NRC are outside the scope of this proceeding; LBP-19-4, 89 NRC 457 (2019)
- Nuclear Waste Policy Act, 42 U.S.C. § 10131  
until a permanent waste repository opens, generators and owners of high-level radioactive waste and spent nuclear fuel have the primary responsibility to provide for, and the responsibility to pay the costs of, interim storage; LBP-19-4, 89 NRC 378 (2019)
- Nuclear Waste Policy Act of 1982, 42 U.S.C. 10134(d)  
Yucca Mountain was statutorily authorized to store 70,000 metric tons of high-level radioactive waste; LBP-19-4, 89 NRC 360 (2019)
- Nuclear Waste Policy Act, 42 U.S.C. § 10143  
delivery, and acceptance by the Secretary of Energy, of any high-level radioactive waste or spent nuclear fuel for a repository shall constitute a transfer to the Secretary of title to such waste or spent fuel; LBP-19-4, 89 NRC 378 n.150 (2019)
- DOE is precluded from taking title to spent fuel unless and until a permanent repository has opened; LBP-19-4, 89 NRC 377 (2019)
- Nuclear Waste Policy Act, 302, 42 U.S.C. § 10222  
power reactor licensees were required to pay into a Nuclear Waste Fund for construction of the repository; LBP-19-4, 89 NRC 376 (2019)
- Nuclear Waste Policy Act, 42 U.S.C. § 10222(a)(5)(A)  
DOE is precluded from taking title to spent fuel unless and until a permanent repository has opened; LBP-19-4, 89 NRC 377 (2019)  
DOE will take title to spent fuel only following commencement of operation of a repository; LBP-19-4, 89 NRC 378 (2019)
- Nuclear Waste Policy Act, 302(a)(5)(B)  
DOE was committed to begin disposing of the nuclear power plants' spent fuel no later than January 31, 1998; LBP-19-4, 89 NRC 376 (2019)
- Safe Drinking Water Act, 42 U.S.C. §§ 300f-300j  
maximum contaminant levels for selenium in groundwater set by the Nebraska DEQ is the same maximum contaminant level set by the U.S. Environmental Protection Agency; CLI-19-5, 89 NRC 334 n.27 (2019)



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OTHERS**

- Exec. Order 12898, 59 Fed. Reg. at 7629  
federal agencies must identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations; LBP-19-4, 89 NRC 454 (2019)
- Merriam-Webster's Collegiate Dictionary (10th ed. 1993)  
"initial" means "of or relating to the beginning, placed at the beginning, first"; LBP-19-3, 89 NRC 305 (2019)
- 118 Neb. Admin. Code § 4-002  
maximum contaminant levels for selenium in groundwater set by the Nebraska DEQ is the same maximum contaminant level set by the U.S. Environmental Protection Agency; CLI-19-5, 89 NRC 334 n.27 (2019)



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### ACCIDENTS

- analysis of required transport accident conditions is addressed in 10 C.F.R. 71.73; LBP-19-4, 89 NRC 353 (2019)
- contention concerning the likelihood of rail accidents during transport of nuclear waste is not admissible; LBP-19-4, 89 NRC 353 (2019)
- contention that omission of accident risks posed by operating aging reactor equipment from environmental report is inadmissible; LBP-19-5, 89 NRC 483 (2019)
- mere fact that additional radioactive waste will be transported if NRC licenses a project does not ipso facto establish a reasonable opportunity for an accident or for radioactive materials to escape because of accident or nature of the substance being transported; LBP-19-4, 89 NRC 353 (2019)

### ACCIDENTS, SEVERE

- inclusion of design-basis accident risk analysis in environmental report for subsequent license renewal is discussed; LBP-19-5, 89 NRC 483 (2019)

### ADJUDICATORY HEARINGS

- board's hearing, hearing record, and subsequent decision on a contested environmental record augment the environmental record of decision developed by the Staff; CLI-19-5, 89 NRC 329 (2019)
- See also Bifurcation of Proceedings; Demand for Hearing; Evidentiary Hearings; Export License Proceedings; Hearing Requests; Hearing Rights; Independent Spent Fuel Storage Installation Proceedings; Materials License Proceedings; Operating License Renewal Proceedings

### ADMINISTRATIVE PROCEDURE ACT

- APA contains a variety of constraints and remedies that serve to prevent agencies from taking improper shortcuts when revising their regulations; LBP-19-3, 89 NRC 245 (2019)
- between the general provisions in the APA and the more specific requirements in the Atomic Energy Act, the Atomic Energy Act controls; LBP-19-3, 89 NRC 245 (2019)
- mandate that agencies use the same procedures when they amend or repeal a rule as they used to issue the rule in the first instance is discussed; LBP-19-3, 89 NRC 245 (2019)

### ADOPTION OF CONTENTIONS

- participant must have demonstrated standing in their own right and (have proffered an admissible contention itself; LBP-19-4, 89 NRC 353 (2019)

### AFFIDAVITS

- petitioner is allowed some latitude to supplement or cure a standing showing in its reply pleading as long as any additional arguments are supported by a supplemental affidavit; LBP-19-4, 89 NRC 353 (2019)

### AGING MANAGEMENT

- contention that external operating experience is insufficient for the aging management programs for subsequent license renewal term is inadmissible; LBP-19-5, 89 NRC 483 (2019)
- contention that omission of accident risks posed by operating aging reactor equipment from environmental report is inadmissible; LBP-19-5, 89 NRC 483 (2019)
- license renewal applications must demonstrate that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis for the period of extended operation; LBP-19-5, 89 NRC 483 (2019)
- NRC may issue a renewed license if it concludes that licensee's management of aging effects on the plant's identified structures, systems, and components will provide reasonable assurance that the

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activities authorized by the renewed license will continue to be conducted in accordance with the current licensing basis; LBP-19-5, 89 NRC 483 (2019)  
power reactor license renewal applicants must demonstrate how their programs and procedures will manage the effects of aging on power reactor structures, systems, and components; LBP-19-5, 89 NRC 483 (2019)

### ALARA

in assessing adequacy of the effort in establishing an alternate concentration limit, licensee must achieve a value that is as low as reasonably achievable, after considering practicable corrective actions; LBP-19-2, 89 NRC 18 (2019)

### ALTERNATE CONCENTRATION LIMITS

applicant may request a license amendment for an ACL where ACL value would be the same as the NDEQ Title 118 water quality standards as long as the request meets all the requirements of this criterion; LBP-19-2, 89 NRC 18 (2019)

if applicant cannot meet either of the Part 40 standards, it may seek NRC approval for an ACL; LBP-19-2, 89 NRC 18 (2019)

in assessing adequacy of the effort in establishing an ACL, licensee must achieve a value that is as low as reasonably achievable, after considering practicable corrective actions; LBP-19-2, 89 NRC 18 (2019)  
limits for hazardous constituent in groundwater are established by NRC; LBP-19-2, 89 NRC 18 (2019)

### AMENDMENT OF CONTENTIONS

board must first consider whether motion to file a contention satisfies the three-prong test before considering whether to allow petitioner to amend its contention after the deadline for filing petitions; LBP-19-4, 89 NRC 353 (2019)

licensing boards have found 30 days from a triggering event for proffering a new or amended contention to be timely; LBP-19-4, 89 NRC 353 (2019); LBP-19-5, 89 NRC 483 (2019)

new and amended contentions must be based on new facts not previously available; LBP-19-4, 89 NRC 353 (2019)

petitioners seeking to amend their original contentions or proffer new ones after the cutoff date must meet the good cause standard; LBP-19-4, 89 NRC 353 (2019)

### AMENDMENT OF REGULATIONS

Administrative Procedure Act's mandate that agencies use the same procedures when they amend or repeal a rule as they used to issue the rule in the first instance is discussed; LBP-19-3, 89 NRC 245 (2019)

because NRC promulgated section 51.53(c)(3) through notice-and-comment rulemaking, it must use the same procedure if it wants to amend or repeal the rule; LBP-19-3, 89 NRC 245 (2019)

neither the board nor the Commission has authority to effectively amend a regulation to reflect new Commission intent outside of the notice-and-comment process; LBP-19-3, 89 NRC 245 (2019)

when presented with an unambiguous regulation, an agency may not, under guise of interpreting that regulation, create de facto a new regulation; LBP-19-3, 89 NRC 245 (2019)

### APPELLATE REVIEW

Commission defers to boards on issues of contention admissibility unless the board made an error of law or abused its discretion; CLI-19-5, 89 NRC 329 (2019)

Commission defers to the board's findings with respect to the facts in a merits decision unless the findings are clearly erroneous; CLI-19-5, 89 NRC 329 (2019)

Commission direction to NRC Staff generally is not reviewable in an NRC adjudication but such a petition may be considered discretionarily; CLI-19-5, 89 NRC 329 (2019)

Commission will grant a petition for review at its discretion, upon a showing that petitioner has raised a substantial question as to five considerations; CLI-19-5, 89 NRC 329 (2019)

Commission will vacate unreviewed Board decisions when appellate review is cut short by mootness; CLI-19-5, 89 NRC 329 (2019)

mere disagreement on how the board weighed conflicting evidence does not raise a substantial question for Commission review; CLI-19-5, 89 NRC 329 (2019)

standard for judicial review of agency action is provided in 5 U.S.C. § 706; CLI-19-1, 89 NRC 1 (2019)

### APPLICANTS

as proponent of agency action, applicant generally has the burden in a licensing proceeding; LBP-19-2, 89 NRC 18 (2019)

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because NRC Staff relies heavily on applicant's environmental report in preparing the environmental assessment, should applicant become a proponent of a particular challenged position set forth in the EA, applicant also has the burden on that matter; LBP-19-2, 89 NRC 18 (2019)  
primary responsibility to address and comply with NRC's safety-related requirements lies with applicant who, in turn, has the burden of proof for a safety-related contention challenging the sufficiency of the application; LBP-19-2, 89 NRC 18 (2019)

### APPROVAL OF LICENSE

Commission declines to set forth a comprehensive formula for addressing future circumstances in which significant NEPA deficiencies are found through the NRC hearing process after Staff issuance of a license; CLI-19-1, 89 NRC 1 (2019)  
court upheld agency's issuance of a conditional approval before completing a hearing on environmental issues, based on agency not allowing that conditional approval to take effect until completion of the environmental hearing; CLI-19-1, 89 NRC 1 (2019)  
during pendency of any materials licensing hearing, consistent with the NRC Staff's findings in its review of the application or matter that is the subject of the hearing and as authorized by law, NRC Staff is expected to promptly issue its approval or denial of the application; CLI-19-1, 89 NRC 1 (2019)  
intervenor may seek a stay of NRC Staff authorization of a license amendment issued during pendency of evidentiary hearing; LBP-19-2, 89 NRC 18 (2019)  
it would be preferable for the final environmental impact statement to contain all relevant information and the record of decision to be complete and adequate before the license is issued; CLI-19-1, 89 NRC 1 (2019)  
NRC Staff may issue its approval or denial of certain types of applications before the presiding officer has issued an initial decision; CLI-19-1, 89 NRC 1 (2019)  
use of stay standard is restricted where a significant NEPA deficiency has already been found through the hearing process; CLI-19-1, 89 NRC 1 (2019)  
with publication of final environmental assessment, NRC Staff notified the board and parties that license amendment authorizing construction and operation had been issued, effective immediately; LBP-19-2, 89 NRC 18 (2019)

### ATOMIC ENERGY ACT

between the general provisions in the APA and the more specific requirements in the Atomic Energy Act, the Atomic Energy Act controls; LBP-19-3, 89 NRC 245 (2019)  
hearing will be granted on an export license application when NRC finds that such a hearing will be in the public interest and will assist in making the required statutory determinations; CLI-19-2, 89 NRC 229 (2019)  
license issued by NRC may be revoked for any material false statement in the license application; LBP-19-4, 89 NRC 353 (2019)  
NRC has authority to issue licenses for the possession and use of source and byproduct material; LBP-19-2, 89 NRC 18 (2019)  
NRC is required to grant a hearing upon the request of any person whose interest may be affected by the proceeding; LBP-19-3, 89 NRC 245 (2019); LBP-19-4, 89 NRC 353 (2019)  
NRC must provide prior written consent for a license transfer; CLI-19-6, 89 NRC 465 (2019)  
violation of section 186 requires a willful misrepresentation; LBP-19-4, 89 NRC 353 (2019)

### BENEFIT-COST ANALYSIS

challenge to applicant's environmental cost-benefit analysis and its analysis of alternatives is inadmissible for failure to address or controvert applicants environmental report; LBP-19-4, 89 NRC 353 (2019)  
environmental reports need not discuss economic or technical benefits and costs of either the proposed action or alternatives except if they are either essential for inclusion of an alternative or relevant to mitigation; LBP-19-3, 89 NRC 245 (2019)

### BIFURCATION OF PROCEEDINGS

Chief Judge of the Atomic Safety and Licensing Board Panel has broad authority to manage the Panel's docket efficiently, including such matters as splitting an adjudication between two boards; CLI-19-3, 89 NRC 236 (2019)

### BURDEN OF PROOF

applicant, as proponent of agency action, generally has the burden in a licensing proceeding; LBP-19-2, 89 NRC 18 (2019)

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- because NRC Staff relies heavily on applicant's environmental report in preparing the environmental assessment, should applicant become a proponent of a particular challenged position set forth in the EA, applicant also has the burden on that matter; LBP-19-2, 89 NRC 18 (2019)
- NRC Staff has the burden of proof on NEPA-based contentions; LBP-19-2, 89 NRC 18 (2019)
- primary responsibility to address and comply with NRC's safety-related requirements lies with applicant who, in turn, has the burden of proof for a safety-related contention challenging the sufficiency of the application; LBP-19-2, 89 NRC 18 (2019)
- to carry the burden of proof on safety or environmental issues, NRC Staff and/or applicant must establish that its position is supported by a preponderance of the evidence; LBP-19-2, 89 NRC 18 (2019)
- BYPRODUCT MATERIALS**  
for export licensing of byproduct materials, NRC will consider whether the export is inimical to the common defense and security; CLI-19-2, 89 NRC 229 (2019)
- BYPRODUCT MATERIALS LICENSES**  
NRC has authority to issue licenses for the possession and use of source and byproduct material; LBP-19-2, 89 NRC 18 (2019)
- CASE MANAGEMENT**  
Chief Judge of the Atomic Safety and Licensing Board Panel has broad authority to manage the Panel's docket efficiently, including such matters as splitting an adjudication between two boards; CLI-19-3, 89 NRC 236 (2019)
- CHEMICAL CONTAMINANTS**  
compliance with effluent standards established for toxic pollutants is required in NPDES permits; CLI-19-5, 89 NRC 329 (2019)
- CHIEF ADMINISTRATIVE JUDGE**  
Chief Judge may substitute board members, or replace an entire board, if necessary for workload reasons; CLI-19-3, 89 NRC 236 (2019)
- Chief Judge of the Atomic Safety and Licensing Board Panel has broad authority to manage the Panel's docket efficiently, including such matters as splitting an adjudication between two boards; CLI-19-3, 89 NRC 236 (2019)
- for the prospect that the judges may be overworked, the Chief Administrative Judge appoints members of each board and has the discretion to manage the boards if the complexity of the issues involved makes it expedient to do so; CLI-19-3, 89 NRC 236 (2019)
- if the Commission itself does not designate the presiding officer, then the Chief Administrative Judge of the Atomic Safety and Licensing Board Panel will do so; CLI-19-3, 89 NRC 236 (2019)
- CLEAN WATER ACT**  
compliance with effluent standards established for toxic pollutants is required in NPDES permits; CLI-19-5, 89 NRC 329 (2019)
- CLIMATE CHANGE**  
contention that environmental report fails to address the effects of climate change during the license renewal period is inadmissible; LBP-19-3, 89 NRC 245 (2019)
- contention that environmental report fails to adequately consider cumulative impacts of continued operation on water resources from the reasonably foreseeable effects of climate change on the cooling canal system, including sea level rise is inadmissible; LBP-19-3, 89 NRC 245 (2019)
- COMMON DEFENSE AND SECURITY**  
for export licensing of byproduct material, NRC will consider whether the export is inimical to the common defense and security; CLI-19-2, 89 NRC 229 (2019)
- COMPENSATORY DAMAGES**  
contract damage lawsuits under the Nuclear Waste Policy Act are now commonplace, and the federal government pays out damages to power reactor licensees on a regular basis; LBP-19-4, 89 NRC 353 (2019)
- COMPLIANCE**  
fuel stored in the UMAX system that is maintained at a temperature below standards is in compliance; LBP-19-4, 89 NRC 353 (2019)
- National Environmental Policy Act does not permit an agency to act first and comply later or to condition performance of its obligation on a showing of irreparable harm; CLI-19-1, 89 NRC 1 (2019)
- statutory obligation for complying with NEPA rests with the NRC Staff; LBP-19-2, 89 NRC 18 (2019)

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### COMPUTER CODE

RADTRAN analysis is used to evaluate incident-free radiological transportation impacts assuming the maximum dose rate allowed for exclusive-use shipments under NRC regulation; LBP-19-4, 89 NRC 353 (2019)

### CONDITIONS

court upheld agency's issuance of a conditional approval before completing a hearing on environmental issues, based on agency not allowing that conditional approval to take effect until completion of the environmental hearing; CLI-19-1, 89 NRC 1 (2019)

### CONFLICT OF INTEREST

argument that a reasonable person might believe the presiding officer would be biased in favor of a party represented by a law firm with which the presiding officer had recently discussed, but had not been offered, employment was rejected; CLI-19-3, 89 NRC 236 (2019)

even where there is no actual conflict of interest, a judge should disqualify himself or herself where a reasonable person would question the judge's impartiality; CLI-19-3, 89 NRC 236 (2019)

### CONSENT

NRC must provide prior written consent for a license transfer; CLI-19-6, 89 NRC 465 (2019)

### CONSIDERATION OF ALTERNATIVES

although neither NRC Staff nor applicant is required to select the most environmentally superior alternative, NRC regulations require the environmental report and the EIS to consider alternatives available for reducing or avoiding adverse environmental impacts; LBP-19-3, 89 NRC 245 (2019)  
applicant's discussion of alternatives in its environmental report must be sufficiently complete to aid NRC in complying with NEPA; LBP-19-4, 89 NRC 353 (2019)

challenge to applicant's environmental cost-benefit analysis and its analysis of alternatives is inadmissible for failure to address or controvert applicants environmental report; LBP-19-4, 89 NRC 353 (2019)

contention regarding dry cooling as a NEPA alternative in light of the sensitive biological resources affected was admissible; LBP-19-3, 89 NRC 245 (2019)

contention that agency must address the alternative of a permanent repository never being developed is not admissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report fails to comply with 10 C.F.R. 52.99(c) because the alternative energy sources review does not include solar or wind power in its analysis is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention that in light of adverse impact of continued cooling canal system operations on the threatened American crocodile and its critical seagrass habitat, the environmental report is deficient for failing to consider reasonable alternatives is admissible; LBP-19-3, 89 NRC 245 (2019)

NEPA calls for consideration of reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment; LBP-19-4, 89 NRC 353 (2019)

NRC requires applicants to take a hard look at the environmental impacts of a proposed action and of environmentally significant alternatives; LBP-19-4, 89 NRC 353 (2019)

NRC Staff has a regulatory obligation to consider reasonable alternatives available for reducing or avoiding adverse environmental effects; LBP-19-3, 89 NRC 245 (2019)

### CONSTRUCTION OF MEANING

*expressio unius* is applied only when circumstances support a sensible inference that the term left out must have been meant to be excluded; LBP-19-3, 89 NRC 245 (2019)

force of the *expressio unius* canon in a particular case, like the force of any negative implication, depends on context; LBP-19-3, 89 NRC 245 (2019)

intervention petition is construed in favor of petitioner when standing is determined; LBP-19-4, 89 NRC 353 (2019)

mention of one thing implies the exclusion of another; LBP-19-3, 89 NRC 245 (2019)

petitioner bears the burden of establishing standing, but licensing boards are to evaluate petitioner's standing, construing the petition in favor of the petitioner; LBP-19-5, 89 NRC 483 (2019)

sometimes Congress drafts statutory provisions that appear preclusive of other unmentioned possibilities without meaning to exclude the unmentioned ones; LBP-19-3, 89 NRC 245 (2019)

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### CONSULTATION DUTY

NRC Staff has a duty to consult with local Native American tribes during its environmental review;  
CLI-19-5, 89 NRC 329 (2019)

### CONTENTIONS

although environmental contentions are, in essence, challenges to Staff's compliance with NEPA, those contentions must be raised, if possible, in response to applicant's environmental report; LBP-19-5, 89 NRC 483 (2019)

incorporation of contentions of other petitioners by reference is allowed only for those who have demonstrated standing and have submitted their own admissible contention; LBP-19-4, 89 NRC 353 (2019)

petitioner may state an issue of law or fact; LBP-19-4, 89 NRC 353 (2019)

petitioners are required to file environmental contentions based on documents or other information available at the time the petition is to be filed; LBP-19-4, 89 NRC 353 (2019)

scope of a contention is limited to issues of law and fact pled with particularity; LBP-19-4, 89 NRC 353 (2019)

See also Adoption of Contentions; Amendment of Contentions

### CONTENTIONS, ADMISSIBILITY

absent applicant's showing that it is attempting to reach regulatory compliance by some other means, the degree to which an application reflects adherence to a standard review plan is a legitimate subject of inquiry; LBP-19-2, 89 NRC 18 (2019)

admissible contention must be timely filed within the time specified in any notice of proposed action; LBP-19-5, 89 NRC 483 (2019)

admissible contention must, at a minimum, reference the portion of the application to which the contention is challenging and show where the applicant is lacking; LBP-19-4, 89 NRC 353 (2019)

admission factors need not be considered for untimely contention; CLI-19-5, 89 NRC 329 (2019)

although it is NRC Staff's responsibility to comply with NEPA in its later-issued environmental impact statement, the board analyzes contentions challenging the environmental report now as if those contentions will migrate as challenges to NRC Staff's later-issued EIS; LBP-19-4, 89 NRC 353 (2019)

although NRC Staff conducts its own independent safety review, parties may not litigate the adequacy of that review; LBP-19-2, 89 NRC 18 (2019)

although petitioner need not prove its contention at the admission stage, mere notice pleading of contentions is insufficient; LBP-19-4, 89 NRC 353 (2019)

amended contention that applicant refuses to publicize emergency and contingency plans is inadmissible; LBP-19-4, 89 NRC 353 (2019)

bald assertions that an application is insufficient or inadequate, without more, do not meet the NRC's contention admissibility standard; LBP-19-4, 89 NRC 353 (2019)

because Category 1 issues have been addressed and codified in Part 51, they cannot be litigated in individual adjudications, such as license renewal proceedings for individual plants; LBP-19-3, 89 NRC 245 (2019)

belated opportunity to submit a waiver petition was offered after resolving an apparent ambiguity in the license renewal regulations; LBP-19-3, 89 NRC 245 (2019)

board examines legal question relevant to the admissibility of contention whether 10 C.F.R. 51.53(c)(3) applies to applicant's preparation of an environmental report in subsequent license renewal proceedings; LBP-19-3, 89 NRC 245 (2019)

board must first consider whether motion to file a contention satisfies the three-prong test before considering whether to allow petitioner to amend its contention after the deadline for filing petitions; LBP-19-4, 89 NRC 353 (2019)

board proceedings regarding application for an NRC-issued license are not a proper forum for contentions that comprise broad policy recommendations and challenges to agency rules; LBP-19-4, 89 NRC 353 (2019)

challenge to a Category 1 issue is not admissible because petitioners have failed to seek a rule waiver; LBP-19-3, 89 NRC 245 (2019)

challenge to a Commission rule or regulation will be rejected unless petitioner makes a prima facie showing supporting a rule waiver before the licensing board, which then must certify the waiver request to the Commission; LBP-19-3, 89 NRC 245 (2019)



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challenge to applicant's environmental cost-benefit analysis and its analysis of alternatives is inadmissible for failure to address or controvert applicants environmental report; LBP-19-4, 89 NRC 353 (2019)

challenge to Continued Storage Rule and impact evaluations in the Continued Storage GEIS requires grant of a rule waiver; LBP-19-4, 89 NRC 353 (2019)

challenges to adequacy of environmental report's discussions related to altered salinity gradients in surface waters and groundwater quality degradation are Category 1 issues and therefore not subject to direct or indirect challenge absent a waiver; LBP-19-3, 89 NRC 245 (2019)

challenges to methodology of endangered dunes sagebrush lizard surveys are not supported by any information that genuinely disputes their sufficiency; LBP-19-4, 89 NRC 353 (2019)

claims of prior violations or past events that are raised for litigation must be directly germane to the challenged licensing action; CLI-19-6, 89 NRC 465 (2019)

claims under state law against an entity that is not seeking a license from the NRC are outside the scope of NRC proceedings; LBP-19-4, 89 NRC 353 (2019)

Commission defers to boards on issues of contention admissibility unless the board made an error of law or abused its discretion; CLI-19-5, 89 NRC 329 (2019)

Commission does not expect a litigant to merely reference large portions of material where doing so would force a tribunal to sift through it in search of asserted factual support; LBP-19-3, 89 NRC 245 (2019)

contention admissibility requirements are provided in 10 C.F.R. 2.309(f); CLI-19-6, 89 NRC 465 (2019)

contention alleging that a federal lawsuit is in play related to potential EPA violations and that plume migration threatens the water supply and federally protected bay is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention alleging that rising sea levels pose a potential risk to safe plant operations, including spent fuel storage, raises a current licensing basis safety issue that is outside the scope of the proceeding; LBP-19-3, 89 NRC 245 (2019)

contention asserting that applicant omitted discussion of high-burnup fuel storage from the environmental report is inaccurate and inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention asserting that use of wastewater to recharge the cooling canals may present a threat to drinking water, groundwater, and safe operation of the plant is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention challenging any aspect of an NRC-approved canister or cask is outside the scope of an independent spent fuel storage installation proceeding; LBP-19-4, 89 NRC 353 (2019)

contention challenging credibility of environmental report preparer is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention challenging thermal evaluation of the HI-STORM UMAX system is inadmissible because it challenges a Commission rule; LBP-19-4, 89 NRC 353 (2019)

contention challenging whether decommissioning plan provides reasonable assurance that funds will be available to decommission interim storage facility is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention claiming that environmental report underestimates impacts related to tritium releases to groundwater is inadmissible because it lacks the requisite support; LBP-19-3, 89 NRC 245 (2019)

contention concerning likelihood of rail accidents during transport of nuclear waste is not admissible; LBP-19-4, 89 NRC 353 (2019)

contention contesting license renewal application projections of sea level rise by 2100 is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention filed after the deadline for initial petitions will not be entertained absent a determination that petitioner has demonstrated good cause; CLI-19-5, 89 NRC 329 (2019)

contention is subject to summary dismissal on the grounds that it was an impermissible challenge to an agency regulation; LBP-19-3, 89 NRC 245 (2019)

contention is subject to summary dismissal on the grounds that it was outside the scope of the proceeding; LBP-19-3, 89 NRC 245 (2019)

contention migrates when a licensing board construes a contention challenging an environmental report as a challenge to a subsequently issued Staff NEPA document without the petitioner amending the contention; LBP-19-3, 89 NRC 245 (2019); LBP-19-4, 89 NRC 353 (2019)

contention must demonstrate a genuine dispute with applicant on a material issue of law or fact; CLI-19-6, 89 NRC 465 (2019)

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contention must fall within the scope of the proceeding and be material to the findings that NRC must make regarding the proposed licensing action; CLI-19-6, 89 NRC 465 (2019)

contention must satisfy six pleading requirements of 10 C.F.R. 2.309(f)(1); LBP-19-4, 89 NRC 353 (2019); LBP-19-5, 89 NRC 483 (2019)

contention of omission must be summarily rejected if the topic that allegedly is omitted is in fact included with the application; LBP-19-4, 89 NRC 353 (2019)

contention regarding dry cooling as a NEPA alternative in light of the sensitive biological resources affected was admissible; LBP-19-3, 89 NRC 245 (2019)

contention requesting unconditional disclosure in the environmental report of probable transportation routes for spent nuclear fuel to the consolidated interim storage facility is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that additional technical study of seismic risk should be considered in environmental report was admissible; LBP-19-5, 89 NRC 483 (2019)

contention that agency must address the alternative of a permanent repository never being developed is not admissible; LBP-19-4, 89 NRC 353 (2019)

contention that applicant cannot provide reasonable assurances that it can obtain the necessary funds to cover the costs of construction, operation, maintenance, and decommissioning of the consolidated interim storage facility is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that applicant plans to aggregate spent nuclear fuel in southeastern New Mexico for purposes of reprocessing is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that applicant's policy of rejecting and returning canisters that have unacceptable external radioactive or structural damage will create potential exposure routes that pose radioactive contamination threats to the public, nuclear workers, and the environment is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that application does not address liability coverage is inadmissible for failure to demonstrate why this issue is material or relates to financial qualifications; LBP-19-4, 89 NRC 353 (2019)

contention that attacks adequacy of environmental report's analysis of cumulative impacts in light of applicant's history of noncompliance with its permits relating to the cooling canal system is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention that brine, contaminated groundwater, soil, and wind-blown dust could potentially degrade HI-STORE vault and spent fuel storage canisters stored therein is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that cladding failure due to high-burnup fuel is inadequately addressed in the environmental report is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that consolidated interim storage facility is within the habitat of the endangered dunes sagebrush lizard is inadmissible because petitioner's maps do not support it; LBP-19-4, 89 NRC 353 (2019)

contention that consolidated interim storage facility's Safety Analysis Report must analyze and evaluate design and performance of structures, systems, and components important to safety for operation of the facility is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that does not comply with NRC's strict-by-design standards is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report and SAR do not adequately discuss and evaluate risks created by geologic conditions is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report and SAR do not discuss the presence and implications of fractured rock beneath consolidated interim storage facility site that could allow radioactive leaks to enter groundwater is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report does not contain any information as to whether brine continues to flow in the subsurface under the consolidated interim storage facility site is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report erroneously fails to describe the reasonably foreseeable affected environment during the subsequent license renewal period (2032-2053), rendering applicant's analyses of environmental impacts, mitigating actions, and alternatives analysis legally insufficient is inadmissible; LBP-19-3, 89 NRC 245 (2019)

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contention that environmental report fails to address the adverse effect of operating the cooling canal system for an additional 20 years on surface waters, freshwater wetlands, and endangered species present in those wetlands is admissible in part; LBP-19-3, 89 NRC 245 (2019)

contention that environmental report fails to address the cumulative impacts related to hypersalinity and mitigation measures is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention that environmental report fails to address the effects of climate change during the license renewal period is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention that environmental report fails to adequately consider cumulative impacts of continued operation on water resources from the reasonably foreseeable effects of climate change on the cooling canal system, including sea level rise is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention that environmental report fails to analyze site characteristics that may directly affect safety or environmental impact of the ISFSI is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report fails to comply with 10 C.F.R. 52.99(c) because the alternative energy sources review does not include solar or wind power in its analysis is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention that environmental report has not adequately evaluated loss of ductility on fuel rods due to high-burnup fuel and the likelihood of material strength and a release of radioactive material is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report improperly fails to consider the impact of salinization on surface waters and freshwater wetlands caused by the cooling canal system is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention that environmental report improperly ignores water resource conflicts insofar as it fails to account for the effect sea level rise will have on freshwater availability, groundwater resources, and release of polluted cooling water into Biscayne Bay is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention that environmental report inadequately determined and discussed the possibility that waste-contaminated groundwater could reach the Santa Rosa Formation is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report is incomplete because it fails to include a discussion of whether applicant intends to seek any power uprates during the renewal period is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention that environmental report lacks experimental support for the safe transportation and storage of high-burnup fuel is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report mischaracterizes both the Blue Ribbon Commission report's conclusions and the relative risks of consolidated interim storage versus onsite storage is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report must conduct an analysis concerning terrorism under NEPA is inadmissible as outside the scope of this proceeding; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report must consider all potential impacts if consolidated interim storage ultimately continues to operate beyond the design life and service life is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report underestimates the volume of low-level radioactive waste that will be generated by the consolidated interim storage facility is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report's cumulative effects analysis fails entirely to discuss the sea level rise-related impacts upon affected resources is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention that environmental report's earthquake data are historical and do not take into account recent fracking activity around the proposed project site is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that extended operation of the consolidated interim storage facility beyond the 100-year benchmark is a cumulative action and must be analyzed as such under NEPA is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that external operating experience is insufficient for the aging management programs for subsequent license renewal term is inadmissible; LBP-19-5, 89 NRC 483 (2019)

contention that in light of adverse impact of continued cooling canal system operations on the threatened American crocodile and its critical seagrass habitat, the environmental report is deficient for failing to consider reasonable alternatives is admissible; LBP-19-3, 89 NRC 245 (2019)

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contention that information on a historic property was withheld from environmental report is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that omission of accident risks posed by operating aging reactor equipment from environmental report is inadmissible; LBP-19-5, 89 NRC 483 (2019)

contention that packer tests in the Santa Rosa Formation to estimate the hydraulic conductivity (permeability) of the formation were not conducted properly is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that relates to the impact of ammonia releases during the renewal period on endangered and threatened species and their critical habitat is admissible; LBP-19-3, 89 NRC 245 (2019)

contention that spent fuel cladding will not be protected against degradation that leads to gross ruptures in the fuel is inadmissible; LBP-19-4, 89 NRC 353 (2019)

dispute regarding character or integrity must raise issues directly germane to the challenged licensing action; LBP-19-4, 89 NRC 353 (2019)

failure to comply with any admissibility requirement renders a contention inadmissible; LBP-19-3, 89 NRC 245 (2019)

failure to identify specific documents referenced in a cited report that applicant should have reviewed and evaluated and to offer any evidence that NEPA mandates such a document review and evaluation in an environmental report renders a contention inadmissible; LBP-19-5, 89 NRC 483 (2019)

failure to satisfy even one of the contention pleading requirements requires the board to reject the contention; LBP-19-4, 89 NRC 353 (2019)

general speculation about potential future costs, without specifying how they make incorrect the financial analysis for the only phase covered by the application, does not raise a genuine dispute; LBP-19-4, 89 NRC 353 (2019)

hybrid safety and environmental contention that raises issues about adequacy of application's hydrogeologic characterization of the site and its environs is inadmissible; LBP-19-2, 89 NRC 18 (2019)

if there are alleged omissions in the environmental analysis, in an NRC adjudication it is intervenors' burden to show their significance and materiality; LBP-19-4, 89 NRC 353 (2019)

interlocutory review sought on grounds that board's timeliness rulings were so overbroad as to affect the basic structure of the proceeding in a pervasive or unusual manner is denied; CLI-19-5, 89 NRC 329 (2019)

legal error renders contention inadmissible for failing to show that the issue raised is material to the findings NRC must make to support the action in the proceeding; LBP-19-3, 89 NRC 245 (2019)

legal issue contention need not address every requirement of section 2.309(f)(1), such as providing a concise statement of the alleged facts or expert opinions that support the requestor's/petitioner's position on the issue; LBP-19-4, 89 NRC 353 (2019)

mere expansion of issues due to admission of a contention rarely, if ever, warrants interlocutory review; CLI-19-5, 89 NRC 329 (2019)

mere increase in litigation burden caused by board's admission of an additional contention is not a pervasive and unusual effect on the litigation or an irreparable harm warranting interlocutory review; CLI-19-5, 89 NRC 329 (2019)

merely referencing a report that does not identify specific portions of the license application does not comply with NRC's specificity requirements; LBP-19-4, 89 NRC 353 (2019)

neither mere speculation nor bare or conclusory assertions, even by an expert, alleging that a matter should be considered will suffice to allow the admission of a proffered contention; LBP-19-4, 89 NRC 353 (2019)

new and significant information requirement does not override, for purposes of litigating issues in an adjudicatory proceeding, the exclusion of Category 1 issues in 10 C.F.R. 51.53(c)(3)(i) from site-specific review, but a rule waiver is required; LBP-19-3, 89 NRC 245 (2019)

new contention filed on NRC Staff document prepared pursuant to the NEPA must still meet the timeliness requirements; CLI-19-5, 89 NRC 329 (2019)

no NRC rule or regulation may be challenged in a contention unless petitioner seeks and obtains a waiver from the Commission; LBP-19-4, 89 NRC 353 (2019)

NRC regulations bar challenges to the Continued Storage Rule; LBP-19-4, 89 NRC 353 (2019)

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opinion testimony that states a legal standard or draws a legal conclusion by applying law to the facts is generally inadmissible; LBP-19-2, 89 NRC 18 (2019)

party to an adjudicatory proceeding can invoke 10 C.F.R. 2.335 and request that a GEIS finding for a Category 1 issue be waived with respect to that proceeding; LBP-19-3, 89 NRC 245 (2019)

petitioner claiming that financial data are either inaccurate or insufficient must identify each failure and explain why the data are flawed; CLI-19-6, 89 NRC 465 (2019)

petitioner is barred by regulation from challenging either the Staff's safety evaluation report or the UMAX SAR analyses in an adjudication; LBP-19-4, 89 NRC 353 (2019)

petitioner must identify specific disputed portions of the application with supporting reasons for each dispute, or identify each failure to contain information required by law and provide supporting reasons for petitioner's belief; CLI-19-6, 89 NRC 465 (2019)

petitioner's failure to comply with any of the section 2.309(f)(1) requirements renders a contention inadmissible; LBP-19-5, 89 NRC 483 (2019)

petitioner's request for an environmental analysis under NEPA of a license transfer application constitutes an impermissible challenge to the categorical exclusion rule and does not meet contention standards; CLI-19-6, 89 NRC 465 (2019)

petitioners seeking to amend their original contentions or proffer new ones after the cutoff date must meet the good cause standard; LBP-19-4, 89 NRC 353 (2019)

pointing to responses to a request for additional information, without more, will rarely provide sufficient support for an admissible contention; LBP-19-4, 89 NRC 353 (2019)

previously, licensing boards would sometimes admit contentions that appeared to be based on little more than speculation, and petitioners would try to unearth admissible contentions through cross-examination; LBP-19-4, 89 NRC 353 (2019)

rather than expend agency time and resources on vague and unsupported claims, NRC strengthened contention admissibility standards so that evidentiary hearings are afforded only to those who proffer at least some minimal factual and legal foundation in support of their contentions; LBP-19-4, 89 NRC 353 (2019)

requests for extensions of time do not constitute contentions challenging a license renewal application; LBP-19-3, 89 NRC 245 (2019)

requirements are strict by design and intended to ensure that adjudicatory proceedings are triggered only by substantive safety or environmental issues, rooted in a reasonably specific factual or legal basis; CLI-19-6, 89 NRC 465 (2019)

requirements of state law are matters for state regulatory bodies; LBP-19-2, 89 NRC 18 (2019)

requiring a petitioner to allege facts under section 2.309(f)(1)(v) or to provide an affidavit that sets out the factual and/or technical bases under section 51.109(a)(2) in support of a legal contention as opposed to a factual contention is not necessary; LBP-19-4, 89 NRC 353 (2019)

routine contention admissibility rulings do not warrant the extraordinary step of interlocutory review; CLI-19-5, 89 NRC 329 (2019)

rules are strict by design; LBP-19-3, 89 NRC 245 (2019); LBP-19-4, 89 NRC 353 (2019)

rules properly reserve the hearing process for genuine, material controversies between knowledgeable litigants; LBP-19-4, 89 NRC 353 (2019)

scope of safety issues that may be considered in an operating license renewal proceeding is limited; LBP-19-5, 89 NRC 483 (2019)

six-factor contention admission standard resulted from the Commission's effort to raise the threshold bar for an admissible contention; LBP-19-4, 89 NRC 353 (2019)

timely filed contention is admissible if it satisfies the six-factor contention admissibility criteria of 10 C.F.R. 2.309(f)(1)(i)-(vi); LBP-19-3, 89 NRC 245 (2019)

to be admissible, claims of poor character or integrity must have some direct and obvious relationship between the character issues and the licensing action in dispute; CLI-19-6, 89 NRC 465 (2019)

to challenge incorporated analyses from Staff generic environmental impact statement in a licensing proceeding, petitioner would have to obtain a rule waiver; LBP-19-5, 89 NRC 483 (2019)

to show a genuine material dispute, contention would have to give the board reason to believe that contamination from a defective canister could find its way outside of the cask; LBP-19-4, 89 NRC 353 (2019)

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- unsupported claims of insufficient information do not establish a genuine, material dispute with the application; CLI-19-6, 89 NRC 465 (2019)
- vague allegations will not support admission of contentions; LBP-19-4, 89 NRC 353 (2019)
- CONTENTIONS, LATE-FILED**
- admissibility factors need not be considered for untimely contention; CLI-19-5, 89 NRC 329 (2019)
- contention filed after the deadline for initial petitions will not be entertained absent a determination that the petitioner shows good cause; CLI-19-5, 89 NRC 329 (2019)
- good cause for late filing exists if petitioner can show that information on which the amended or new contention is based was not previously available and is materially different, and the filing has been submitted in a timely fashion based on the availability of the subsequent information; LBP-19-4, 89 NRC 353 (2019); LBP-19-5, 89 NRC 483 (2019)
- interlocutory review sought on grounds that board's timeliness rulings were so overbroad as to affect the basic structure of the proceeding in a pervasive or unusual manner is denied; CLI-19-5, 89 NRC 329 (2019)
- licensing boards have found 30 days from a triggering event for proffering a new or amended contention to be timely; LBP-19-4, 89 NRC 353 (2019); LBP-19-5, 89 NRC 483 (2019)
- materially different information in context of late-filed contentions concerns the type or degree of difference between the new information and previously available information; LBP-19-4, 89 NRC 353 (2019); LBP-19-5, 89 NRC 483 (2019)
- new and amended contentions must be based on new facts not previously available; LBP-19-4, 89 NRC 353 (2019)
- new contention filed on NRC Staff document prepared pursuant to the NEPA must still meet the timeliness requirements; CLI-19-5, 89 NRC 329 (2019)
- participant in an adjudication may file a new environmental contention after the deadline for initial intervention petitions based on a draft or final environmental review document if that contention complies with the requirements of section 2.309(c); CLI-19-5, 89 NRC 329 (2019)
- petitioners seeking to amend their original contentions or proffer new ones after the cutoff date must meet the good cause standard; LBP-19-4, 89 NRC 353 (2019); LBP-19-5, 89 NRC 483 (2019)
- petitioners who choose to wait to proffer environmental contentions challenging NRC Staff's later-issued environmental document do so at their peril because if there is no material difference between the applicant's ER and the NRC Staff's environmental document, a contention raised at that point would be rendered impermissibly late; LBP-19-5, 89 NRC 483 (2019)
- previously available information that is newly acquired by the petitioner does not constitute good cause for late filing; LBP-19-4, 89 NRC 353 (2019)
- CONTESTED LICENSE APPLICATIONS**
- when petitioner withdraws its petition in a contested proceeding and there are no petitions remaining, NRC terminates the proceeding; CLI-19-4, 89 NRC 241 (2019)
- CONTINUED STORAGE RULE**
- applicant's environmental report is not required to discuss impacts following the proposed license term; LBP-19-4, 89 NRC 353 (2019)
- challenge to Continued Storage Rule and impact evaluations in the Continued Storage GEIS requires grant of a rule waiver; LBP-19-4, 89 NRC 353 (2019)
- generic environmental impact statement acknowledges that not all storage facilities will necessarily match the assumed generic facility, and therefore NRC will evaluate site-specific impacts of the construction and operation as part of that facility's licensing process; LBP-19-4, 89 NRC 353 (2019)
- generic environmental impact statement determined that at-reactor storage for an indefinite period would generally result in only small environmental impacts; LBP-19-4, 89 NRC 353 (2019)
- NRC developed its Continued Storage Rule and Generic Environmental Impact Statement as a response to ruling that NRC inadequately performed its NEPA evaluation by not considering the environmental effects of failing to secure permanent storage; LBP-19-4, 89 NRC 353 (2019)
- NRC regulations bar challenges to this rule; LBP-19-4, 89 NRC 353 (2019)
- CONTRACTORS**
- contention challenging credibility of environmental report preparer is inadmissible; LBP-19-4, 89 NRC 353 (2019)

## SUBJECT INDEX

### COOLING SYSTEMS

- contention asserting that use of wastewater to recharge the cooling canals may present a threat to drinking water, groundwater, and safe operation of the plant is inadmissible; LBP-19-3, 89 NRC 245 (2019)
- contention regarding dry cooling as a NEPA alternative in light of the sensitive biological resources affected was admissible; LBP-19-3, 89 NRC 245 (2019)
- contention that attacks adequacy of environmental report's analysis of cumulative impacts in light of applicant's history of noncompliance with its permits relating to the cooling canal system is inadmissible; LBP-19-3, 89 NRC 245 (2019)
- contention that environmental report fails to address the adverse effect of operating the cooling canal system for an additional 20 years on surface waters, freshwater wetlands, and endangered species present in those wetlands is admissible in part; LBP-19-3, 89 NRC 245 (2019)
- contention that environmental report fails to adequately consider cumulative impacts of continued operation on water resources from the reasonably foreseeable effects of climate change on the cooling canal system, including sea level rise is inadmissible; LBP-19-3, 89 NRC 245 (2019)
- contention that environmental report improperly fails to consider the impact of salinization on surface waters and freshwater wetlands caused by the cooling canal system is inadmissible; LBP-19-3, 89 NRC 245 (2019)
- contention that in light of adverse impact of continued cooling canal system operations on the threatened American crocodile and its critical seagrass habitat, the environmental report is deficient for failing to consider reasonable alternative is admissible; LBP-19-3, 89 NRC 245 (2019)

### COSTS

- general speculation about potential future costs, without specifying how they make incorrect the financial analysis for the only phase covered by the application, does not raise a genuine dispute with the application; LBP-19-4, 89 NRC 353 (2019)

See also Decommissioning Costs

### COUNCIL ON ENVIRONMENTAL QUALITY

- CEQ regulations do not bind NRC as an agency, but the Commission has chosen to follow them in some instances; LBP-19-4, 89 NRC 353 (2019)

### CREDIBILITY

- contention challenging credibility of environmental report preparer is inadmissible; LBP-19-4, 89 NRC 353 (2019)

### CUMULATIVE IMPACTS ANALYSIS

- contention that attacks adequacy of environmental report's analysis of cumulative impacts in light of applicant's history of noncompliance with its permits relating to the cooling canal system is inadmissible; LBP-19-3, 89 NRC 245 (2019)
- contention that environmental report fails to adequately consider cumulative impacts of continued operation on water resources from the reasonably foreseeable effects of climate change on the cooling canal system, including sea level rise is inadmissible; LBP-19-3, 89 NRC 245 (2019)
- contention that environmental report's cumulative effects analysis fails entirely to discuss the sea level rise-related impacts upon affected resources is inadmissible; LBP-19-3, 89 NRC 245 (2019)
- contention that extended operation of the consolidated interim storage facility beyond the 100-year benchmark is a cumulative action and must be analyzed as such under NEPA is inadmissible; LBP-19-4, 89 NRC 353 (2019)

### CURRENT LICENSING BASIS

- CLB is an evolving set of requirements and commitments applicable to the plant that are effective throughout the plant's license term; LBP-19-5, 89 NRC 483 (2019)

### DAMAGES

See Compensatory Damages

### DEADLINES

- admissible contention must be timely filed within the time specified in any notice of proposed action; LBP-19-5, 89 NRC 483 (2019)
- licensing boards have found 30 days from a triggering event for proffering a new or amended contention to be timely; LBP-19-4, 89 NRC 353 (2019); LBP-19-5, 89 NRC 483 (2019)
- within 2 years of permanently ceasing operations, licensee must provide a site-specific decommissioning cost estimate if one has not already been submitted; CLI-19-6, 89 NRC 465 (2019)

## SUBJECT INDEX

### DECISION ON THE MERITS

Commission defers to the board's findings with respect to the facts in a merits decision unless the findings are clearly erroneous; CLI-19-5, 89 NRC 329 (2019)

### DECOMMISSIONING

if impacts of a planned decommissioning activity are not enveloped by previous environmental impact analyses, licensee seeking to undertake the activity should submit a license amendment request, together with a supplemental environmental report evaluating the additional impacts; CLI-19-6, 89 NRC 465 (2019)

licensee is prohibited from performing any decommissioning activity that results in significant environmental impacts not previously reviewed; CLI-19-6, 89 NRC 465 (2019)

licensees in decommissioning continue to carry onsite property damage insurance and offsite nuclear liability insurance, in amounts the NRC requires for a defueled plant; CLI-19-6, 89 NRC 465 (2019)

### DECOMMISSIONING COSTS

within 2 years of permanently ceasing operations, licensee must provide a site-specific decommissioning cost estimate if one has not already been submitted; CLI-19-6, 89 NRC 465 (2019)

### DECOMMISSIONING FUND DISBURSEMENTS

licensee must notify NRC in writing, with a copy sent to the affected state(s), prior to performing any decommissioning activities that would significantly increase the facility's decommissioning cost; CLI-19-6, 89 NRC 465 (2019)

### DECOMMISSIONING FUNDING

for license transfer, NRC requires power reactor applicants to demonstrate reasonable assurance of having, or being able to obtain, the necessary funding for decommissioning and spent fuel management; CLI-19-6, 89 NRC 465 (2019)

for operating power reactors, NRC has the right to review accumulation rate of decommissioning funds, and to take additional actions; DD-19-1, 89 NRC 317 (2019)

if licensee permanently ceases operation before the expiration of its license, NRC will determine the collection period for any shortfall of decommissioning funds on a case-by-case basis and will consider specific financial situation of each licensee; DD-19-1, 89 NRC 317 (2019)

if new developments point to a projected funding shortfall, NRC requires additional financial assurance to cover the estimated cost to complete the decommissioning; CLI-19-6, 89 NRC 465 (2019)

license transfer applicant must provide reasonable assurance that sufficient funds will be available to decommission the facility and to carry out applicable activities under the license; CLI-19-6, 89 NRC 465 (2019)

licensee that has set aside prepaid funds based on a site-specific decommissioning cost estimate may take credit for projected earnings on decommissioning funds, up to a 2% annual real rate of return, through the projected decommissioning period; CLI-19-6, 89 NRC 465 (2019)

licensees are required to provide the information requested, as applicable, in their decommissioning funding status reports; DD-19-1, 89 NRC 317 (2019)

reasonable assurance of adequate decommissioning funding is discussed; LBP-19-4, 89 NRC 353 (2019)

### DECOMMISSIONING FUNDING PLANS

acceptable methods of demonstrating financial assurance for decommissioning are outlined; CLI-19-6, 89 NRC 465 (2019)

contention challenging whether decommissioning plan provides reasonable assurance that funds will be available to decommission interim storage facility is inadmissible; LBP-19-4, 89 NRC 353 (2019)

methods to demonstrate financial assurance for decommissioning include surety bond, letter of credit, insurance, or parent company guarantee; CLI-19-6, 89 NRC 465 (2019)

prepayment method of financial assurance for decommissioning involves depositing funds into an account kept segregated from the licensee's assets and outside of the licensee's administrative control, in an amount sufficient to pay decommissioning costs at the time permanent termination of operations is expected; CLI-19-6, 89 NRC 465 (2019)

### DECOMMISSIONING PLANS

interim storage facility licensee is required to update its decommissioning plan in response to any changes in the authorized possession limits; LBP-19-4, 89 NRC 353 (2019)



## SUBJECT INDEX

### DEFICIENCIES

- Commission declines to set forth a comprehensive formula for addressing future circumstances in which significant NEPA deficiencies are found through the NRC hearing process after NRC Staff issuance of a license; CLI-19-1, 89 NRC 1 (2019)
- court declined to impose a remedy for an NRC-identified NEPA-compliance deficiency on the ground that NRC had already corrected the deficiency itself through the adjudicatory hearing process; CLI-19-1, 89 NRC 1 (2019)
- court has sometimes regarded deviations from NEPA as harmless when an agency subsequently completed a comprehensive environmental review before the matter reached the circuit court; CLI-19-1, 89 NRC 1 (2019)
- once NRC determines that there is a significant deficiency in its NEPA compliance, it may not permit a project to continue in a manner that puts at risk the values NEPA protects simply because no intervenor can show irreparable harm; CLI-19-1, 89 NRC 1 (2019)
- under remand-without-vacatur doctrine, court had no reason to expect that the agency would be unable to correct board-identified NEPA deficiencies; CLI-19-1, 89 NRC 1 (2019)
- use of stay standard is restricted where a significant NEPA deficiency has already been found through the hearing process; CLI-19-1, 89 NRC 1 (2019)

### DEFINITIONS

- board takes official notice that the term “homogeneity” is synonymous with uniformity in space; LBP-19-2, 89 NRC 18 (2019)
- “current licensing basis,” is defined as an evolving set of requirements and commitments applicable to the plant that are effective through the plant’s license term; LBP-19-5, 89 NRC 483 (2019)
- independent spent fuel storage installation or ISFSI is defined in 10 C.F.R. 72.3; LBP-19-4, 89 NRC 353 (2019)
- “initial” means “of or relating to the beginning, placed at the beginning, first”; LBP-19-3, 89 NRC 245 (2019)

### DEMAND FOR HEARING

- senior reactor operator applicant who has been denied a license has the right to demand a hearing; LBP-19-1, 89 NRC 15 (2019)

### DEMAND FOR INFORMATION

- request to issue demands for information is denied because licensees are required to provide the information requested, as applicable, in their decommissioning funding status reports; DD-19-1, 89 NRC 317 (2019)

### DENIAL OF LICENSE

- NRC Staff may issue its approval or denial of certain types of applications during pendency of a licensing hearing before the presiding officer has issued an initial decision; CLI-19-1, 89 NRC 1 (2019)
- senior reactor operator applicant who has been denied a license has the right to demand a hearing; LBP-19-1, 89 NRC 15 (2019)

### DEPARTMENT OF ENERGY

- delivery, and acceptance by the Secretary of Energy, of any high-level radioactive waste or spent nuclear fuel for a repository shall constitute a transfer to the Secretary of title to such waste or spent fuel; LBP-19-4, 89 NRC 353 (2019)
- DOE has no authority under the Nuclear Waste Policy Act to provide interim storage in the absence of a facility that has been authorized, constructed, and licensed in accordance with the NWPA; LBP-19-4, 89 NRC 353 (2019)
- DOE is precluded from taking title to spent fuel unless and until a permanent repository has opened; LBP-19-4, 89 NRC 353 (2019)
- DOE takes the position that it lacks statutory authority under the Nuclear Waste Policy Act to provide interim storage; LBP-19-4, 89 NRC 353 (2019)
- DOE was committed to begin disposing of the nuclear power plants’ spent fuel no later than January 31, 1998; LBP-19-4, 89 NRC 353 (2019)
- license to construct and operate Yucca Mountain Waste Repository would require DOE to demonstrate a reasonable expectation that it would meet specified performance standards throughout the period of geologic stability; LBP-19-4, 89 NRC 353 (2019)

## SUBJECT INDEX

### DISCLOSURE

contention requesting unconditional disclosure in the environmental report of probable transportation routes for spent nuclear fuel to the consolidated interim storage facility is inadmissible; LBP-19-4, 89 NRC 353 (2019)

NRC Staff may withhold information from an environmental document if they determine that public disclosure might risk harm to a potential historic resource; LBP-19-4, 89 NRC 353 (2019)

### DISCRIMINATION

site selection process to possess and use nuclear material must be free from discrimination against minority and low-income populations; LBP-19-4, 89 NRC 353 (2019)

### DISQUALIFICATION

judges should not have preconceived beliefs about the facts, but it is not grounds for disqualification for a judge to have formed an opinion about the applicable law; CLI-19-3, 89 NRC 236 (2019)

licensing board denial of motion for disqualification must be referred to the Commission; CLI-19-3, 89 NRC 236 (2019)

NRC regulation pertaining to disqualification of a judge does not describe what circumstances justify disqualification, and so licensing board members should look to standards that apply to federal judges; CLI-19-3, 89 NRC 236 (2019)

to provide a basis for disqualification of a judge, the prejudgment, or appearance of prejudgment, must relate to a factual dispute rather than a legal one; CLI-19-3, 89 NRC 236 (2019)

### DOCUMENTARY MATERIAL

documentation of stratigraphy in one proceeding regarding a license renewal may contribute to stipulated understandings of geology and hydrogeology of another proceeding; LBP-19-2, 89 NRC 18 (2019)

### DRAFT ENVIRONMENTAL IMPACT STATEMENT

argument that NRC Staff may not rely on the generic environmental impact statement for addressing

Category 1 issues in preparing a DEIS for supplemental license renewal applications flies in the face of the 1996 regulatory language and structure; LBP-19-3, 89 NRC 245 (2019)

DSEIS for license renewal prepared under section 51.95(c) will rely on conclusions as amplified by the supporting information in the GEIS for issues designated as Category 1 in 10 C.F.R. Part 50, Subpart A, Appendix B; LBP-19-3, 89 NRC 245 (2019)

in license renewal proceedings, NRC Staff is required to integrate into the DSEIS information developed for those Category 2 issues applicable to the plant under section 51.53(c)(3)(ii); LBP-19-3, 89 NRC 245 (2019)

NRC Staff reviews applicant's environmental report and draws upon it to produce a DSEIS; LBP-19-3, 89 NRC 245 (2019); LBP-19-5, 89 NRC 483 (2019)

### EARTHQUAKES

Criteria 4(e) and 5G(2) of 10 C.F.R. Part 40, Appendix A are inapplicable to in situ uranium recovery because they concern the location of permanent tailings or waste disposal impoundments relative to a capable earthquake fault and applicant does not propose any surface impoundments nor is there any evidence of capable faults in the vicinity; LBP-19-2, 89 NRC 18 (2019)

### EMERGENCY PLANS

amended contention that applicant refuses to publicize emergency and contingency plans is inadmissible; LBP-19-4, 89 NRC 353 (2019)

### ENDANGERED SPECIES

challenges to methodology of endangered dunes sagebrush lizard surveys are not supported by any information that genuinely disputes their sufficiency; LBP-19-4, 89 NRC 353 (2019)

contention that consolidated interim storage facility is within the habitat of the endangered dunes sagebrush lizard is inadmissible because petitioner's maps do not support it; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report fails to address the adverse effect of operating the cooling canal system for an additional 20 years on surface waters, freshwater wetlands, and endangered species present in those wetlands is admissible in part; LBP-19-3, 89 NRC 245 (2019)

contention that relates to the impact of ammonia releases during the renewal period on endangered and threatened species and their critical habitat is admissible; LBP-19-3, 89 NRC 245 (2019)

## SUBJECT INDEX

### ENDANGERED SPECIES ACT

use of a federally funded multi-million-dollar dam project was halted to protect a small fish, although not operating the dam similarly could have been described as a wasteful expenditure, but the court declined to use such an excuse to go beyond the plain meaning of the Act; LBP-19-3, 89 NRC 245 (2019)

### ENVIRONMENTAL ANALYSIS

finding of environmental acceptability by a competent state authority pursuant to a thorough hearing is properly entitled to substantial weight in the conduct of NRC's own NEPA analysis; LBP-19-3, 89 NRC 245 (2019)

for all licensing actions outside the Ninth Circuit, terrorist attacks are too far removed from the natural or expected consequences of agency action to require environmental analysis; LBP-19-4, 89 NRC 353 (2019)

if there are alleged omissions in the environmental analysis, in an NRC adjudication it is intervenors' burden to show their significance and materiality; LBP-19-4, 89 NRC 353 (2019)

neither NEPA nor NRC regulations require an environmental analysis of potential actions that are merely contemplated and have not been proposed; LBP-19-4, 89 NRC 353 (2019)

NEPA seeks to guarantee process, not specific outcomes; LBP-19-3, 89 NRC 245 (2019)

### ENVIRONMENTAL ASSESSMENT

application and final EA must provide sufficient information about geological setting of the area to meet regulatory requirements; LBP-19-2, 89 NRC 18 (2019)

because NRC Staff relies heavily on applicant's environmental report in preparing the EA, should applicant become a proponent of a particular challenged position set forth in the EA, applicant also has the burden on that matter; LBP-19-2, 89 NRC 18 (2019)

brief discussion of environmental impacts of a proposed action must be discussed; CLI-19-5, 89 NRC 329 (2019)

clarification that land disposal is not currently being used did not change the fact that such disposal could occur during the license term; CLI-19-5, 89 NRC 329 (2019)

EA is not intended to be a research document; LBP-19-2, 89 NRC 18 (2019)

environmental process is complete if the EA supports a finding of no significant impact; CLI-19-5, 89 NRC 329 (2019)

even if an EA prepared by NRC Staff is found to be inadequate in certain respects, the board's findings, as well as the adjudicatory record, become, in effect, part of the final EA; LBP-19-2, 89 NRC 18 (2019)

if an EA does not support a finding of no significant impact, the environmental review activities transition to the process to develop an environmental impact statement, which is a longer environmental review document; CLI-19-5, 89 NRC 329 (2019)

NRC Staff must prepare an EA in response to licensee's request to amend its license to possess and use source material at its existing in situ uranium recovery facility; LBP-19-2, 89 NRC 18 (2019)

sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact should be provided; CLI-19-5, 89 NRC 329 (2019)

when the contemplated major federal action before an agency is not significantly affecting the quality of the human environment, an EA, with its accompanying finding of no significant impact, constitutes an agency's evaluation of the environmental effects of a proposed action; LBP-19-5, 89 NRC 483 (2019)

with publication of final EA, NRC Staff notified the board and parties that license amendment authorizing construction and operation had been issued, effective immediately; LBP-19-2, 89 NRC 18 (2019)

### ENVIRONMENTAL EFFECTS

board's hearing, hearing record, and subsequent decision on a contested environmental record augment the environmental record of decision developed by NRC Staff; CLI-19-5, 89 NRC 329 (2019)

federal agencies must take a hard look at the environmental impacts of a proposed action; LBP-19-2, 89 NRC 18 (2019)

licensee is prohibited from performing any decommissioning activity that results in significant environmental impacts not previously reviewed; CLI-19-6, 89 NRC 465 (2019)

NEPA does not call for certainty or precision when considering reasonably foreseeable impacts, but rather an estimate of anticipated, not unduly speculative, impacts; LBP-19-2, 89 NRC 18 (2019)

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under NEPA, an environmental impact is reasonably foreseeable if it is sufficiently likely to occur that a person of ordinary prudence would take it into account in reaching a decision; CLI-19-5, 89 NRC 329 (2019)

where board augmented environmental record of decision with additional information but the information did not alter board's conclusion, no harmful consequence of the supplementation was identified, and there was therefore nothing to be gained by considering the same information again; CLI-19-5, 89 NRC 329 (2019)

whether an impact is reasonably foreseeable, or whether a person of ordinary prudence would consider it, is a question of fact; CLI-19-5, 89 NRC 329 (2019)

### ENVIRONMENTAL IMPACT STATEMENT

although neither NRC Staff nor applicant is required to select the most environmentally superior alternative, NRC regulations require the environmental report and the EIS to consider alternatives available for reducing or avoiding adverse environmental impacts; LBP-19-3, 89 NRC 245 (2019)

Commission declines to set forth a comprehensive formula for addressing future circumstances in which significant NEPA deficiencies are found through the NRC hearing process after Staff issuance of a license; CLI-19-1, 89 NRC 1 (2019)

court declined to impose a remedy for an NRC-identified NEPA-compliance deficiency on the ground that NRC had already corrected the deficiency itself through the adjudicatory hearing process; CLI-19-1, 89 NRC 1 (2019)

court has sometimes regarded deviations from NEPA as harmless when an agency subsequently completed a comprehensive environmental review before the matter reached the circuit court; CLI-19-1, 89 NRC 1 (2019)

detailed discussion of environmental impacts of the proposed action, any adverse environmental effects that cannot be avoided should the proposal be implemented, and alternatives to the proposed action must be included; LBP-19-3, 89 NRC 245 (2019); LBP-19-5, 89 NRC 483 (2019)

environmental report should contain sufficient data to aid the Commission in its development of an independent analysis in the EIS; LBP-19-3, 89 NRC 245 (2019)

federal agencies must prepare an EIS for proposed major federal actions significantly affecting the quality of the human environment; LBP-19-3, 89 NRC 245 (2019); LBP-19-4, 89 NRC 353 (2019); LBP-19-5, 89 NRC 483 (2019)

if an environmental assessment does not support a finding of no significant impact, the environmental review activities transition to the process to develop an EIS, which is a longer environmental review document; CLI-19-5, 89 NRC 329 (2019)

it is NRC Staff's responsibility to comply with NEPA in its later-issued EIS; LBP-19-4, 89 NRC 353 (2019)

NEPA does not require a worst-case analysis, which creates a distorted picture of a project's impacts and wastes agency resources; LBP-19-4, 89 NRC 353 (2019)

NEPA requires an agency to take a hard look at environmental consequences of major federal actions; CLI-19-1, 89 NRC 1 (2019); LBP-19-3, 89 NRC 245 (2019)

NEPA's EIS requirement ensures that the agency will inform the public that it has indeed considered environmental concerns in its decisionmaking process; LBP-19-3, 89 NRC 245 (2019)

NEPA's EIS requirement places upon an agency the obligation to consider every significant aspect of the environmental impact of a proposed action; LBP-19-3, 89 NRC 245 (2019)

new in situ uranium recovery facility license application triggers preparation of an EIS; LBP-19-2, 89 NRC 18 (2019)

NRC must consider information developed by subsequent license renewal applicant under section 51.53(c)(3)(ii) in its preparation of the draft SEIS; LBP-19-3, 89 NRC 245 (2019)

NRC Staff may withhold information from an environmental document if they determine that public disclosure might risk harm to a potential historic resource; LBP-19-4, 89 NRC 353 (2019)

NRC Staff's steps in preparation of an EIS are described; LBP-19-3, 89 NRC 245 (2019)

once NRC determines that there is a significant deficiency in its NEPA compliance, it may not permit a project to continue in a manner that puts at risk the values NEPA protects simply because no intervenor can show irreparable harm; CLI-19-1, 89 NRC 1 (2019)

only reasonably foreseeable impacts need to be discussed; LBP-19-4, 89 NRC 353 (2019)

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preparation of an EIS is meant to ensure that federal agencies will not act on incomplete information, only to regret their decision after it is too late to correct; LBP-19-4, 89 NRC 353 (2019)

preparing an EIS that considers all significant environmental issues relevant to the renewal of a nuclear power plant on a site-specific basis is a demanding and time-consuming task; LBP-19-3, 89 NRC 245 (2019)

process of creating an EIS begins with the license renewal applicant; LBP-19-3, 89 NRC 245 (2019)

renewal of a license to operate a nuclear power plant constitutes a major federal action triggering NRC's obligation under NEPA to prepare an EIS; LBP-19-3, 89 NRC 245 (2019); LBP-19-5, 89 NRC 483 (2019)

under remand-without-vacatur doctrine, court had no reason to expect that the agency will be unable to correct board-identified NEPA deficiencies; CLI-19-1, 89 NRC 1 (2019)

use of stay standard is restricted where a significant NEPA deficiency has already been found through the hearing process; CLI-19-1, 89 NRC 1 (2019)

when information on reasonably foreseeable significant adverse effects on the human environment is incomplete or unavailable in an environmental impact statement, the agency shall always make clear that such information is lacking; LBP-19-5, 89 NRC 483 (2019)

when the GEIS and SEIS are combined, they cover all issues that NEPA requires be addressed in an EIS for a nuclear power plant license renewal proceeding; LBP-19-3, 89 NRC 245 (2019)

See also Draft Environmental Impact Statement; Final Environmental Impact Statement; Generic Environmental Impact Statement; Supplemental Environmental Impact Statement

### ENVIRONMENTAL ISSUES

agencies should consider both the context and intensity of environmental impacts; LBP-19-2, 89 NRC 18 (2019)

all NEPA issues for license renewal of nuclear power plants are listed in 10 C.F.R. Part 51, Subpart A, Appendix B and assigned to either Category 1 or Category 2; LBP-19-3, 89 NRC 245 (2019)

although environmental contentions are, in essence, challenges to NRC Staff's compliance with NEPA, those contentions must be raised, if possible, in response to applicant's environmental report; LBP-19-5, 89 NRC 483 (2019)

because Category 1 issues have been addressed and codified in Part 51, they cannot be litigated in individual adjudications, such as license renewal proceedings for individual plants; LBP-19-3, 89 NRC 245 (2019)

board's ultimate NEPA judgments can be made on the basis of the entire adjudicatory record in addition to NRC Staff's final environmental assessment; LBP-19-2, 89 NRC 18 (2019)

Category 1 issues are NEPA-related issues that could be addressed generically, i.e., applied to all plants, and Category 2 issues are those that needed to be determined on a plant-by-plant basis; LBP-19-3, 89 NRC 245 (2019)

divergent treatment of generic and site-specific issues is reasonable and consistent with the purpose of promoting efficiency in handling license renewal decisions; LBP-19-3, 89 NRC 245 (2019)

hybrid safety and environmental contention that raises issues about adequacy of application's hydrogeologic characterization of the site and its environs is inadmissible; LBP-19-2, 89 NRC 18 (2019)

in license renewal proceedings, NRC Staff is required to integrate into the draft supplemental EIS information developed for those Category 2 issues applicable to the plant under section 51.53(c)(3)(ii); LBP-19-3, 89 NRC 245 (2019)

new contention filed on NRC Staff document prepared pursuant to NEPA must still meet the timeliness requirements; CLI-19-5, 89 NRC 329 (2019)

participant in an adjudication may file a new environmental contention after the deadline for initial intervention petitions based on a draft or final environmental review document if that contention complies with the requirements of section 2.309(c); CLI-19-5, 89 NRC 329 (2019)

petitioners are required to file environmental contentions based on documents or other information available at the time the petition is to be filed; LBP-19-4, 89 NRC 353 (2019)

petitioners who choose to wait to proffer environmental contentions challenging the NRC Staff's later-issued environmental document do so at their peril because if there is no material difference between the applicant's ER and the NRC Staff's environmental document, a contention raised at that point would be rendered impermissibly late; LBP-19-5, 89 NRC 483 (2019)

## SUBJECT INDEX

where board granted summary disposition in favor of intervenors on NEPA contention, neither the potential that the board erred nor the need for NRC Staff to perform potentially unnecessary analysis in the environmental impact statement presented a compelling case for interlocutory review; CLI-19-5, 89 NRC 329 (2019)

### ENVIRONMENTAL JUSTICE

assertion of community support or opposition in a license application does not lend any weight to the environmental justice analysis to be conducted by applicant; LBP-19-4, 89 NRC 353 (2019)  
because NRC is an independent agency, E.O. 12898 did not automatically apply to the NRC; LBP-19-4, 89 NRC 353 (2019)

federal agencies must identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations; LBP-19-4, 89 NRC 353 (2019)

NEPA requires that NRC consider social and economic impacts ancillary to environmental impacts; LBP-19-4, 89 NRC 353 (2019)

site selection process to possess and use nuclear material must be free from discrimination against minority and low-income populations; LBP-19-4, 89 NRC 353 (2019)

### ENVIRONMENTAL REPORT

although it is NRC Staff's responsibility to comply with NEPA in its later-issued environmental impact statement, the board analyzes contentions challenging the ER now as if those contentions will migrate as challenges to NRC Staff's later-issued EIS; LBP-19-4, 89 NRC 353 (2019)

although neither NRC Staff nor applicant is required to select the most environmentally superior alternative, NRC regulations require the ER and the EIS to consider alternatives available for reducing or avoiding adverse environmental impacts; LBP-19-3, 89 NRC 245 (2019)

although preparing an EIS that complies with NEPA is ultimately NRC's responsibility, the process actually begins with the license renewal applicant; LBP-19-5, 89 NRC 483 (2019)

applicant is not required to include an analysis of impacts of subsequent license renewal operation for Category 1 issues because they have been determined to be similar for all plants and are not required to be evaluated in a plant-specific analysis; LBP-19-5, 89 NRC 483 (2019)

applicant must describe in detail the affected environment around the plant, not the reasonably foreseeable environment; LBP-19-3, 89 NRC 245 (2019)

applicant need not discuss economic or technical benefits and costs of either the proposed action or alternatives except if they are either essential for inclusion of an alternative or relevant to mitigation; LBP-19-3, 89 NRC 245 (2019)

applicants are not required to discuss the environmental impacts of spent nuclear fuel storage in an independent spent fuel storage installation for the period following the term of the ISFSI license; LBP-19-4, 89 NRC 353 (2019)

applicant's discussion of alternatives in its environmental report must be sufficiently complete to aid NRC in complying with NEPA; LBP-19-4, 89 NRC 353 (2019)

applicant's ER must address any new and significant information regarding environmental impacts, of which the applicant is aware, that might render the Commission's generic Category 1 determinations incorrect in that proceeding; LBP-19-3, 89 NRC 245 (2019)

applicant's ER must provide a site-specific review of the non-generic Category 2 issues; LBP-19-3, 89 NRC 245 (2019)

applicant's ER need not contain analyses of generic Category 1 issues but instead may reference and adopt the Commission's generic findings in 10 C.F.R. Part 51 and the GEIS; LBP-19-3, 89 NRC 245 (2019)

applicant's ER should contain sufficient data to aid the Commission in its development of an independent analysis in the environmental impact statement; LBP-19-3, 89 NRC 245 (2019)

applicants for initial license renewals need not consider Category 1 issues in their ER; LBP-19-3, 89 NRC 245 (2019)

applicants for renewal of power reactor operating licenses, including subsequent license renewal applicants, may use guidance in Reg. Guide 4.2 to develop the ER; LBP-19-3, 89 NRC 245 (2019)

because NRC Staff relies heavily on applicant's ER in preparing the environmental assessment, should applicant become a proponent of a particular challenged position set forth in the EA, applicant also has the burden on that matter; LBP-19-2, 89 NRC 18 (2019)

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board examines legal question relevant to the admissibility of contention whether 10 C.F.R. 51.53(e)(3) applies to applicant's preparation of an ER in subsequent license renewal proceedings; LBP-19-3, 89 NRC 245 (2019)

Category 1 issues are exempt from consideration in subsequent license renewal application; LBP-19-5, 89 NRC 483 (2019)

challenge to applicant's environmental cost-benefit analysis and its analysis of alternatives is inadmissible for failure to address or controvert applicants environmental report; LBP-19-4, 89 NRC 353 (2019)

challenges to adequacy of the ER's discussions related to altered salinity gradients in surface waters and groundwater quality degradation are Category 1 issues and therefore not subject to direct or indirect challenge absent a rule waiver; LBP-19-3, 89 NRC 245 (2019)

contention asserting that applicant omitted discussion of high-burnup fuel storage from the environmental report is inaccurate and inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention challenging credibility of environmental report preparer is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention migrates when a licensing board construes a contention challenging an environmental report as a challenge to a subsequently issued Staff NEPA document without the petitioner amending the contention; LBP-19-4, 89 NRC 353 (2019)

contention that additional technical study of seismic risk should be considered in environmental report was admissible; LBP-19-5, 89 NRC 483 (2019)

contention that attacks adequacy of ER's analysis of cumulative impacts in light of applicant's history of noncompliance with its permits relating to the cooling canal system is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention that cladding failure due to high burnup fuel is inadequately addressed in the environmental report is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that ER does not contain any information as to whether brine continues to flow in the subsurface under the consolidated interim storage facility site is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that ER has not adequately evaluated loss of ductility on fuel rods due to high burnup fuel and the likelihood of material strength and a release of radioactive material is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that ER inadequately determined and discussed the possibility that waste-contaminated groundwater could reach the Santa Rosa Formation is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that ER lacks experimental support for the safe transportation and storage of high-burnup fuel is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that ER mischaracterizes both the Blue Ribbon Commission report's conclusions and the relative risks of consolidated interim storage versus onsite storage is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that ER must conduct an analysis concerning terrorism under NEPA is inadmissible as outside the scope of this proceeding; LBP-19-4, 89 NRC 353 (2019)

contention that ER must consider all potential impacts if consolidated interim storage ultimately continues to operate beyond the design life and service life is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that ER fails to address the adverse effect of operating the cooling canal system for an additional 20 years on surface waters, freshwater wetlands, and endangered species present in those wetlands is admissible in part; LBP-19-3, 89 NRC 245 (2019)

contention that ER fails to adequately consider cumulative impacts of continued operation on water resources from the reasonably foreseeable effects of climate change on the cooling canal system, including sea level rise is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention that ER fails to describe the reasonably foreseeable affected environment during the subsequent license renewal period (2032-2053), rendering applicant's analyses of environmental impacts, mitigating actions, and alternatives analysis legally insufficient is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention that ER ignores water resource conflicts insofar as it fails to account for the effect sea level rise will have on freshwater availability, groundwater resources, and release of polluted cooling water into Biscayne Bay is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention that ER's cumulative effects analysis fails entirely to discuss the sea level rise-related impacts upon affected resources is inadmissible; LBP-19-3, 89 NRC 245 (2019)

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contention that ER's earthquake data are historical and do not take into account recent fracking activity around the proposed project site is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that in light of adverse impact of continued cooling canal system operations on the threatened American crocodile and its critical seagrass habitat, the ER is deficient for failing to consider reasonable alternative is admissible; LBP-19-3, 89 NRC 245 (2019)

Continued Storage Rule explicitly states that applicant's ER is not required to discuss impacts following the proposed license term; LBP-19-4, 89 NRC 353 (2019)

discussion of adverse environmental effects that cannot be avoided, of alternatives, and of any irreversible and irretrievable commitments of resources that would be involved in the proposed action is required in the ER; LBP-19-4, 89 NRC 353 (2019)

inclusion of design-basis accident risk analysis in ER for subsequent license renewal is discussed; LBP-19-5, 89 NRC 483 (2019)

license renewal applicant must include a description of the proposed action, the affected environment around the plant, modifications directly affecting the environment or any plant effluents, and any planned refurbishment activities, as well as the environmental impacts of alternatives and any other matters described in 10 C.F.R. 51.45; LBP-19-3, 89 NRC 245 (2019)

license renewal applicants must submit an ER, the purpose of which is to aid the Commission in complying with section 102(2) of NEPA; LBP-19-3, 89 NRC 245 (2019); LBP-19-5, 89 NRC 483 (2019)

license renewal applicants need not address mitigation for issues designated Category 1; LBP-19-3, 89 NRC 245 (2019)

NRC requires applicants to take a hard look at the environmental impacts of a proposed action and of environmentally significant alternatives; LBP-19-4, 89 NRC 353 (2019)

NRC Staff reviews applicant's ER and draws upon it to produce a draft supplemental EIS; LBP-19-3, 89 NRC 245 (2019); LBP-19-5, 89 NRC 483 (2019)

particular category of license renewal applicants is identified in 10 C.F.R. 51.53(c) whose ERs shall include the information required in section 51.53(c)(2) subject to certain conditions and considerations; LBP-19-3, 89 NRC 245 (2019)

reliance of subsequent license renewal applicant on generic environmental analyses contained in Part 51, Appendix B to Subpart A (Table B-1) is discussed; LBP-19-5, 89 NRC 483 (2019)

ruling that 10 C.F.R. 51.53(c)(3) applies to the preparation of ERs in subsequent license renewal proceedings is referred to the Commission; LBP-19-3, 89 NRC 245 (2019)

section 51.53(c)(3) is silent as to subsequent license renewal applicants and imposes no restrictions on the Commission's authority to allow SLR applicants to utilize these regulatory prescriptions when preparing ERs; LBP-19-3, 89 NRC 245 (2019)

**ENVIRONMENTAL REVIEW**

agencies are given broad discretion to keep their environmental impact inquiries within appropriate and manageable boundaries; LBP-19-2, 89 NRC 18 (2019)

agencies should consider both the context and intensity of environmental impacts; LBP-19-2, 89 NRC 18 (2019)

although NEPA requires NRC to take a hard look at environmental consequences of major federal actions, it seeks to guarantee process, not specific outcomes; LBP-19-5, 89 NRC 483 (2019)

Commission considers, as an exercise of its inherent supervisory authority over the NRC Staff, whether any additional information developed during the adjudication necessitates further NEPA activities; CLI-19-5, 89 NRC 329 (2019)

even if an environmental assessment prepared by NRC Staff is found to be inadequate in certain respects, the board's findings, as well as the adjudicatory record, become, in effect, part of the final EA; LBP-19-2, 89 NRC 18 (2019)

if impacts of a planned decommissioning activity are not enveloped by previous environmental impact analyses, licensee seeking to undertake the activity should submit a license amendment request, together with a supplemental environmental report evaluating the additional impacts; CLI-19-6, 89 NRC 465 (2019)

intent behind 10 C.F.R. 51.53(c)(3) is to promote efficiency in the environmental review process for license renewal applications; LBP-19-3, 89 NRC 245 (2019)



## SUBJECT INDEX

license transfer applications and associated license amendments necessary to reflect approval of the transfers are excluded from the requirement of an additional environmental review; CLI-19-6, 89 NRC 465 (2019)

NEPA does not necessitate certainty or precision nor does it mandate particular results from NRC; LBP-19-4, 89 NRC 353 (2019)

NEPA hard-look requirement is intended to foster both informed decisionmaking and informed public participation so as to ensure that the agency does not act upon incomplete information, only to regret its decision after it is too late to correct; LBP-19-2, 89 NRC 18 (2019)

NEPA hard-look requirement is subject to a rule of reason in that consideration of environmental impacts need not address all theoretical possibilities, but rather only those that have some reasonable possibility of occurring; LBP-19-2, 89 NRC 18 (2019)

NEPA imposes a duty on NRC to both consider every significant aspect of the environmental impact of a proposed action and inform the public of its analysis and conclusion; LBP-19-4, 89 NRC 353 (2019)

NEPA requires agencies to take a hard look at environmental consequences of the proposed action; LBP-19-4, 89 NRC 353 (2019)

NEPA requires only an estimate of anticipated, not unduly speculative, impacts from NRC; LBP-19-4, 89 NRC 353 (2019)

NEPA's hard-look mandate is subject to a rule of reason; LBP-19-4, 89 NRC 353 (2019)

NEPA's hard-look mandate notwithstanding, the agency is not obliged to analyze every conceivable aspect of the project before it; LBP-19-4, 89 NRC 353 (2019)

NRC need not consider remote and highly speculative events in its environmental analysis; LBP-19-4, 89 NRC 353 (2019)

NRC need not perform analyses concerning events that would be considered worst-case scenarios involving the project; LBP-19-4, 89 NRC 353 (2019)

NRC Staff has a duty to consult with local Native American tribes during its environmental review; CLI-19-5, 89 NRC 329 (2019)

NRC Staff's non-consideration of the Category 1 issue on a plant-specific basis fully comports with its environmental review responsibilities under NEPA and Part 51; LBP-19-3, 89 NRC 245 (2019)

NRC Staff's steps in preparation of an environmental impact statement are described; LBP-19-3, 89 NRC 245 (2019)

purpose of NRC's environmental review is to inform the decisionmaking agency and the public of a broad range of environmental impacts that will result, with a fair degree of likelihood, from a proposed project, rather than to speculate about worst-case scenarios and how to prevent them; LBP-19-4, 89 NRC 353 (2019)

where board granted summary disposition in favor of intervenors on NEPA contention, neither the potential that the board erred nor the need for NRC Staff to perform potentially unnecessary analysis in the environmental impact statement presented a compelling case for interlocutory review; CLI-19-5, 89 NRC 329 (2019)

whereas NRC hearings on safety issues concern adequacy of the license application, not NRC Staff's work, NRC hearings on NEPA issues focus entirely on adequacy of NRC Staff's work; LBP-19-2, 89 NRC 18 (2019)

**ERROR**

standard for showing clear error is deliberately high, requiring petitioner to show that, in light of the record as a whole, the board's determination is not even plausible; CLI-19-5, 89 NRC 329 (2019)

where board granted summary disposition in favor of intervenors on NEPA contention, neither the potential that the board erred nor the need for NRC Staff to perform potentially unnecessary analysis in the environmental impact statement presented a compelling case for interlocutory review; CLI-19-5, 89 NRC 329 (2019)

**EVIDENTIARY HEARINGS**

Commission declines to set forth a comprehensive formula for addressing future circumstances in which significant NEPA deficiencies are found through the NRC hearing process after Staff issuance of a license; CLI-19-1, 89 NRC 1 (2019)

intervenors may seek a stay of NRC Staff authorization of a license amendment issued during pendency of hearing; LBP-19-2, 89 NRC 18 (2019)

## SUBJECT INDEX

to carry the burden of proof on safety or environmental issues, NRC Staff and/or applicant must establish that its position is supported by a preponderance of the evidence; LBP-19-2, 89 NRC 18 (2019)  
use of stay standard is restricted where a significant NEPA deficiency has already been found through the hearing process; CLI-19-1, 89 NRC 1 (2019)f

### EXCEPTIONS

expert testimony may be excluded on purely legal issues for questions of foreign law; LBP-19-2, 89 NRC 18 (2019)

### EXECUTIVE ORDER 12898

because NRC is an independent agency, Executive Order 12898 did not automatically apply to it; LBP-19-4, 89 NRC 353 (2019)

### EXPORT LICENSE PROCEEDINGS

alleged harm must result from the grant or denial of the export license; CLI-19-2, 89 NRC 229 (2019)

hearing request must specify, when a person asserts that his interest may be affected, both the facts pertaining to his interest and how it may be affected; CLI-19-2, 89 NRC 229 (2019)

to satisfy the public interest requirement for a hearing on an export license application, petitioner must show how a hearing would bring new information to light; CLI-19-2, 89 NRC 229 (2019)

when determining whether petitioner identifies an interest that may be affected on an export license, the Commission considers the nature of the alleged interest, how that interest relates to issuance or denial, and possible effect of any order on that interest, including whether the relief requested is within the Commission's authority, and, if so, whether granting relief would redress the alleged injury; CLI-19-2, 89 NRC 229 (2019)

### EXPORT LICENSES

amended intervention petition on export license is properly considered as a public comment on the application and is therefore referred to the Office of International Programs as a public comment; CLI-19-2, 89 NRC 229 (2019)

for export licensing of byproduct material, NRC will consider whether the export is inimical to the common defense and security; CLI-19-2, 89 NRC 229 (2019)

hearing will be granted on an export license application when NRC finds that such a hearing will be in the public interest and will assist in making the statutory determinations required by the Atomic Energy Act; CLI-19-2, 89 NRC 229 (2019)

### EXTENSION OF TIME

requests for extensions of time do not constitute contentions challenging a license renewal application; LBP-19-3, 89 NRC 245 (2019)

### FAULTS

Criteria 4(e) and 5G(2) of 10 C.F.R. Part 40, Appendix A are inapplicable to in situ uranium recovery because they concern the location of permanent tailings or waste disposal impoundments relative to a capable earthquake fault and applicant does not propose any surface impoundments nor is there any evidence of capable faults in the vicinity; LBP-19-2, 89 NRC 18 (2019)

### FINAL ENVIRONMENTAL IMPACT STATEMENT

it would be preferable for the FEIS to contain all relevant information and the record of decision to be complete and adequate before the license is issued; CLI-19-1, 89 NRC 1 (2019)

### FINANCIAL ASSURANCE

acceptable methods of demonstrating financial assurance for decommissioning are outlined; CLI-19-6, 89 NRC 465 (2019)

after submitting its site-specific cost estimate for decommissioning, licensee must annually submit a report on the status of its funding for managing irradiated fuel; CLI-19-6, 89 NRC 465 (2019)

applicant must either possess, or demonstrate reasonable assurance of obtaining, necessary funds to cover estimated construction, operating, and decommissioning costs; LBP-19-4, 89 NRC 353 (2019)

contention that applicant cannot provide reasonable assurances that it can obtain the necessary funds to cover the costs of construction, operation, maintenance, and decommissioning of the consolidated interim storage facility is inadmissible; LBP-19-4, 89 NRC 353 (2019)

following the site-specific decommissioning cost estimate at permanent cessation of operations, licensee must annually submit to NRC a financial assurance status report for decommissioning until licensee completes its final radiation survey and demonstrates that residual radioactivity has been reduced to levels permitting license termination; CLI-19-6, 89 NRC 465 (2019)

## SUBJECT INDEX

- for license transfer, NRC requires power reactor applicants to demonstrate reasonable assurance of having, or being able to obtain, the necessary funding for decommissioning and spent fuel management; CLI-19-6, 89 NRC 465 (2019)
- if new developments point to a projected funding shortfall, NRC requires additional financial assurance to cover the estimated cost to complete decommissioning; CLI-19-6, 89 NRC 465 (2019)
- methods to demonstrate financial assurance for decommissioning include surety bond, letter of credit, insurance, or parent company guarantee; CLI-19-6, 89 NRC 465 (2019)
- prepayment method of financial assurance for decommissioning involves depositing funds into an account kept segregated from the licensee's assets and outside of the licensee's administrative control, in an amount sufficient to pay decommissioning costs at the time permanent termination of operations is expected; CLI-19-6, 89 NRC 465 (2019)
- FINANCIAL ISSUES**
  - contract damage lawsuits under the NWPA are now commonplace, and the federal government pays out damages to power reactor licensees on a regular basis; LBP-19-4, 89 NRC 353 (2019)
  - petitioner claiming that financial data are either inaccurate or insufficient must identify each failure and explain why the data are flawed; CLI-19-6, 89 NRC 465 (2019)
  - power reactor licensees were required to pay into a Nuclear Waste Fund for construction of the repository; LBP-19-4, 89 NRC 353 (2019)
  - when a permanent repository failed to materialize, power plant licensees sued and began to recover from the federal government substantial damages to cover the cost of continuing to store spent fuel at their reactor sites; LBP-19-4, 89 NRC 353 (2019)
- FINANCIAL QUALIFICATIONS**
  - applicants need not demonstrate financial qualifications to cover power reactor operating costs if power operations have permanently ceased; CLI-19-6, 89 NRC 465 (2019)
  - contention that application does not address liability coverage is inadmissible for failure to demonstrate why this issue is material or relates to financial qualifications; LBP-19-4, 89 NRC 353 (2019)
  - license transfer applicant must provide reasonable assurance that sufficient funds will be available to decommission the facility and to carry out applicable activities under the license; CLI-19-6, 89 NRC 465 (2019)
- FINANCIAL QUALIFICATIONS REVIEW**
  - license transfer review is limited to specific matters, including financial and technical qualifications of the proposed transferee; CLI-19-6, 89 NRC 465 (2019)
- FINDING OF NO SIGNIFICANT IMPACT**
  - if an environmental assessment supports a FONSI, the environmental process is complete; CLI-19-5, 89 NRC 329 (2019)
- FINDINGS OF FACT**
  - Commission traditionally gives a high level of deference to the boards as the fact finder in NRC adjudicatory proceedings; CLI-19-3, 89 NRC 236 (2019)
  - even if an environmental assessment prepared by NRC Staff is found to be inadequate in certain respects, the board's findings, as well as the adjudicatory record, become, in effect, part of the final EA; LBP-19-2, 89 NRC 18 (2019)
- FRACKING**
  - contention that environmental report's earthquake data are historical and do not take into account recent fracking activity around the proposed project site is inadmissible; LBP-19-4, 89 NRC 353 (2019)
- FUEL CLADDING**
  - contention that cladding failure due to high-burnup fuel is inadequately addressed in the environmental report is inadmissible; LBP-19-4, 89 NRC 353 (2019)
  - spent fuel cladding must be protected against degradation that leads to gross ruptures in the fuel or the fuel must be otherwise confined so that degradation during storage will not pose operational safety problems when the fuel is retrieved from storage; LBP-19-4, 89 NRC 353 (2019)
- FUEL REMOVAL**
  - after certification of permanent removal of fuel, license no longer authorizes operation of the reactor or emplacement or retention of fuel into the reactor vessel; CLI-19-6, 89 NRC 465 (2019)

## SUBJECT INDEX

### FUEL ROD

contention that environmental report has not adequately evaluated loss of ductility on fuel rods due to high-burnup fuel and the likelihood of material strength and a release of radioactive material is inadmissible; LBP-19-4, 89 NRC 353 (2019)

### GENERIC ENVIRONMENTAL IMPACT STATEMENT

analysis must be forward looking and have enough breadth to support the Commission's conclusions; LBP-19-3, 89 NRC 245 (2019)

any member of the public can petition the agency for a rulemaking proceeding for the purpose of changing the GEIS findings; LBP-19-3, 89 NRC 245 (2019)

argument that NRC Staff may not rely on GEIS for addressing Category 1 issues in preparing a draft EIS for supplemental license renewal applications flies in the face of the 1996 regulatory language and structure; LBP-19-3, 89 NRC 245 (2019)

Continued Storage GEIS acknowledges that not all storage facilities will necessarily match the assumed generic facility, and therefore NRC will evaluate site-specific impacts of the construction and operation as part of that facility's licensing process; LBP-19-4, 89 NRC 353 (2019)

Continued Storage Rule determined that at-reactor storage for an indefinite period would generally result in only small environmental impacts; LBP-19-4, 89 NRC 353 (2019)

derivation of generic effects of transportation and fuel waste for one power reactor is based on survey of then-existing power plants; LBP-19-4, 89 NRC 353 (2019)

environmental report need not contain analyses of generic Category 1 issues but instead may reference and adopt the Commission's generic findings in 10 C.F.R. Part 51 and the GEIS; LBP-19-3, 89 NRC 245 (2019)

GEIS's findings do not refer to initial renewals, but speak more broadly about applying to a renewed operating license for a nuclear power plant, and as representing the analysis of the environmental impacts associated with renewal of any operating license; LBP-19-3, 89 NRC 245 (2019)

generic method is clearly appropriate for conducting the hard look required by NEPA; LBP-19-3, 89 NRC 245 (2019)

NRC has authority to make generic determinations to meet its NEPA obligations; LBP-19-3, 89 NRC 245 (2019)

reliance of subsequent license renewal applicant on generic environmental analyses contained in Part 51, Appendix B to Subpart A (Table B-1) is discussed; LBP-19-5, 89 NRC 483 (2019)

section 51.53(a) approves incorporation by reference of NRC Staff-prepared final GEIS in subsequent license renewal application; LBP-19-5, 89 NRC 483 (2019)

to challenge incorporated analyses from Staff GEIS in a licensing proceeding, petitioner would have to obtain a rule waiver; LBP-19-5, 89 NRC 483 (2019)

when the GEIS and the supplemental environmental impact statement are combined, they cover all issues that NEPA requires be addressed in an EIS for a nuclear power plant license renewal proceeding; LBP-19-3, 89 NRC 245 (2019)

### GENERIC ISSUES

challenge to a Category 1 issue is not admissible because petitioners have failed to seek a rule waiver; LBP-19-3, 89 NRC 245 (2019)

draft supplemental EIS for license renewal prepared under section 51.95(c) will rely on conclusions as amplified by the supporting information in the GEIS for issues designated as Category 1 in 10 C.F.R. Part 50, Subpart A, Appendix B; LBP-19-3, 89 NRC 245 (2019)

environmental report must address any new and significant information regarding environmental impacts, of which the applicant is aware, that might render the Commission's generic Category 1 determinations incorrect in that proceeding; LBP-19-3, 89 NRC 245 (2019)

new and significant information requirement does not override, for purposes of litigating issues in an adjudicatory proceeding, the exclusion of Category 1 issues in 10 C.F.R. 51.53(c)(3)(i) from site-specific review, but a rule waiver is required; LBP-19-3, 89 NRC 245 (2019)

NRC Staff's non-consideration of the Category 1 issue on a plant-specific basis fully comports with its environmental review responsibilities under NEPA and Part 51; LBP-19-3, 89 NRC 245 (2019)

party to an adjudicatory proceeding can invoke 10 C.F.R. 2.335 and request that a GEIS finding for a Category 1 issue be waived with respect to that proceeding; LBP-19-3, 89 NRC 245 (2019)

## SUBJECT INDEX

### GEOLOGIC CONDITIONS

application and final environmental assessment must provide sufficient information about geological setting of the area to meet regulatory requirements; LBP-19-2, 89 NRC 18 (2019)  
contention that environmental report and SAR do not adequately discuss and evaluate risks created by geologic conditions is inadmissible; LBP-19-4, 89 NRC 353 (2019)  
period of geologic stability for Yucca Mountain Waste Repository is defined to end 1 million years after disposal; LBP-19-4, 89 NRC 353 (2019)

### GOOD CAUSE

petitioners seeking to amend their original contentions or proffer new ones after the cutoff date must meet the good cause standard; LBP-19-4, 89 NRC 353 (2019); LBP-19-5, 89 NRC 483 (2019)  
previously available information that is newly acquired by the petitioner does not constitute good cause for late filing; LBP-19-4, 89 NRC 353 (2019)  
previously available information that is newly interpreted by the petitioner does not constitute good cause to file a new contention; LBP-19-4, 89 NRC 353 (2019)  
standard for late filing exists if petitioner demonstrates that information on which a new or amended contention is based was not previously available, is materially different, and has been submitted in a timely fashion based on availability of subsequent information; LBP-19-4, 89 NRC 353 (2019); LBP-19-5, 89 NRC 483 (2019)

### GROUNDWATER

if background concentrations are less than the UMTRCA levels in the Criterion 5C table, applicant must meet the groundwater protection standard listed for that constituent in the Criterion 5C table; LBP-19-2, 89 NRC 18 (2019)  
quality standards for all restored aquifers must conform to the standards promulgated by the EPA in 40 C.F.R. 192.32(a)(2); LBP-19-2, 89 NRC 18 (2019)  
sampling results will be used to define background protection standards for restoration; LBP-19-2, 89 NRC 18 (2019)  
using diligent application of best practicable technologies and efforts, applicant must first attempt to return a constituent in the aquifer to the NRC-approved background concentration for that constituent; LBP-19-2, 89 NRC 18 (2019)

### GROUNDWATER CONTAMINATION

alternate concentration limit for hazardous constituent in groundwater is established by NRC; LBP-19-2, 89 NRC 18 (2019)  
aquifer pumping test data interpretation, contaminant pathways, heterogeneity, and anisotropy from fracturing/faulting are discussed; LBP-19-2, 89 NRC 18 (2019)  
concentration limits for hazardous constituent in groundwater are specified in 10 C.F.R. Part 40, Appendix A, Criterion 5B(5); LBP-19-2, 89 NRC 18 (2019)  
contention claiming that environmental report underestimates impacts related to tritium releases to groundwater is inadmissible because it lacks the requisite support; LBP-19-3, 89 NRC 245 (2019)  
contention that environmental report and SAR do not discuss the presence and implications of fractured rock beneath consolidated interim storage facility site that could allow radioactive leaks to enter groundwater is inadmissible; LBP-19-4, 89 NRC 353 (2019)  
contention that environmental report inadequately determined and discussed the possibility that waste-contaminated groundwater could reach the Santa Rosa Formation is inadmissible; LBP-19-4, 89 NRC 353 (2019)  
if applicant cannot meet either of the Part 40 standards, it may seek NRC approval for an alternate concentration limit; LBP-19-2, 89 NRC 18 (2019)  
in assessing adequacy of the effort to establish an alternate concentration limit, licensee must achieve a value that is as low as reasonably achievable, after considering practicable corrective actions; LBP-19-2, 89 NRC 18 (2019)  
in making constituent hazard finding, NRC Staff will consider nine factors regarding potential adverse effects on groundwater quality and the 10 factors relating to potential adverse effects on hydraulically connected surface water quality; LBP-19-2, 89 NRC 18 (2019)  
maximum contaminant levels for selenium in groundwater set by the Nebraska DEQ is the same MCL set by the U.S. Environmental Protection Agency; CLI-19-5, 89 NRC 329 (2019)

## SUBJECT INDEX

restoration at in situ uranium recovery facilities must meet Uranium Mill Tailings Radiation Control Act standards rather than those associated with the Safe Drinking Water Act or analogous state regulations; LBP-19-2, 89 NRC 18 (2019)

### HEALTH AND SAFETY

NRC must ensure that facilities associated with the licensed possession and use of source and byproduct materials meet regulatory requirements developed to protect public health and safety from radiological hazards; LBP-19-2, 89 NRC 18 (2019)

### HEARING REQUESTS

petitioner in an export case must explain why a hearing or an intervention would be in the public interest and how a hearing or intervention would assist the Commission in making the required statutory determinations; CLI-19-2, 89 NRC 229 (2019)

### HEARING RIGHTS

evidentiary hearings are only afforded to those who proffer at least some minimal factual and legal foundation in support of their contentions; LBP-19-5, 89 NRC 483 (2019)

hearing will be granted on an export license application when NRC finds that such a hearing will be in the public interest and will assist in making the statutory determinations required by the Atomic Energy Act; CLI-19-2, 89 NRC 229 (2019)

NRC is required to grant a hearing upon the request of any person whose interest may be affected by the proceeding; LBP-19-3, 89 NRC 245 (2019); LBP-19-4, 89 NRC 353 (2019)

### HIGH-BURNUP FUEL

contention asserting that applicant omitted discussion of high-burnup fuel storage from the environmental report is inaccurate and inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that cladding failure due to high-burnup fuel is inadequately addressed in the environmental report is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report has not adequately evaluated loss of ductility on fuel rods due to high-burnup fuel and the likelihood of material strength and a release of radioactive material is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report lacks experimental support for the safe transportation and storage of high-burnup fuel is inadmissible; LBP-19-4, 89 NRC 353 (2019)

### HIGH-LEVEL WASTE REPOSITORY

contention that agency must address the alternative of a permanent repository never being developed is not admissible; LBP-19-4, 89 NRC 353 (2019)

DOE is precluded from taking title to spent fuel unless and until a permanent repository has opened; LBP-19-4, 89 NRC 353 (2019)

Greater Than Class C waste must be disposed of in a geologic repository licensed by NRC unless NRC approves an alternative land disposal proposal; LBP-19-4, 89 NRC 353 (2019)

period of geologic stability for Yucca Mountain Waste Repository is defined to end 1 million years after disposal; LBP-19-4, 89 NRC 353 (2019)

power reactor licensees were required to pay into a Nuclear Waste Fund for construction of the repository; LBP-19-4, 89 NRC 353 (2019)

when a permanent repository failed to materialize, the power plant licensees sued and began to recover from the federal government substantial damages to cover the cost of continuing to store spent fuel at their reactor sites; LBP-19-4, 89 NRC 353 (2019)

Yucca Mountain was statutorily authorized to store 70,000 metric tons of high-level radioactive waste; LBP-19-4, 89 NRC 353 (2019)

### HIGH-LEVEL WASTE REPOSITORY PROCEEDING

license to construct and operate Yucca Mountain Waste Repository would require DOE to demonstrate a reasonable expectation that it would meet specified performance standards throughout the period of geologic stability; LBP-19-4, 89 NRC 353 (2019)

pending adjudication before an NRC licensing board was suspended in September 2011 when Congress stopped funding the Yucca Mountain project; LBP-19-4, 89 NRC 353 (2019)

### HISTORIC SITES

NRC Staff may withhold information from an environmental document if they determine that public disclosure might risk harm to a potential historic resource; LBP-19-4, 89 NRC 353 (2019)

## SUBJECT INDEX

### HYDRODYNAMICS

in making constituent hazard finding, NRC Staff will consider nine factors regarding potential adverse effects on groundwater quality and the 10 factors relating to potential adverse effects on hydraulically connected surface water quality; LBP-19-2, 89 NRC 18 (2019)

### HYDROGEOLOGY

aquifer thickness, data selectivity, homogeneity and isotropy assumptions, monitoring well screen intervals, offsite influences, and Theis and Cooper-Jacob methodologies are discussed; LBP-19-2, 89 NRC 18 (2019)

contention that environmental report and SAR do not discuss the presence and implications of fractured rock beneath consolidated interim storage facility site that could allow radioactive leaks to enter groundwater is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report does not contain any information as to whether brine continues to flow in the subsurface under the consolidated interim storage facility site is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report inadequately determined and discussed the possibility that waste-contaminated groundwater could reach the Santa Rosa Formation is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that packer tests in the Santa Rosa Formation to estimate the hydraulic conductivity (permeability) of the formation were not conducted properly is inadmissible; LBP-19-4, 89 NRC 353 (2019)

documentation of stratigraphy in one proceeding regarding a license renewal may contribute to stipulated understandings of geology and hydrogeology of another proceeding; LBP-19-2, 89 NRC 18 (2019)

hybrid safety and environmental contention that raises issues about adequacy of application's hydrogeologic characterization of the site and its environs is inadmissible; LBP-19-2, 89 NRC 18 (2019)

in situ uranium recovery license amendment application must provide sufficient information about the ability of the underlying geologic strata to control contaminant and solution transport; LBP-19-2, 89 NRC 18 (2019)

### IMMEDIATE EFFECTIVENESS

with publication of final environmental assessment, NRC Staff notified the board and parties that license amendment authorizing construction and operation had been issued, effective immediately; LBP-19-2, 89 NRC 18 (2019)

### IMPARTIALITY

even where there is no actual conflict of interest, a judge should disqualify himself or herself where a reasonable person would question the judge's impartiality; CLI-19-3, 89 NRC 236 (2019)

federal standards hold that a judge must disqualify himself or herself whenever the judge's impartiality in the proceeding might reasonably be questioned, as well as in specific circumstances in which conflict of interest is shown; CLI-19-3, 89 NRC 236 (2019)

### IN SITU URANIUM SOLUTION MINING

Criterion 5G(2) of 10 C.F.R. Part 40, Appendix A is inapplicable to ISR because it concerns the location of permanent tailings or waste disposal impoundments relative to a capable earthquake fault and applicant does not propose any surface impoundments nor is there any evidence of capable faults in the vicinity; LBP-19-2, 89 NRC 18 (2019)

environmental assessment's clarification that land disposal is not currently being used did not change the fact that such disposal could occur during the license term; CLI-19-5, 89 NRC 329 (2019)

groundwater restoration at ISR facilities must meet Uranium Mill Tailings Radiation Control Act standards rather than those associated with the Safe Drinking Water Act or analogous state regulations; LBP-19-2, 89 NRC 18 (2019)

license amendment application must provide sufficient information about the ability of the underlying geologic strata to control contaminant and solution transport; LBP-19-2, 89 NRC 18 (2019)

license amendment applications must meet safety requirements including specific standards for uranium mill operation and waste material disposal; LBP-19-2, 89 NRC 18 (2019)

new license application triggers preparation of an environmental impact statement; LBP-19-2, 89 NRC 18 (2019)

## SUBJECT INDEX

NRC Staff must prepare an environmental assessment in response to licensee's request to amend its license to possess and use source material at its existing in situ uranium recovery facility; LBP-19-2, 89 NRC 18 (2019)

whether water quality data should be obtained before in situ recovery operations begin is at best questionable; LBP-19-2, 89 NRC 18 (2019)

### INCORPORATION BY REFERENCE

Commission does not expect a litigant to merely reference large portions of material where doing so would force a tribunal to sift through it in search of asserted factual support; LBP-19-3, 89 NRC 245 (2019)

environmental report need not contain analyses of generic Category 1 issues but instead may reference and adopt the Commission's generic findings in 10 C.F.R. Part 51 and the GEIS; LBP-19-3, 89 NRC 245 (2019)

incorporation of contentions of other petitioners by reference is allowed only for those who have demonstrated standing and have submitted their own admissible contention; LBP-19-4, 89 NRC 353 (2019)

section 51.53(a) approves incorporation by reference of NRC Staff-prepared final generic environmental impact statement in subsequent license renewal application; LBP-19-5, 89 NRC 483 (2019)

### INDEPENDENT SPENT FUEL STORAGE INSTALLATION

contention challenging whether decommissioning plan provides reasonable assurance that funds will be available to decommission interim storage facility is inadmissible; LBP-19-4, 89 NRC 353 (2019)

Continued Storage Rule and Continued Storage Generic EIS determined that at-reactor storage for an indefinite period would generally result in only small environmental impacts; LBP-19-4, 89 NRC 353 (2019)

environmental reports are not required to discuss the environmental impacts of spent nuclear fuel storage in an independent spent fuel storage installation for the period following the term of the ISFSI license; LBP-19-4, 89 NRC 353 (2019)

ISFSI is defined in 10 C.F.R. 72.3; LBP-19-4, 89 NRC 353 (2019)

it is unreasonable for NRC to categorically dismiss the possibility of terrorist attack on a storage installation as too remote and highly speculative to warrant consideration under NEPA; LBP-19-4, 89 NRC 353 (2019)

no obvious potential for harm exists from an ISFSI; LBP-19-4, 89 NRC 353 (2019)

NRC allows licensing of interim storage facilities not co-located with a power plant; LBP-19-4, 89 NRC 353 (2019)

NRC has authority under the AEA to license privately owned facilities, and the Nuclear Waste Policy Act did not repeal or supersede that authority; LBP-19-4, 89 NRC 353 (2019)

NRC regulations expressly allow licensing of away-from-reactor interim storage facilities; LBP-19-4, 89 NRC 353 (2019)

only reasonably foreseeable impacts need to be discussed; LBP-19-4, 89 NRC 353 (2019)

See also Interim Storage Facility

### INDEPENDENT SPENT FUEL STORAGE INSTALLATION PROCEEDINGS

although 35 miles is within the 50-mile proximity presumption that applies to licensing reactors, it is nearly twice the distance that any licensing board has found sufficient to support standing in a spent fuel storage case; LBP-19-4, 89 NRC 353 (2019)

because no obvious potential for harm from an ISFSI exists, petitioners have the burden to show specific and plausible means for how the proposed action will affect them; LBP-19-4, 89 NRC 353 (2019)

canisters and casks for the interim storage facility that have been separately approved by NRC are not part of the license application; LBP-19-4, 89 NRC 353 (2019)

contention challenging any aspect of an NRC-approved canister or cask is outside the scope of an ISFSI proceeding; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report must conduct an analysis concerning terrorism under NEPA is inadmissible as outside the scope of this proceeding; LBP-19-4, 89 NRC 353 (2019)

distance to establish proximity-based standing in a consolidated interim storage facility proceeding is likely less than 50 miles because such a storage facility is essentially a passive structure rather than an operating facility, and therefore has less chance of widespread radioactive release; LBP-19-4, 89 NRC 353 (2019)



## SUBJECT INDEX

### INITIAL DECISIONS

NRC Staff may issue its approval or denial of certain types of applications before the presiding officer has issued an initial decision; CLI-19-1, 89 NRC 1 (2019)  
See also Licensing Board Decisions

### INJURY IN FACT

in export cases, the alleged harm must result from the grant or denial of the export license; CLI-19-2, 89 NRC 229 (2019)  
to show an interest that may be affected by an export license proceeding, petitioners must assert that the proposed export itself could cause them harm; CLI-19-2, 89 NRC 229 (2019)

### INTEGRITY

dispute regarding character or integrity must raise issues directly germane to the challenged licensing action; LBP-19-4, 89 NRC 353 (2019)

### INTEREST

export license hearing request must specify, when a person asserts that his interest may be affected, both the facts pertaining to his interest and how it may be affected; CLI-19-2, 89 NRC 229 (2019)  
persons without an affected interest are not as likely as persons with such interest to contribute to decisionmaking and are also less likely to be able to show that a hearing would be in the public interest and would assist us in making the requisite statutory and regulatory determinations; CLI-19-2, 89 NRC 229 (2019)

to show an interest that may be affected by an export license proceeding, petitioners must assert that the proposed export itself could cause them harm; CLI-19-2, 89 NRC 229 (2019)

when determining whether petitioner identifies an interest that may be affected on an export license, the Commission considers the nature of the alleged interest, how that interest relates to issuance or denial, and possible effect of any order on that interest, including whether the relief requested is within the Commission's authority, and, if so, whether granting relief would redress the alleged injury; CLI-19-2, 89 NRC 229 (2019)

See also Conflict of Interest

### INTERESTED GOVERNMENTAL ENTITY

demonstration of standing from an interested governmental entity is not required; LBP-19-3, 89 NRC 245 (2019); LBP-19-4, 89 NRC 353 (2019)

entity that seeks to participate as an interested government must identify contentions on which it intends to participate and designate a single representative for the hearing; LBP-19-3, 89 NRC 245 (2019); LBP-19-4, 89 NRC 353 (2019)

licensing board will afford an interested local governmental body (county, municipality, or other subdivision) that has not been admitted as a party under section 2.309, a reasonable opportunity to participate in a hearing as an interested nonparty; LBP-19-3, 89 NRC 245 (2019); LBP-19-4, 89 NRC 353 (2019)

local governmental body that is not admitted as a party under section 2.309 may participate in a hearing as an interested nonparty; LBP-19-3, 89 NRC 245 (2019)

scope of participation is outlined in 10 C.F.R. 2.315(c); LBP-19-3, 89 NRC 245 (2019)

### INTERIM STORAGE FACILITY

amended contention that applicant refuses to publicize emergency and contingency plans is inadmissible; LBP-19-4, 89 NRC 353 (2019)

applicant must either possess, or demonstrate reasonable assurance of obtaining, necessary funds to cover estimated construction, operating, and decommissioning costs; LBP-19-4, 89 NRC 353 (2019)

canisters and casks for the facility that have been separately approved by the NRC are not part of the license application; LBP-19-4, 89 NRC 353 (2019)

challenge to applicant's environmental cost-benefit analysis and its analysis of alternatives is inadmissible for failure to address or controvert applicants environmental report; LBP-19-4, 89 NRC 353 (2019)

contention that agency must address the alternative of a permanent repository never being developed is not admissible; LBP-19-4, 89 NRC 353 (2019)

contention that applicant cannot provide reasonable assurances that it can obtain the necessary funds to cover the costs of construction, operation, maintenance, and decommissioning of the consolidated interim storage facility is inadmissible; LBP-19-4, 89 NRC 353 (2019)

## SUBJECT INDEX

contention that applicant's policy of rejecting and returning canisters that have unacceptable external radioactive or structural damage will create potential exposure routes that pose radioactive contamination threats to the public, nuclear workers, and the environment is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report fails to analyze site characteristics that may directly affect safety or environmental impact of the ISFSI is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report mischaracterizes both the Blue Ribbon Commission report's conclusions and the relative risks of consolidated interim storage versus onsite storage is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report underestimates the volume of low-level radioactive waste that will be generated by the facility is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that extended operation of the facility beyond the 100-year benchmark is a cumulative action and must be analyzed as such under NEPA is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that facility is within the habitat of the endangered dunes sagebrush lizard is inadmissible because petitioner's maps do not support it; LBP-19-4, 89 NRC 353 (2019)

contention that facility's Safety Analysis Report must analyze and evaluate design and performance of structures, systems, and components important to safety for operation of the facility is inadmissible; LBP-19-4, 89 NRC 353 (2019)

Continued Storage GEIS acknowledges that not all storage facilities will necessarily match the assumed generic facility, and therefore NRC will evaluate site-specific impacts of the construction and operation as part of that facility's licensing process; LBP-19-4, 89 NRC 353 (2019)

Continued Storage Rule explicitly states that applicant's environmental report is not required to discuss impacts following the proposed license term; LBP-19-4, 89 NRC 353 (2019)

discussion of adverse environmental effects that cannot be avoided, of alternatives, and of any irreversible and irretrievable commitments of resources that would be involved in the proposed action is required in the environmental report; LBP-19-4, 89 NRC 353 (2019)

distance to establish proximity-based standing is likely less than 50 miles because a storage facility is essentially a passive structure rather than an operating facility, and therefore has less chance of widespread radioactive release; LBP-19-4, 89 NRC 353 (2019)

licensee is required to update its decommissioning plan in response to any changes in the authorized possession limits; LBP-19-4, 89 NRC 353 (2019)

licensing requirements apply to renewable terms of no more than 40 years from the date of issuance; LBP-19-4, 89 NRC 353 (2019)

See also Independent Spent Fuel Storage Installation

### INTERVENTION

for a hearing to be granted, petitioner must establish standing to intervene and proffer at least one admissible contention; CLI-19-6, 89 NRC 465 (2019); LBP-19-4, 89 NRC 353 (2019); LBP-19-5, 89 NRC 483 (2019)

### INTERVENTION, DISCRETIONARY

board denies petitioner's alternative request for discretionary intervention because petitioner's further participation would significantly and improperly broaden the scope of the proceeding; LBP-19-4, 89 NRC 353 (2019)

### INTERVENTION PETITIONS

amended petition on export license is properly considered as a public comment on the application and is therefore referred to the Office of International Programs as a public comment; CLI-19-2, 89 NRC 229 (2019)

information that petitioner should include in its petition to establish standing is included in 10 C.F.R. 2.309(d), but it does not set the standard the board must apply when deciding whether that information is sufficient; LBP-19-4, 89 NRC 353 (2019)

petition is construed in favor of petitioner when standing is determined; LBP-19-4, 89 NRC 353 (2019)

petitioner must establish standing and proffer at least one admissible contention to participate in the proceeding; LBP-19-3, 89 NRC 245 (2019)

required content of petitioner's hearing request is described in 10 C.F.R. 2.309(d)(1); LBP-19-3, 89 NRC 245 (2019); LBP-19-5, 89 NRC 483 (2019)

## SUBJECT INDEX

### INTERVENTION RULINGS

information that petitioner should include in its petition to establish standing is included in 10 C.F.R. 2.309(d), but it does not set the standard the board must apply when deciding whether that information is sufficient; LBP-19-4, 89 NRC 353 (2019)

interlocutory review sought on grounds that board's timeliness rulings were so overbroad as to affect the basic structure of the proceeding in a pervasive or unusual manner is denied; CLI-19-5, 89 NRC 329 (2019)

mere expansion of issues due to admission of a contention rarely, if ever, warrants interlocutory review; CLI-19-5, 89 NRC 329 (2019)

mere increase in litigation burden caused by board's admission of an additional contention is not a pervasive and unusual effect on the litigation or an irreparable harm warranting interlocutory review; CLI-19-5, 89 NRC 329 (2019)

petitioner bears the burden of establishing standing, but licensing boards are to evaluate petitioner's standing, construing the petition in favor of the petitioner; LBP-19-5, 89 NRC 483 (2019)

### IRREPARABLE INJURY

mere increase in litigation burden caused by board's admission of an additional contention is not a pervasive and unusual effect on the litigation or an irreparable harm warranting interlocutory review; CLI-19-5, 89 NRC 329 (2019)

National Environmental Policy Act does not permit an agency to act first and comply later or to condition performance of its obligation on a showing of irreparable harm; CLI-19-1, 89 NRC 1 (2019)

once NRC determines that there is a significant deficiency in its NEPA compliance, it may not permit a project to continue in a manner that puts at risk the values NEPA protects simply because no intervenor can show irreparable harm; CLI-19-1, 89 NRC 1 (2019)

stay standard considers irreparable injury to the stay requestor, likelihood of the stay requestor prevailing on the merits in the adjudication, harm a stay would inflict on the other participants in the adjudication, and public interest; CLI-19-1, 89 NRC 1 (2019)

See also Injury in Fact

### LEGISLATIVE HISTORY

resorting to regulatory history is unnecessary when the meaning of a regulation is clear; LBP-19-3, 89 NRC 245 (2019)

### LIABILITY

contract damage lawsuits under the NWPA are now commonplace, and the federal government pays out damages to power reactor licensees on a regular basis; LBP-19-4, 89 NRC 353 (2019)

### LIABILITY INSURANCE

contention that application does not address liability coverage is inadmissible for failure to demonstrate why this issue is material or relates to financial qualifications; LBP-19-4, 89 NRC 353 (2019)

licensees in decommissioning continue to carry onsite property damage insurance and offsite nuclear liability insurance, in amounts the NRC requires for a defueled plant; CLI-19-6, 89 NRC 465 (2019)

section 72.22(e) does not address liability coverage; LBP-19-4, 89 NRC 353 (2019)

### LICENSE RENEWAL APPLICATIONS

applicant must identify and list structures, systems, and components subject to aging management review; LBP-19-5, 89 NRC 483 (2019)

license renewal applications must demonstrate that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis for the period of extended operation; LBP-19-5, 89 NRC 483 (2019)

section 51.53(a) approves incorporation by reference of NRC Staff-prepared final generic environmental impact statement in subsequent license renewal application; LBP-19-5, 89 NRC 483 (2019)

### LICENSE RENEWALS

licensing requirements for an interim storage facility apply to renewable terms of no more than 40 years from the date of issuance; LBP-19-4, 89 NRC 353 (2019)

### LICENSE TRANSFER APPLICATIONS

LTAs and associated amendments necessary to reflect approval of the transfers are excluded from the requirement of an additional environmental review; CLI-19-6, 89 NRC 465 (2019)

NRC requires applicants to demonstrate reasonable assurance of having, or being able to obtain, necessary funding for decommissioning and spent fuel management; CLI-19-6, 89 NRC 465 (2019)

## SUBJECT INDEX

### LICENSE TRANSFERS

applicant must provide reasonable assurance that sufficient funds will be available to decommission the facility and to carry out applicable activities under the license; CLI-19-6, 89 NRC 465 (2019)

applicants need not demonstrate financial qualifications to cover power reactor operating costs if power operations have permanently ceased; CLI-19-6, 89 NRC 465 (2019)

NRC must provide prior written consent for a license transfer; CLI-19-6, 89 NRC 465 (2019)

NRC review is limited to specific matters, including financial and technical qualifications of the proposed transferee; CLI-19-6, 89 NRC 465 (2019)

NRC will approve a license transfer application if it finds the proposed transferee to be qualified to hold the license and the transfer is otherwise consistent with applicable law, regulations, and NRC orders; CLI-19-6, 89 NRC 465 (2019)

### LICENSEE CHARACTER

applicant's past violations, standing alone, do not constitute sufficient information to raise a genuine dispute with the assumption that the state will enforce, and applicant will comply with, the legally mandated mitigation measures in the permits; LBP-19-3, 89 NRC 245 (2019)

to be admissible, claims of poor character or integrity must have some direct and obvious relationship between the character issues and the licensing action in dispute; CLI-19-6, 89 NRC 465 (2019)

### LICENSING BOARD DECISIONS

board's ultimate NEPA judgments can be made on the basis of the entire adjudicatory record in addition to NRC Staff's final environmental assessment; LBP-19-2, 89 NRC 18 (2019)

See also Initial Decisions

### LICENSING BOARD JUDGES

even where there is no actual conflict of interest, a judge should disqualify himself or herself where a reasonable person would question the judge's impartiality; CLI-19-3, 89 NRC 236 (2019)

federal standards hold that a judge must disqualify himself or herself whenever the judge's impartiality in the proceeding might reasonably be questioned, as well as in specific circumstances in which conflict of interest is shown; CLI-19-3, 89 NRC 236 (2019)

judges should not have preconceived beliefs about the facts, but it is not grounds for disqualification for a judge to have formed an opinion about the applicable law; CLI-19-3, 89 NRC 236 (2019)

NRC regulation pertaining to disqualification of a judge does not describe what circumstances justify disqualification, and so licensing board members should look to standards that apply to federal judges; CLI-19-3, 89 NRC 236 (2019)

to provide a basis for disqualification of a judge, the prejudgment, or appearance of prejudgment, must relate to a factual dispute rather than a legal one; CLI-19-3, 89 NRC 236 (2019)

### LICENSING BOARDS

Chief Administrative Judge may substitute board members, or replace an entire board, if necessary for workload reasons; CLI-19-3, 89 NRC 236 (2019)

for the prospect that the judges may be overworked, the Chief Administrative Judge appoints members of each board and has the discretion to manage the boards if the complexity of the issues involved makes it expedient to do so; CLI-19-3, 89 NRC 236 (2019)

### LICENSING BOARDS, AUTHORITY

Commission traditionally gives a high level of deference to the boards as the fact finder in NRC adjudicatory proceedings; CLI-19-3, 89 NRC 236 (2019)

neither the board nor the Commission has authority to effectively amend a regulation to reflect new Commission intent outside of the notice-and-comment process; LBP-19-3, 89 NRC 245 (2019)

### LICENSING BOARDS, JURISDICTION

when a board has ruled on all pending contentions in a matter, ordinarily its jurisdiction in the case would be terminated; CLI-19-5, 89 NRC 329 (2019)

### MARKET POWER

NRC is not in the business of regulating market strategies of licensees or determining whether market strategies warrant commencing operations; LBP-19-4, 89 NRC 353 (2019)

### MATERIAL FALSE STATEMENTS

license issued by NRC may be revoked for any material false statement in the license application; LBP-19-4, 89 NRC 353 (2019)

## SUBJECT INDEX

### MATERIAL INFORMATION

“materially different” requirement necessary to file a contention after the initial deadline is contrasted with “material to the findings the NRC must make” requirement of section 2.309(f)(1)(iv); LBP-19-4, 89 NRC 353 (2019)

### MATERIAL MISREPRESENTATIONS

violation of AEA section 186 requires willfulness; LBP-19-4, 89 NRC 353 (2019)

### MATERIALS LICENSE AMENDMENT APPLICATIONS

in situ uranium recovery license amendment applications must meet safety requirements including specific standards for uranium mill operation and waste material disposal; LBP-19-2, 89 NRC 18 (2019)

NRC Staff must prepare an environmental assessment in response to licensee’s request to amend its license to possess and use source material at its existing in situ uranium recovery facility; LBP-19-2, 89 NRC 18 (2019)

### MATERIALS LICENSE AMENDMENTS

applicant may request a license amendment for an alternate concentration limit where ACL value would be the same as the NDEQ Title 118 water quality standards as long as the request meets all requirements of this criterion; LBP-19-2, 89 NRC 18 (2019)

intervenor may seek a stay of NRC Staff authorization of a license amendment issued during pendency of evidentiary hearing; LBP-19-2, 89 NRC 18 (2019)

with publication of final environmental assessment, NRC Staff notified the board and parties that license amendment authorizing construction and operation had been issued, effective immediately; LBP-19-2, 89 NRC 18 (2019)

### MATERIALS LICENSE APPLICATIONS

final environmental assessment must provide sufficient information about geological setting of the area to meet regulatory requirements; LBP-19-2, 89 NRC 18 (2019)

new in situ uranium recovery facility license application triggers preparation of an environmental impact statement; LBP-19-2, 89 NRC 18 (2019)

### MATERIALS LICENSE PROCEEDINGS

during pendency of hearing, consistent with NRC Staff’s findings in its review of the application or matter that is the subject of the hearing and as authorized by law, the NRC Staff is expected to promptly issue its approval or denial of the application; CLI-19-1, 89 NRC 1 (2019)

presumption of standing based on geographic proximity is not confined solely to Part 50 reactor licenses, but is also applicable to materials cases where the potential for offsite consequences is obvious; LBP-19-4, 89 NRC 353 (2019)

### MATERIALS LICENSE RENEWAL

contention that environmental report must consider all potential impacts if consolidated interim storage facility ultimately continues to operate beyond the design life and service life is inadmissible; LBP-19-4, 89 NRC 353 (2019)

license renewals trigger new hearing opportunities; LBP-19-4, 89 NRC 353 (2019)

### MATERIALS LICENSES

NRC must ensure that facilities associated with the licensed possession and use of source and byproduct materials meet regulatory requirements developed to protect public health and safety from radiological hazards; LBP-19-2, 89 NRC 18 (2019)

See also Byproduct Materials Licenses

### MAXIMUM CONTAMINANT LEVELS

selenium MCL in groundwater set by the Nebraska DEQ is the same maximum contaminant level set by the U.S. Environmental Protection Agency; CLI-19-5, 89 NRC 329 (2019)

### MIGRATION TENET

although it is NRC Staff’s responsibility to comply with NEPA in its later-issued environmental impact statement, the board analyzes contentions challenging the environmental report now as if those contentions will migrate as challenges to NRC Staff’s later-issued EIS; LBP-19-4, 89 NRC 353 (2019)

contention migrates when a licensing board construes a contention challenging an environmental report as a challenge to a subsequently issued Staff NEPA document without the petitioner amending the contention; LBP-19-3, 89 NRC 245 (2019); LBP-19-4, 89 NRC 353 (2019)

## SUBJECT INDEX

### MINORITIES

federal agencies must identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations; LBP-19-4, 89 NRC 353 (2019)

### MITIGATION PLANS

license renewal applicants need not address mitigation for issues designated Category 1; LBP-19-3, 89 NRC 245 (2019)

### MODELS/MODELING

site hydrologic conceptual model is discussed; LBP-19-2, 89 NRC 18 (2019)

### MOOTNESS

Commission will vacate unreviewed board decisions when appellate review is cut short by mootness; CLI-19-5, 89 NRC 329 (2019)

### MOTIONS

NRC's regulations do not provide for the filing of threshold motions or objections; LBP-19-4, 89 NRC 353 (2019)

### NATIONAL HISTORIC PRESERVATION ACT

agencies are given broad discretion to keep their environmental impact inquiries within appropriate and manageable boundaries; LBP-19-2, 89 NRC 18 (2019)

agencies are required to take a hard look at environmental consequences of the proposed action; LBP-19-4, 89 NRC 353 (2019)

agency is not permitted to act first and comply later or to condition performance of its obligation on a showing of irreparable harm; CLI-19-1, 89 NRC 1 (2019)

agency must take a hard look at environmental consequences of major federal actions; LBP-19-3, 89 NRC 245 (2019)

all NEPA issues for license renewal of nuclear power plants are listed in 10 C.F.R. Part 51, Subpart A, Appendix B and assigned to either Category 1 or Category 2; LBP-19-3, 89 NRC 245 (2019)

although NEPA requires NRC to take a hard look at environmental consequences of major federal actions, it seeks to guarantee process, not specific outcomes; LBP-19-5, 89 NRC 483 (2019)

Category 1 issues are NEPA-related issues that could be addressed generically, i.e., applied to all plants, and Category 2 issues are those that needed to be determined on a plant-by-plant basis; LBP-19-3, 89 NRC 245 (2019)

certainty, precision, or particular results from the agency are not mandated by the act; LBP-19-4, 89 NRC 353 (2019)

consideration of reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment is required; LBP-19-4, 89 NRC 353 (2019)

environmental impact is reasonably foreseeable if it is sufficiently likely to occur that a person of ordinary prudence would take it into account in reaching a decision; CLI-19-5, 89 NRC 329 (2019)

environmental impact statement must include a detailed discussion of the environmental impact of the proposed action, any adverse environmental effects that cannot be avoided should the proposal be implemented, and alternatives to the proposed action; LBP-19-3, 89 NRC 245 (2019); LBP-19-5, 89 NRC 483 (2019)

environmental impact statement requirement ensures that the agency will inform the public that it has indeed considered environmental concerns in its decisionmaking process; LBP-19-3, 89 NRC 245 (2019)

environmental impact statement requirement places upon an agency the obligation to consider every significant aspect of the environmental impact of a proposed action; LBP-19-3, 89 NRC 245 (2019)

federal agencies must prepare an environmental impact statement for proposed major federal actions significantly affecting the quality of the human environment; LBP-19-3, 89 NRC 245 (2019); LBP-19-4, 89 NRC 353 (2019); LBP-19-5, 89 NRC 483 (2019)

generic method is clearly an appropriate method of conducting the hard look required by NEPA; LBP-19-3, 89 NRC 245 (2019)

goal of NEPA is to guarantee process, not specific outcomes; CLI-19-1, 89 NRC 1 (2019); LBP-19-3, 89 NRC 245 (2019); LBP-19-4, 89 NRC 353 (2019)

hard-look requirement is intended to foster both informed decisionmaking and informed public participation so as to ensure that the agency does not act upon incomplete information, only to regret its decision after it is too late to correct; LBP-19-2, 89 NRC 18 (2019)

## SUBJECT INDEX

hard-look requirement is subject to a rule of reason in that consideration of environmental impacts need not address all theoretical possibilities, but rather only those that have some reasonable possibility of occurring; LBP-19-2, 89 NRC 18 (2019); LBP-19-4, 89 NRC 353 (2019)

it is NRC Staff's responsibility to comply with NEPA in its later-issued EIS; LBP-19-4, 89 NRC 353 (2019)

it is unreasonable for NRC to categorically dismiss the possibility of terrorist attack on the storage installation as too remote and highly speculative to warrant consideration under NEPA; LBP-19-4, 89 NRC 353 (2019)

neither certainty nor precision is called for when considering reasonably foreseeable environmental impacts, but rather an estimate of anticipated, not unduly speculative, impacts; LBP-19-2, 89 NRC 18 (2019); LBP-19-4, 89 NRC 353 (2019)

neither NEPA nor NRC regulations require an environmental analysis of potential actions that are merely contemplated and have not been proposed; LBP-19-4, 89 NRC 353 (2019)

NRC is required to both consider every significant aspect of the environmental impact of a proposed action and inform the public of its analysis and conclusion; LBP-19-4, 89 NRC 353 (2019)

NRC must consider social and economic impacts ancillary to environmental impacts, i.e., environmental justice concerns; LBP-19-4, 89 NRC 353 (2019)

NRC Staff has a duty to consult with local Native American tribes during its environmental review; CLI-19-5, 89 NRC 329 (2019)

NRC Staff has the burden of proof on environmental contentions; LBP-19-2, 89 NRC 18 (2019)

renewal of a license to operate a nuclear power plant constitutes a major federal action triggering NRC's obligation under NEPA to prepare an environmental impact statement; LBP-19-3, 89 NRC 245 (2019)

requirement that a detailed environmental impact statement be made for a proposed action makes clear that agencies must take the required hard look before taking that action; CLI-19-1, 89 NRC 1 (2019)

under remand-without-vacatur doctrine, court had no reason to expect that the agency will be unable to correct board-identified NEPA deficiencies; CLI-19-1, 89 NRC 1 (2019)

when the generic environmental impact statement and the supplemental environmental impact statement are combined, they cover all issues that NEPA requires be addressed in an EIS for a nuclear power plant license renewal proceeding; LBP-19-3, 89 NRC 245 (2019)

worst-case analysis is not required because it creates a distorted picture of a project's impacts and wastes agency resources; LBP-19-4, 89 NRC 353 (2019)

**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT**

compliance with effluent standards established for toxic pollutants is required in NPDES permits; CLI-19-5, 89 NRC 329 (2019)

**NATIVE AMERICANS**

NRC Staff has a duty to consult with local tribes during its environmental review; CLI-19-5, 89 NRC 329 (2019)

spent nuclear fuel transportation route identification requires separate review and approval by the NRC and the Department of Transportation, as well as by applicable states or tribes; LBP-19-4, 89 NRC 353 (2019)

**NONCOMPLIANCES**

contention that attacks adequacy of environmental report's analysis of cumulative impacts in light of applicant's history of noncompliance with its permits relating to the cooling canal system is inadmissible; LBP-19-3, 89 NRC 245 (2019)

**NOTICE AND COMMENT PROCEDURES**

because NRC promulgated section 51.53(c)(3) through notice-and-comment rulemaking, it must use the same procedure if it wants to amend or repeal the rule; LBP-19-3, 89 NRC 245 (2019)

**NOTICE PLEADING**

although petitioner need not prove its contention at the admission stage, mere notice pleading of proffered contentions is insufficient; LBP-19-4, 89 NRC 353 (2019)

**NRC GUIDANCE DOCUMENTS**

agency's interpretative statements reflect a body of experience and informed judgment to which courts and litigants may properly resort for guidance and as such, they are entitled to a measure of respect; LBP-19-3, 89 NRC 245 (2019)

## SUBJECT INDEX

documents that are developed to assist in compliance with applicable regulations are entitled to special weight; LBP-19-3, 89 NRC 245 (2019)

while recognizing the guidance nature of standard review plans, the Commission has indicated that, having been developed to assist an applicant in complying with applicable regulations, such plans are entitled to special weight; LBP-19-2, 89 NRC 18 (2019)

### NRC POLICY

agency must provide more substantial justification when its new policy rests upon factual findings that contradict those that underlay its prior policy, or when its prior policy has engendered serious reliance interests in the written regulation that must be taken into account; LBP-19-3, 89 NRC 245 (2019)

### NRC STAFF

because Staff relies heavily on applicant's environmental report in preparing the environmental assessment, should applicant become a proponent of a particular challenged position set forth in the EA, applicant also has the burden on that matter; LBP-19-2, 89 NRC 18 (2019)

burden of proof on NEPA-based contentions rests on NRC Staff; LBP-19-2, 89 NRC 18 (2019)

### NRC STAFF REVIEW

although NRC Staff conducts its own independent safety review, parties may not litigate the adequacy of that review; LBP-19-2, 89 NRC 18 (2019)

Commission considers, as an exercise of its inherent supervisory authority over the NRC Staff, whether any additional information developed during the adjudication necessitates further NEPA activities; CLI-19-5, 89 NRC 329 (2019)

Commission direction to NRC Staff generally is not reviewable in an NRC adjudication but such a petition may be considered discretionarily; CLI-19-5, 89 NRC 329 (2019)

during pendency of any materials licensing hearing, consistent with the Staff's findings in its review of the application or matter that is the subject of the hearing and as authorized by law, Staff is expected to promptly issue its approval or denial of the application; CLI-19-1, 89 NRC 1 (2019)

duty to consult with local Native American tribes is part of NRC environmental review; CLI-19-5, 89 NRC 329 (2019)

environmental assessment must be prepared in response to licensee's request to amend its license to possess and use source material at its existing in situ uranium recovery facility; LBP-19-2, 89 NRC 18 (2019)

in situ uranium recovery license amendment applications must meet safety requirements including specific standards for uranium mill operation and waste material disposal; LBP-19-2, 89 NRC 18 (2019)

it is NRC Staff's responsibility to comply with NEPA in its later-issued EIS; LBP-19-4, 89 NRC 353 (2019)

NEPA does not necessitate certainty or precision nor does it mandate particular results from the agency; LBP-19-4, 89 NRC 353 (2019)

NEPA requires only an estimate of anticipated, not unduly speculative, impacts from the agency; LBP-19-4, 89 NRC 353 (2019)

NEPA's hard-look mandate notwithstanding, the agency is not obliged to analyze every conceivable aspect of the project before it; LBP-19-4, 89 NRC 353 (2019)

NRC must consider information developed by a subsequent license renewal applicant under section 51.53(c)(3)(ii) in its preparation of the draft SEIS; LBP-19-3, 89 NRC 245 (2019)

NRC need not consider remote and highly speculative events in its environmental analysis; LBP-19-4, 89 NRC 353 (2019)

NRC need not perform analyses concerning events that would be considered worst-case scenarios involving the project; LBP-19-4, 89 NRC 353 (2019)

NRC steps in preparation of an environmental impact statement are described; LBP-19-3, 89 NRC 245 (2019)

purpose of NRC's environmental review is to inform the decisionmaking agency and the public of a broad range of environmental impacts that will result, with a fair degree of likelihood, from a proposed project, rather than to speculate about worst-case scenarios and how to prevent them; LBP-19-4, 89 NRC 353 (2019)

Staff has a regulatory obligation to consider reasonable alternatives available for reducing or avoiding adverse environmental effects; LBP-19-3, 89 NRC 245 (2019)



## SUBJECT INDEX

Staff reviews applicant's environmental report and draws upon it to produce a draft supplemental EIS; LBP-19-3, 89 NRC 245 (2019); LBP-19-5, 89 NRC 483 (2019)

Staff's non-consideration of the Category 1 issue on a plant-specific basis fully comports with its environmental review responsibilities under NEPA and Part 51; LBP-19-3, 89 NRC 245 (2019) where board granted summary disposition in favor of intervenors on NEPA contention, neither the potential that the board erred nor the need for NRC Staff to perform potentially unnecessary analysis in the environmental impact statement presented a compelling case for interlocutory review; CLI-19-5, 89 NRC 329 (2019)

whereas NRC hearings on safety issues concern adequacy of the license application, not NRC Staff's work, NRC hearings on NEPA issues focus entirely on adequacy of NRC Staff's work; LBP-19-2, 89 NRC 18 (2019)

### NUCLEAR REGULATORY COMMISSION, AUTHORITY

Commission considers, as an exercise of its inherent supervisory authority over NRC Staff, whether any additional information developed during adjudication necessitates further NEPA activities; CLI-19-5, 89 NRC 329 (2019)

for operating power reactors, NRC has the right to review accumulation rate of decommissioning funds, and to take additional actions; DD-19-1, 89 NRC 317 (2019)

neither the board nor the Commission has authority to effectively amend a regulation to reflect new Commission intent outside of the notice-and-comment process; LBP-19-3, 89 NRC 245 (2019)

NRC can make generic determinations to meet its NEPA obligations; LBP-19-3, 89 NRC 245 (2019)

NRC has authority to issue licenses for the possession and use of source and byproduct material; LBP-19-2, 89 NRC 18 (2019)

NRC has authority under the AEA to license privately owned facilities, and the Nuclear Waste Policy Act did not repeal or supersede that authority; LBP-19-4, 89 NRC 353 (2019)

NRC is not in the business of regulating market strategies of licensees or determining whether market strategies warrant commencing operations; LBP-19-4, 89 NRC 353 (2019)

### NUCLEAR REGULATORY COMMISSION, JURISDICTION

claims under state law against an entity that is not seeking a license from the NRC are outside the scope of the proceeding; LBP-19-4, 89 NRC 353 (2019)

### NUCLEAR WASTE POLICY ACT

delivery, and acceptance by the Secretary of Energy, of any high-level radioactive waste or spent nuclear fuel for a repository shall constitute a transfer to the Secretary of title to such waste or spent fuel; LBP-19-4, 89 NRC 353 (2019)

DOE has no authority under the NWPA to provide interim storage in the absence of a facility that has been authorized, constructed, and licensed in accordance with the NWPA; LBP-19-4, 89 NRC 353 (2019)

DOE is precluded from taking title to spent fuel unless and until a permanent repository has opened; LBP-19-4, 89 NRC 353 (2019)

DOE takes the position that it lacks statutory authority under the NWPA to provide interim storage; LBP-19-4, 89 NRC 353 (2019)

DOE was committed to begin disposing of the nuclear power plants' spent fuel no later than January 31, 1998; LBP-19-4, 89 NRC 353 (2019)

NRC has authority under the Atomic Energy Act to license privately owned facilities, and NWPA did not repeal or supersede that authority; LBP-19-4, 89 NRC 353 (2019)

power reactor licensees were required to pay into a Nuclear Waste Fund for construction of the repository; LBP-19-4, 89 NRC 353 (2019)

Yucca Mountain was statutorily authorized to store 70,000 metric tons of high-level radioactive waste; LBP-19-4, 89 NRC 353 (2019)

### OBJECTIONS

NRC's regulations do not provide for the filing of threshold motions or objections; LBP-19-4, 89 NRC 353 (2019)

### OFFICIAL NOTICE

board takes official notice that the term "homogeneity" is synonymous with uniformity in space; LBP-19-2, 89 NRC 18 (2019)

## SUBJECT INDEX

### OPERATING LICENSE RENEWAL

- all NEPA issues are listed in 10 C.F.R. Part 51, Subpart A, Appendix B and assigned to either Category 1 or Category 2; LBP-19-3, 89 NRC 245 (2019)
- applicants for initial license renewals need not consider Category 1 issues in their environmental report; LBP-19-3, 89 NRC 245 (2019)
- applicants must demonstrate how their programs and procedures will manage the effects of aging on power reactor structures, systems, and components; LBP-19-5, 89 NRC 483 (2019)
- applicants must demonstrate that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis for the period of extended operation; LBP-19-5, 89 NRC 483 (2019)
- applicants must include in the environmental report a description of the proposed action, a detailed description of the affected environment around the plant, modifications directly affecting the environment or any plant effluents, and any planned refurbishment activities, as well as the environmental impacts of alternatives and any other matters described in section 51.45; LBP-19-3, 89 NRC 245 (2019)
- applicants must submit an environmental report, the purpose of which is to aid the Commission in complying with section 102(2) of NEPA; LBP-19-3, 89 NRC 245 (2019); LBP-19-5, 89 NRC 483 (2019)
- applicants need not address mitigation for issues designated Category 1; LBP-19-3, 89 NRC 245 (2019)
- applications must identify and list structures, systems, and components subject to aging management review; LBP-19-5, 89 NRC 483 (2019)
- divergent treatment of generic and site-specific issues is reasonable and consistent with the purpose of promoting efficiency in handling license renewal decisions; LBP-19-3, 89 NRC 245 (2019)
- draft supplemental EIS prepared under section 51.95(c) will rely on conclusions as amplified by the supporting information in the GEIS for issues designated as Category 1 in 10 C.F.R. Part 50, Subpart A, Appendix B; LBP-19-3, 89 NRC 245 (2019)
- environmental reports need not discuss economic or technical benefits and costs of either the proposed action or alternatives except if they are either essential for inclusion of an alternative or relevant to mitigation; LBP-19-3, 89 NRC 245 (2019)
- GEIS's findings do not refer to initial renewals, but speak more broadly about applying to a renewed operating license for a nuclear power plant, and as representing the analysis of the environmental impacts associated with renewal of any operating license; LBP-19-3, 89 NRC 245 (2019)
- had NRC abandoned its one-renewal limit on the 1991 Part 51 amendments without expressly explaining why, the agency's action would have been subject to challenge as arbitrary and capricious; LBP-19-3, 89 NRC 245 (2019)
- intent behind 10 C.F.R. 51.53(c)(3) is to promote efficiency in the environmental review process for license renewal applications; LBP-19-3, 89 NRC 245 (2019)
- NRC may issue a renewed license if it concludes that licensee's management of aging effects on the plant's identified structures, systems, and components will provide reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the current licensing basis; LBP-19-5, 89 NRC 483 (2019)
- particular category of license renewal applicants is identified in 10 C.F.R. 51.53(c) whose environmental reports shall include the information required in section 51.53(c)(2) subject to certain conditions and considerations; LBP-19-3, 89 NRC 245 (2019)
- preparing an environmental impact statement that considers all of the significant environmental issues relevant to the renewal of a nuclear power plant on a site-specific basis is a demanding and time-consuming task; LBP-19-3, 89 NRC 245 (2019)
- purpose of Part 51 regulations is explained in 10 C.F.R. 51.10; LBP-19-3, 89 NRC 245 (2019)
- renewal constitutes a major federal action triggering NRC's obligation under NEPA to prepare an EIS; LBP-19-5, 89 NRC 483 (2019)
- scope of license renewal requirements is explained in 10 C.F.R. 54.4; LBP-19-3, 89 NRC 245 (2019)
- supplemental environmental impact statement must include a plant-specific analysis of all Category 2 issues, but need not discuss Category 1 issues because those issues have already been addressed globally in the GEIS and codified in 10 C.F.R. Part 51; LBP-19-3, 89 NRC 245 (2019)

## SUBJECT INDEX

- this major federal action triggers NRC's obligation under NEPA to prepare an environmental impact statement; LBP-19-3, 89 NRC 245 (2019)
- when the GEIS and SEIS are combined, they cover all issues that NEPA requires be addressed in an EIS for a nuclear power plant license renewal proceeding; LBP-19-3, 89 NRC 245 (2019)
- OPERATING LICENSE RENEWAL PROCEEDINGS**
- applicants may use the guidance in Reg. Guide 4.2 to develop the environmental report; LBP-19-3, 89 NRC 245 (2019)
- Commission has implicitly endorsed application of the proximity presumption in these proceedings; LBP-19-3, 89 NRC 245 (2019)
- licensing boards have routinely applied the 50-mile proximity presumption in these proceedings, reasoning that renewal allows operation of a reactor over an additional period of time during which the reactor could be subject to the same equipment failures and personnel errors as during operations over the original period of the license; LBP-19-3, 89 NRC 245 (2019); LBP-19-5, 89 NRC 483 (2019)
- NRC Staff is required to integrate into the draft SEIS information developed for those Category 2 issues applicable to the plant under section 51.53(c)(3)(ii); LBP-19-3, 89 NRC 245 (2019)
- scope of safety issues that may be considered in an operating license renewal proceeding is limited; LBP-19-5, 89 NRC 483 (2019)
- when the generic environmental impact statement and the supplemental environmental impact statement are combined, they cover all issues that NEPA requires be addressed in the EIS; LBP-19-3, 89 NRC 245 (2019)
- See also Subsequent Operating License Renewal Proceedings
- OPINIONS**
- judges should not have preconceived beliefs about the facts, but it is not grounds for disqualification for a judge to have formed an opinion about the applicable law; CLI-19-3, 89 NRC 236 (2019)
- testimony that states a legal standard or draws a legal conclusion by applying law to the facts is generally inadmissible; LBP-19-2, 89 NRC 18 (2019)
- OPPORTUNITY FOR HEARING**
- license renewals trigger new hearing opportunities; LBP-19-4, 89 NRC 353 (2019)
- OWNERSHIP**
- delivery, and acceptance by the Secretary of Energy, of any high-level radioactive waste or spent nuclear fuel for a repository shall constitute a transfer to the Secretary of title to such waste or spent fuel; LBP-19-4, 89 NRC 353 (2019)
- PENDENCY OF PROCEEDINGS**
- during pendency of any materials licensing hearing, consistent with the NRC staff's findings in its review of the application or matter that is the subject of the hearing and as authorized by law, the NRC Staff is expected to promptly issue its approval or denial of the application; CLI-19-1, 89 NRC 1 (2019)
- PERMITS**
- contention that attacks adequacy of environmental report's analysis of cumulative impacts in light of applicant's history of noncompliance with its permits relating to the cooling canal system is inadmissible; LBP-19-3, 89 NRC 245 (2019)
- See also National Pollutant Discharge Elimination System Permit
- POLICY**
- board proceedings regarding application for an NRC-issued license are not a proper forum for contentions that comprise broad policy recommendations and challenges to agency rules; LBP-19-4, 89 NRC 353 (2019)
- See also NRC Policy
- POSSESSION-ONLY LICENSES**
- interim storage facility licensee is required to update its decommissioning plan in response to any changes in the authorized possession limits; LBP-19-4, 89 NRC 353 (2019)
- POWER UPRATE**
- contention that environmental report is incomplete because it fails to include a discussion of whether applicant intends to seek any power uprates during the renewal period is inadmissible; LBP-19-3, 89 NRC 245 (2019)

## SUBJECT INDEX

### PREJUDGMENT

to provide a basis for disqualification of a judge, the prejudgment, or appearance of prejudgment, must relate to a factual dispute rather than a legal one; CLI-19-3, 89 NRC 236 (2019)

### PRESIDING OFFICER

argument that a reasonable person might believe the Presiding Officer would be biased in favor of a party represented by a law firm with which the Presiding Officer had recently discussed, but had not been offered, employment was rejected; CLI-19-3, 89 NRC 236 (2019)

if the Commission itself does not designate the presiding officer, then the Chief Administrative Judge of the Atomic Safety and Licensing Board Panel will do so; CLI-19-3, 89 NRC 236 (2019)

### PRESUMPTION OF COMPLIANCE

absent evidence to the contrary, NRC will assume that licensee will comply with license obligations; LBP-19-3, 89 NRC 245 (2019); LBP-19-4, 89 NRC 353 (2019)

applicant's past violations, standing alone, do not constitute sufficient information to raise a genuine dispute with the assumption that the state will enforce, and applicant will comply with, the legally mandated mitigation measures in the permits; LBP-19-3, 89 NRC 245 (2019)

### PRESUMPTION OF REGULARITY

board declines to base its regulatory analysis on the notion that the NRC might engage in administrative misconduct in future adjudicatory proceedings; LBP-19-3, 89 NRC 245 (2019)

federal agencies should be assumed to act properly in the absence of evidence to the contrary; LBP-19-4, 89 NRC 353 (2019)

### PROOF

See Burden of Proof

### PROXIMITY PRESUMPTION

although 35 miles is within the 50-mile proximity presumption that applies to licensing reactors, it is nearly twice the distance that any licensing board has found sufficient to support standing in a spent fuel storage case; LBP-19-4, 89 NRC 353 (2019)

applying the proximity presumption to reactor license renewal proceedings not only satisfies contemporaneous judicial concepts of standing, it provides clarity for litigants and licensing boards, thereby promoting efficiency in the adjudicatory process; LBP-19-3, 89 NRC 245 (2019); LBP-19-5, 89 NRC 483 (2019)

assertion of injury from spent fuel that would travel on railway track very near property was insufficient to establish standing; LBP-19-4, 89 NRC 353 (2019)

boards have regularly declined to find that a mere increase in traffic of radioactive materials near petitioner's residence, without more, constitutes an injury traceable to a licensing decision that primarily affects a site hundreds of miles away; LBP-19-4, 89 NRC 353 (2019)

Commission has implicitly endorsed application of the presumption in reactor license renewal proceedings; LBP-19-3, 89 NRC 245 (2019)

distance to establish proximity-based standing in a consolidated interim storage facility proceeding is likely less than 50 miles because such a storage facility is essentially a passive structure rather than an operating facility, and therefore has less chance of widespread radioactive release; LBP-19-4, 89 NRC 353 (2019)

employment 10 miles from site where organization member might not actually spend her workday and does not reflect for how long she expects her six-month employment to continue does not support standing; LBP-19-4, 89 NRC 353 (2019)

even before 2004, licensing boards rejected standing arguments based on proximity to likely transportation routes; LBP-19-4, 89 NRC 353 (2019)

fifty-mile proximity presumption has been applied in a recent subsequent license renewal proceeding; LBP-19-5, 89 NRC 483 (2019)

fifty-mile proximity presumption is simply a shortcut for determining standing in certain cases; LBP-19-3, 89 NRC 245 (2019); LBP-19-5, 89 NRC 483 (2019)

for proposed spent fuel pool expansions, 17 miles and 10 miles have been found sufficient for proximity-based standing; LBP-19-4, 89 NRC 353 (2019)

in context of certain reactor licensing proceedings, petitioner is presumed to have standing if he or she resides, or otherwise has frequent contacts, within approximately 50 miles of the facility in question; LBP-19-3, 89 NRC 245 (2019)

## SUBJECT INDEX

- individuals who reside within, or have frequent contacts with, a geographic zone of potential harm are deemed to be the area within a 50-mile radius of the site; LBP-19-4, 89 NRC 353 (2019)
- licensing boards have routinely applied the 50-mile presumption of standing in reactor license renewal proceedings, reasoning that renewal allows operation of a reactor over an additional period of time during which the reactor could be subject to the same equipment failures and personnel errors as during operations over the original period of the license; LBP-19-3, 89 NRC 245 (2019); LBP-19-5, 89 NRC 483 (2019)
- mere geographical proximity to potential transportation routes is insufficient to confer standing; LBP-19-4, 89 NRC 353 (2019)
- petitioners' standing claim was denied for failing to show there would be any impact from the transport of radioactive materials to be imported; LBP-19-4, 89 NRC 353 (2019)
- proximity-based standing of individual living within 10 miles of spent fuel pools has been allowed; LBP-19-4, 89 NRC 353 (2019)
- proximity-plus standard is applied on a case-by-case basis, taking into account the nature of the proposed action and the significance of the radioactive source; LBP-19-4, 89 NRC 353 (2019)
- standing based on geographic proximity is not confined solely to Part 50 reactor licenses, but is also applicable to materials cases where the potential for offsite consequences is obvious; LBP-19-4, 89 NRC 353 (2019)
- standing may be based on proximity to transportation routes in unique circumstances; LBP-19-4, 89 NRC 353 (2019)
- standing rests on finding that persons living within the roughly 50-mile radius of a facility face a realistic threat of harm if a release from the facility of radioactive material were to occur; LBP-19-3, 89 NRC 245 (2019)
- standing was denied to petitioner who resided 1 mile from likely transportation route and merely claimed that an accident along that route would cause an increased radiological dose; LBP-19-4, 89 NRC 353 (2019)
- standing was denied where petitioner resided merely one block from route over which applicant proposed to transport radioactive materials; LBP-19-4, 89 NRC 353 (2019)
- standing was found based on part-time residence 10 miles from storage facility and where the facility itself was a small fraction of the size to which the facility might grow; LBP-19-4, 89 NRC 353 (2019)
- when the presumption of having the requisite interest is applied, it becomes unnecessary to establish a causal relationship between the claimed injury and the requested action; LBP-19-4, 89 NRC 353 (2019)
- where there is obvious potential for offsite consequences, NRC routinely grants standing to petitioners who reside within a certain distance from the power reactor under the proximity presumption, effectively dispensing with a petitioner's need to make an affirmative showing of injury, causation, and redressability; LBP-19-5, 89 NRC 483 (2019)
- PUBLIC COMMENTS**
- amended intervention petition on export license is properly considered as a public comment on the application and is therefore referred to the Office of International Programs as a public comment; CLI-19-2, 89 NRC 229 (2019)
- PUBLIC INTEREST**
- hearing will be granted on an export license application when NRC finds that such a hearing will be in the public interest and will assist in making the statutory determinations required by the Atomic Energy Act; CLI-19-2, 89 NRC 229 (2019)
- to satisfy the public interest requirement for a hearing on an export license application, petitioner must show how a hearing would bring new information to light; CLI-19-2, 89 NRC 229 (2019)
- QUALIFICATIONS**
- NRC will approve a license transfer application if it finds the proposed transferee to be qualified to hold the license and the transfer is otherwise consistent with applicable law, regulations, and Commission orders; CLI-19-6, 89 NRC 465 (2019)
- RADIOACTIVE WASTE MANAGEMENT**
- DOE was committed to begin disposing of the nuclear power plants' spent fuel no later than January 31, 1998; LBP-19-4, 89 NRC 353 (2019)
- Greater Than Class C waste must be disposed of in a geologic repository licensed by the NRC unless the Commission approves an alternative land disposal proposal; LBP-19-4, 89 NRC 353 (2019)

## SUBJECT INDEX

### RADIOACTIVE WASTE STORAGE

Yucca Mountain was statutorily authorized to store 70,000 metric tons of high-level radioactive waste; LBP-19-4, 89 NRC 353 (2019)

### RADIOACTIVE WASTE, HIGH-LEVEL

Greater Than Class C waste must be disposed of in a geologic repository licensed by the NRC unless the Commission approves an alternative land disposal proposal; LBP-19-4, 89 NRC 353 (2019)

Yucca Mountain was statutorily authorized to store 70,000 metric tons of high-level radioactive waste; LBP-19-4, 89 NRC 353 (2019)

### RADIOACTIVE WASTE, LOW-LEVEL

contention that environmental report underestimates the volume of low-level radioactive waste that will be generated by the consolidated interim storage facility is inadmissible; LBP-19-4, 89 NRC 353 (2019)

### RADIOLOGICAL CONTAMINATION

contention claiming that environmental report underestimates impacts related to tritium releases to groundwater is inadmissible because it lacks the requisite support; LBP-19-3, 89 NRC 245 (2019)  
to show a genuine material dispute, contention would have to give the board reason to believe that contamination from a defective canister could find its way outside of the cask; LBP-19-4, 89 NRC 353 (2019)

### RADIOLOGICAL EXPOSURE

contention that applicant's policy of rejecting and returning canisters that have unacceptable external radioactive or structural damage will create potential exposure routes that pose radioactive contamination threats to the public, nuclear workers, and the environment is inadmissible; LBP-19-4, 89 NRC 353 (2019)

### REACTOR OPERATOR EXAMINATIONS

senior reactor operator applicant must pass both the requisite written examination and the operating (simulator) examination to be granted license by NRC; LBP-19-1, 89 NRC 15 (2019)

### REBUTTABLE PRESUMPTION

analysis that warrants rebutting the presumption of vacatur would look to the seriousness of the order's deficiencies, and thus the extent of doubt whether the agency chose correctly, and the disruptive consequences of an interim change that may itself be changed; CLI-19-1, 89 NRC 1 (2019)

### RECORD OF DECISION

board's hearing, hearing record, and subsequent decision on a contested environmental record augment the environmental ROD developed by the Staff; CLI-19-5, 89 NRC 329 (2019)

even if an environmental assessment prepared by NRC Staff is found to be inadequate in certain respects, the board's findings, as well as the adjudicatory record, become, in effect, part of the final EA; LBP-19-2, 89 NRC 18 (2019)

it would be preferable for the final environmental impact statement to contain all relevant information and the ROD to be complete and adequate before the license is issued; CLI-19-1, 89 NRC 1 (2019)

where board augmented environmental ROD with additional information but the information did not alter board's conclusion, no harmful consequence of the supplementation was identified, and there was therefore nothing to be gained by considering the same information again; CLI-19-5, 89 NRC 329 (2019)

### RECUSAL

even where there is no actual conflict of interest, a judge should disqualify himself or herself where a reasonable person would question the judge's impartiality; CLI-19-3, 89 NRC 236 (2019)

federal standards hold that a judge must disqualify himself or herself whenever the judge's impartiality in the proceeding might reasonably be questioned, as well as in specific circumstances in which conflict of interest is shown; CLI-19-3, 89 NRC 236 (2019)

### REFERRAL OF RULING

licensing board denial of motion for disqualification must be referred to the Commission; CLI-19-3, 89 NRC 236 (2019)

ruling on legal issue of first impression that is also pending before a licensing board, signifying that it will likely be a recurring issue, is referred to the Commission; LBP-19-3, 89 NRC 245 (2019)

ruling that 10 C.F.R. 51.53(c)(3) applies to the preparation of environmental reports in subsequent license renewal proceedings is referred to the Commission; LBP-19-3, 89 NRC 245 (2019)

## SUBJECT INDEX

### REGULATIONS

- board proceedings regarding application for an NRC-issued license are not a proper forum for contentions that comprise broad policy recommendations and challenges to agency rules; LBP-19-4, 89 NRC 353 (2019)
- contention is subject to summary dismissal on the grounds that it was an impermissible challenge to an agency regulation; LBP-19-3, 89 NRC 245 (2019)
- contention that challenges a Commission rule or regulation will be rejected unless petitioner makes a prima facie showing supporting a rule waiver before the licensing board, which then must certify the waiver request to the Commission; LBP-19-3, 89 NRC 245 (2019)
- Council on Environmental Quality regulations do not bind NRC as an agency, but the Commission has chosen to follow them in some instances; LBP-19-4, 89 NRC 353 (2019)
- no NRC rule or regulation may be challenged in a contention unless petitioner seeks and obtains a waiver from the Commission; LBP-19-4, 89 NRC 353 (2019)
- See also Amendment of Regulations; Rules of Practice

### REGULATIONS, INTERPRETATION

- administrative history and other available guidance may be consulted for background information and the resolution of ambiguities in a regulation's language, but its interpretation may not conflict with the plain meaning of the wording used in that regulation; LBP-19-3, 89 NRC 245 (2019)
- agencies are susceptible to drafting imprecision, and in such circumstances, a tribunal is obliged to give effect to agency intent in a manner that comports with the regulatory text, purpose, and structure; LBP-19-3, 89 NRC 245 (2019)
- agency's interpretative statements reflect a body of experience and informed judgment to which courts and litigants may properly resort for guidance and as such, they are entitled to a measure of respect; LBP-19-3, 89 NRC 245 (2019)
- all words in a regulation must be given full effect; LBP-19-3, 89 NRC 245 (2019)
- although NRC amended the regulation in 2007 to include combined licenses, section 51.53(c)(3) is limited to license holders as of June 30, 1995, at which time no combined license had been issued, thereby precluding its use for those licensees; LBP-19-3, 89 NRC 245 (2019)
- application of 10 C.F.R. 51.53(c)(3) to subsequent license renewals is discussed; LBP-19-3, 89 NRC 245 (2019); LBP-19-5, 89 NRC 483 (2019)
- board declines to base its regulatory analysis on the notion that the NRC might engage in administrative misconduct in future adjudicatory proceedings; LBP-19-3, 89 NRC 245 (2019)
- court declined to defer to an agency interpretation that conflicted with an unambiguous regulation because to do so would be to permit the agency, under the guise of interpreting a regulation, to create de facto a new regulation; LBP-19-3, 89 NRC 245 (2019)
- Criterion 5G(2) of 10 C.F.R. Part 40, Appendix A is inapplicable to in situ uranium recovery because it concerns the location of permanent tailings or waste disposal impoundments relative to a capable earthquake fault and applicant does not propose any surface impoundments nor is there any evidence of capable faults in the vicinity; LBP-19-2, 89 NRC 18 (2019)
- even assuming a status report is an expression of intent, the report to Congress would not be enough to overcome the plain language of section 51.53(c)(3); LBP-19-3, 89 NRC 245 (2019)
- expressio unius* canon is not an inflexible rule of law commanding that the mere mention of one thing means the exclusion of another but rather is used as a starting point in regulatory construction to ascertain the intent of the drafter; LBP-19-3, 89 NRC 245 (2019)
- force of the *expressio unius* principle depends on context; LBP-19-3, 89 NRC 245 (2019)
- in assessing the deference to be accorded to an interpretative rule, a tribunal should consider whether the agency has applied its position with consistency; LBP-19-3, 89 NRC 245 (2019)
- in liming the scope of a regulatory provision in the face of regulatory silence, the Court conducted a holistic analysis that considered regulatory structure, agency's interpretative rules, and administrative efficiency, logic, and practicality; LBP-19-3, 89 NRC 245 (2019)
- intent behind 10 C.F.R. 51.53(c)(3) is to promote efficiency in the environmental review process for license renewal applications; LBP-19-3, 89 NRC 245 (2019)
- interpretation of any regulation must begin with the language and structure of the provision itself; LBP-19-3, 89 NRC 245 (2019)

## SUBJECT INDEX

- “materially different” in context of late-filed contention concerns the type or degree of difference between the new information and previously available; LBP-19-5, 89 NRC 483 (2019)
- “materially different” requirement necessary to file a contention after the initial deadline is contrasted with “material to the findings the NRC must make” requirement of section 2.309(f)(1)(iv); LBP-19-4, 89 NRC 353 (2019)
- mention of one thing is the exclusion of the other; LBP-19-3, 89 NRC 245 (2019)
- petitioners’ invitation to put a restrictive gloss on a silent statutory provision when that gloss is not supported by the statutory or regulatory scheme was rejected; LBP-19-3, 89 NRC 245 (2019)
- resorting to regulatory history is unnecessary when the meaning of a regulation is clear; LBP-19-3, 89 NRC 245 (2019)
- section 51.53(c)(3) is silent as to subsequent license renewal applicants and imposes no restrictions on the Commission’s authority to allow SLR applicants to utilize these regulatory prescriptions when preparing environmental reports; LBP-19-3, 89 NRC 245 (2019)
- section 72.22(e) does not address liability coverage; LBP-19-4, 89 NRC 353 (2019)
- sections 52.99(c) and 52.103(b) govern combined license applications, not license renewals; LBP-19-3, 89 NRC 245 (2019)
- when presented with an unambiguous regulation, an agency may not, under guise of interpreting that regulation, create de facto a new regulation; LBP-19-3, 89 NRC 245 (2019)
- where a specific provision conflicts with a general one, the specific governs; LBP-19-3, 89 NRC 245 (2019)
- whether the word “initial” in section 51.53(c)(3) necessarily excludes SLRs from the regulation’s scope is a matter of Commission intent, to be determined by considering whether or not the Commission’s mention of one thing does really necessarily, or at least reasonably, imply the preclusion of alternatives; LBP-19-3, 89 NRC 245 (2019)
- REGULATORY GUIDES**
- applicants for renewal of power reactor operating licenses, including SLR applicants, may use the guidance in Reg. Guide 4.2 to develop the environmental report; LBP-19-3, 89 NRC 245 (2019)
- special weight accorded to regulatory guides recognizes that it reflects a body of experience and informed judgment developed by the NRC Staff; LBP-19-3, 89 NRC 245 (2019)
- REGULATORY OVERSIGHT PROCESS**
- NRC is not in the business of regulating market strategies of licensees or determining whether market strategies warrant commencing operations; LBP-19-4, 89 NRC 353 (2019)
- REMAND**
- “no harm, no foul” rationale has been utilized in remand without vacatur of the underlying agency action; CLI-19-1, 89 NRC 1 (2019)
- remand without vacatur of the underlying agency action required the agency to supplement the relevant environmental impact statement before the project moved forward; CLI-19-1, 89 NRC 1 (2019)
- under remand-without-vacatur doctrine, court had no reason to expect that the agency will be unable to correct board-identified NEPA deficiencies; CLI-19-1, 89 NRC 1 (2019)
- RENEWABLE ENERGY SOURCES**
- contention that environmental report fails to comply with 10 C.F.R. 52.99(c) because the alternative energy sources review does not include solar or wind power in its analysis is inadmissible; LBP-19-3, 89 NRC 245 (2019)
- REPLY BRIEFS**
- petitioner is allowed some latitude to supplement or cure a standing showing in its reply pleading as long as any additional arguments are supported by a supplemental affidavit; LBP-19-4, 89 NRC 353 (2019)
- REQUEST FOR ACTION**
- request to issue demands for information is denied because licensees are required to provide the information requested, as applicable, in their decommissioning funding status reports; DD-19-1, 89 NRC 317 (2019)
- REQUEST FOR ADDITIONAL INFORMATION**
- pointing to responses to a request for additional information, without more, will rarely provide sufficient support for an admissible contention; LBP-19-4, 89 NRC 353 (2019)



## SUBJECT INDEX

### REVIEW

spent nuclear fuel transportation route identification requires separate review and approval by the NRC and the Department of Transportation, as well as by applicable states or tribes; LBP-19-4, 89 NRC 353 (2019)

See also Appellate Review; Environmental Review; Financial Qualifications Review; NRC Staff Review; Safety Review; Standard of Review; Standard Review Plans

### REVIEW, DISCRETIONARY

Commission direction to NRC Staff generally is not reviewable in an NRC adjudication but such a petition may be considered discretionarily; CLI-19-5, 89 NRC 329 (2019)

Commission will grant a petition for review at its discretion, upon a showing that petitioner has raised a substantial question as to five considerations; CLI-19-5, 89 NRC 329 (2019)

### REVIEW, INTERLOCUTORY

mere expansion of issues due to admission of a contention rarely, if ever, warrants interlocutory review; CLI-19-5, 89 NRC 329 (2019)

mere increase in litigation burden caused by board's admission of an additional contention is not a pervasive and unusual effect on the litigation or an irreparable harm warranting interlocutory review; CLI-19-5, 89 NRC 329 (2019)

review sought on grounds that board's timeliness rulings were so overbroad as to affect the basic structure of the proceeding in a pervasive or unusual manner is denied; CLI-19-5, 89 NRC 329 (2019)

routine contention admissibility rulings do not warrant the extraordinary step of interlocutory review; CLI-19-5, 89 NRC 329 (2019)

where board granted summary disposition in favor of intervenors on NEPA contention, neither the potential that the board erred nor the need for NRC Staff to perform potentially unnecessary analysis in the environmental impact statement presented a compelling case for interlocutory review; CLI-19-5, 89 NRC 329 (2019)

### REVOCAION OF LICENSES

license issued by NRC may be revoked for any material false statement in the license application; LBP-19-4, 89 NRC 353 (2019)

### RISK ANALYSIS

analysis of required transport accident conditions is addressed in 10 C.F.R. 71.73; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report mischaracterizes both the Blue Ribbon Commission report's conclusions and the relative risks of consolidated interim storage versus onsite storage is inadmissible; LBP-19-4, 89 NRC 353 (2019)

inclusion of design-basis accident risk analysis in environmental report for subsequent license renewal is discussed; LBP-19-5, 89 NRC 483 (2019)

RADTRAN analysis is used to evaluate incident-free radiological transportation impacts assuming the maximum dose rate allowed for exclusive-use shipments under NRC regulation; LBP-19-4, 89 NRC 353 (2019)

### RISKS

mere fact that additional radioactive waste will be transported if NRC licenses a project does not ipso facto establish a reasonable opportunity for an accident or for radioactive materials to escape because of accident or nature of the substance being transported; LBP-19-4, 89 NRC 353 (2019)

### RULE OF REASON

NEPA hard-look requirement is subject to a rule of reason in that consideration of environmental impacts need not address all theoretical possibilities, but rather only those that have some reasonable possibility of occurring; LBP-19-2, 89 NRC 18 (2019); LBP-19-4, 89 NRC 353 (2019)

### RULEMAKING

Administrative Procedure Act contains a variety of constraints and remedies that serve to prevent agencies from taking improper shortcuts when revising their regulations; LBP-19-3, 89 NRC 245 (2019)

agencies are susceptible to drafting imprecision, and in such circumstances, a tribunal is obliged to give effect to agency intent in a manner that comports with the regulatory text, purpose, and structure; LBP-19-3, 89 NRC 245 (2019)

any member of the public can petition the agency for a rulemaking proceeding for the purpose of changing the GEIS findings; LBP-19-3, 89 NRC 245 (2019)

## SUBJECT INDEX

because NRC promulgated section 51.53(c)(3) through notice-and-comment rulemaking, it must use the same procedure if it wants to amend or repeal the rule; LBP-19-3, 89 NRC 245 (2019)

Commission declines to set forth a comprehensive formula for addressing future circumstances in which significant NEPA deficiencies are found through the NRC hearing process after Staff issuance of a license; CLI-19-1, 89 NRC 1 (2019)

laws enacted with good intention, when put to the test, frequently, and to the surprise of the law maker himself, turn out to be mischievous, absurd or otherwise objectionable, but in such case, the remedy lies with the law making authority, and not with the courts; LBP-19-3, 89 NRC 245 (2019)

remedy for dissatisfaction with the results of applying section 51.53(c)(3) according to its plain text lies with the NRC in its rulemaking authority, not the board; LBP-19-3, 89 NRC 245 (2019)

when an agency's decision to issue an interpretive rule, rather than a legislative rule, is driven primarily by a desire to skirt notice-and-comment provisions, the agency may be challenged under the arbitrary and capricious standard; LBP-19-3, 89 NRC 245 (2019)

### RULES OF PRACTICE

admissible contention must be timely filed within the time specified in any notice of proposed action; LBP-19-5, 89 NRC 483 (2019)

admissible contention must fall within the scope of the proceeding and be material to the findings that NRC must make regarding the proposed licensing action; CLI-19-6, 89 NRC 465 (2019)

admissible contention must satisfy six pleading requirements; LBP-19-4, 89 NRC 353 (2019)

admissible contention must, at a minimum, reference the portion of the application to which the contention is challenging and show where the applicant is lacking; LBP-19-4, 89 NRC 353 (2019)

board denies petitioner's alternative request for discretionary intervention because petitioner's further participation would significantly and improperly broaden the scope of the proceeding; LBP-19-4, 89 NRC 353 (2019)

board must first consider whether motion to file a contention satisfies the three-prong test before considering whether to allow petitioner to amend its contention after the deadline for filing petitions; LBP-19-4, 89 NRC 353 (2019)

contention admissibility rules are strict by design; LBP-19-4, 89 NRC 353 (2019)

contention admissibility rules properly reserve the hearing process for genuine, material controversies between knowledgeable litigants; LBP-19-4, 89 NRC 353 (2019)

contention filed after the deadline for initial petitions will not be entertained absent a determination that petitioner shows good cause; CLI-19-5, 89 NRC 329 (2019)

contention may state an issue of law or fact; LBP-19-4, 89 NRC 353 (2019)

contention must demonstrate a genuine dispute with applicant on a material issue of law or fact; CLI-19-6, 89 NRC 465 (2019)

contention must satisfy the admissibility requirements of 10 C.F.R. 2.309(f)(1) ; CLI-19-6, 89 NRC 465 (2019); LBP-19-5, 89 NRC 483 (2019)

contention that challenges a Commission rule or regulation will be rejected unless petitioner makes a prima facie showing supporting a rule waiver before the licensing board, which then must certify the waiver request to the Commission; LBP-19-3, 89 NRC 245 (2019)

contention that environmental report must conduct an analysis concerning terrorism under NEPA is inadmissible as outside the scope of this proceeding; LBP-19-4, 89 NRC 353 (2019)

for a hearing to be granted, petitioner must establish standing to intervene and proffer at least one admissible contention; LBP-19-5, 89 NRC 483 (2019)

good cause for late filing exists if petitioner demonstrates that information on which a new or amended contention is based was not previously available, is materially different, and has been submitted in a timely fashion based on the availability of the subsequent information; LBP-19-4, 89 NRC 353 (2019); LBP-19-5, 89 NRC 483 (2019)

information required in intervention petition is described in 10 C.F.R. 2.309(d)(1); LBP-19-5, 89 NRC 483 (2019)

information that petitioner should include in its petition to establish standing is included in 10 C.F.R. 2.309(d), but it does not set the standard the board must apply when deciding whether that information is sufficient; LBP-19-4, 89 NRC 353 (2019)

## SUBJECT INDEX

- interlocutory review sought on grounds that board's timeliness rulings were so overbroad as to affect the basic structure of the proceeding in a pervasive or unusual manner is denied; CLI-19-5, 89 NRC 329 (2019)
- intervenor may seek a stay of NRC Staff authorization of a license amendment issued during pendency of evidentiary hearing; LBP-19-2, 89 NRC 18 (2019)
- intervention petitioner must establish standing and proffer at least one admissible contention to participate in the proceeding; CLI-19-6, 89 NRC 465 (2019); LBP-19-3, 89 NRC 245 (2019); LBP-19-4, 89 NRC 353 (2019); LBP-19-5, 89 NRC 483 (2019)
- late-filed contention must rely on information that is materially different from information previously available; LBP-19-4, 89 NRC 353 (2019)
- legal issue contention need not address every requirement of section 2.309(f)(1), such as providing a concise statement of the alleged facts or expert opinions that support the requestor's/petitioner's position on the issue; LBP-19-4, 89 NRC 353 (2019)
- licensing board denial of motion for disqualification must be referred to the Commission; CLI-19-3, 89 NRC 236 (2019)
- local governmental body that is not admitted as a party under section 2.309 may participate in a hearing as an interested nonparty; LBP-19-3, 89 NRC 245 (2019); LBP-19-4, 89 NRC 353 (2019)
- NRC Staff may issue its approval or denial of certain types of applications before the presiding officer has issued an initial decision; CLI-19-1, 89 NRC 1 (2019)
- organization invoking representational standing on behalf of members must show that at least one of its members may be affected by the Commission's approval of the license transfer by identifying the individual and providing written authorization of such representation; CLI-19-6, 89 NRC 465 (2019)
- participant in an adjudication may file a new environmental contention after the deadline for initial intervention petitions based on a draft or final environmental review document if that contention complies with the requirements of section 2.309(c); CLI-19-5, 89 NRC 329 (2019)
- petitioner must identify specific disputed portions of the application with supporting reasons for each dispute, or identify each failure to contain information required by law and provide supporting reasons for petitioner's belief; CLI-19-6, 89 NRC 465 (2019)
- petitioner's failure to comply with any of the section 2.309(f)(1) requirements renders a contention inadmissible; LBP-19-5, 89 NRC 483 (2019)
- petitioners seeking to amend their original contentions or proffer new ones after the cutoff date must meet the good cause standard; LBP-19-4, 89 NRC 353 (2019)
- required content of petitioner's hearing request is described in 10 C.F.R. 2.309(d)(1); LBP-19-3, 89 NRC 245 (2019)
- requiring a petitioner to allege facts under section 2.309(f)(1)(v) or to provide an affidavit that sets out the factual and/or technical bases under section 51.109(a)(2) in support of a legal contention as opposed to a factual contention is not necessary; LBP-19-4, 89 NRC 353 (2019)
- ruling that 10 C.F.R. 51.53(c)(3) applies to the preparation of environmental reports in subsequent license renewal proceedings is referred to the Commission; LBP-19-3, 89 NRC 245 (2019)
- stay standard considers irreparable injury to the stay requestor, likelihood of the stay requestor prevailing on the merits in the adjudication, harm a stay would inflict on the other participants in the adjudication, and public interest; CLI-19-1, 89 NRC 1 (2019)
- timely filed contention is admissible if it satisfies the six-factor contention admissibility criteria of 10 C.F.R. 2.309(f)(1)(i)-(vi); LBP-19-3, 89 NRC 245 (2019)
- unsupported claims of insufficient information do not establish a genuine, material dispute with the application; CLI-19-6, 89 NRC 465 (2019)
- SAFE DRINKING WATER ACT**
- groundwater restoration at ISR facilities must meet Uranium Mill Tailings Radiation Control Act standards rather than those associated with the Safe Drinking Water Act or analogous state regulations; LBP-19-2, 89 NRC 18 (2019)
- maximum contaminant levels for selenium in groundwater set by the Nebraska DEQ is the same maximum contaminant level set by the U.S. Environmental Protection Agency; CLI-19-5, 89 NRC 329 (2019)

## SUBJECT INDEX

### SAFETY ANALYSIS REPORT

contention that consolidated interim storage facility's SAR must analyze and evaluate design and performance of structures, systems, and components important to safety for operation of the facility is inadmissible; LBP-19-4, 89 NRC 353 (2019)

### SAFETY EVALUATION REPORT

petitioner is barred by regulation from challenging either the Staff's SER or the UMAX SAR analyses in an adjudication; LBP-19-4, 89 NRC 353 (2019)

### SAFETY ISSUES

hybrid safety and environmental contention that raises issues about adequacy of application's hydrogeologic characterization of the site and its environs is inadmissible; LBP-19-2, 89 NRC 18 (2019)

primary responsibility to address and comply with NRC's safety-related requirements lies with applicant who, in turn, has the burden of proof for a safety-related contention challenging the sufficiency of the application; LBP-19-2, 89 NRC 18 (2019)

scope of safety issues that may be considered in an operating license renewal proceeding is limited; LBP-19-5, 89 NRC 483 (2019)

See also Health and Safety

### SAFETY REVIEW

although NRC Staff conducts its own independent review, parties may not litigate the adequacy of that review; LBP-19-2, 89 NRC 18 (2019)

in situ uranium recovery license amendment applications must meet safety requirements including specific standards for uranium mill operation and waste material disposal; LBP-19-2, 89 NRC 18 (2019)

whereas NRC hearings on safety issues concern adequacy of the license application, not NRC Staff's work, NRC hearings on NEPA issues focus entirely on adequacy of NRC Staff's work; LBP-19-2, 89 NRC 18 (2019)

### SALTWATER INTRUSION

contention that brine, contaminated groundwater, soil, and wind-blown dust could potentially degrade the HI-STORE vault and spent fuel storage canisters stored therein is inadmissible; LBP-19-4, 89 NRC 353 (2019)

contention that environmental report does not contain any information as to whether brine continues to flow in the subsurface under the consolidated interim storage facility site is inadmissible; LBP-19-4, 89 NRC 353 (2019)

### SEA LEVEL RISE

contention alleging that rising sea levels pose a potential risk to safe plant operations, including spent fuel storage, raises a current licensing basis safety issue that is outside the scope of the proceeding; LBP-19-3, 89 NRC 245 (2019)

contention contesting license renewal application projections of sea level rise by 2100 is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention that environmental report fails to adequately consider cumulative impacts of continued operation on water resources from the reasonably foreseeable effects of climate change on the cooling canal system, including sea level rise is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention that environmental report fails to analyze new and significant information regarding the effect of sea level rise on Category 1 and 2 issues is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention that environmental report improperly ignores water resource conflicts insofar as it fails to account for the effect sea level rise will have on freshwater availability, groundwater resources, and release of polluted cooling water into Biscayne Bay is inadmissible; LBP-19-3, 89 NRC 245 (2019)

### SECURITY

See Common Defense and Security

### SEISMIC ANALYSIS

contention that additional technical study of seismic risk should be considered in environmental report was admissible; LBP-19-5, 89 NRC 483 (2019)

contention that environmental report's earthquake data are historical and do not take into account recent fracking activity around the proposed project site is inadmissible; LBP-19-4, 89 NRC 353 (2019)

## SUBJECT INDEX

### SEISMIC RISK

Criteria 4(e) and 5G(2) of 10 C.F.R. Part 40, Appendix A are inapplicable to in situ uranium recovery because they concern the location of permanent tailings or waste disposal impoundments relative to a capable earthquake fault and applicant does not propose any surface impoundments nor is there any evidence of capable faults in the vicinity; LBP-19-2, 89 NRC 18 (2019)

### SENIOR REACTOR OPERATOR LICENSE

applicant must pass both the requisite written examination and the operating (simulator) examination to be granted license by NRC; LBP-19-1, 89 NRC 15 (2019)

applicant who has been denied a license has the right to demand a hearing; LBP-19-1, 89 NRC 15 (2019)

### SHUTDOWN

after certification of permanent removal of fuel, license no longer authorizes operation of the reactor or emplacement or retention of fuel into the reactor vessel; CLI-19-6, 89 NRC 465 (2019)

applicants need not demonstrate financial qualifications to cover power reactor operating costs if power operations have permanently ceased; CLI-19-6, 89 NRC 465 (2019)

### SITE CHARACTERIZATION

application and final environmental assessment must provide sufficient information about geological setting of the area to meet regulatory requirements; LBP-19-2, 89 NRC 18 (2019)

contention that environmental report fails to analyze site characteristics that may directly affect safety or environmental impact of the ISFSI is inadmissible; LBP-19-4, 89 NRC 353 (2019)

environmental report must provide a site-specific review of the non-generic Category 2 issues; LBP-19-3, 89 NRC 245 (2019)

hybrid safety and environmental contention that raises issues about adequacy of application's hydrogeologic characterization of the site and its environs is inadmissible; LBP-19-2, 89 NRC 18 (2019)

in situ uranium recovery license amendment application must provide sufficient information about the ability of the underlying geologic strata to control contaminant and solution transport; LBP-19-2, 89 NRC 18 (2019)

### SITE HYDROLOGY

contention that packer tests in the Santa Rosa Formation to estimate the hydraulic conductivity (permeability) of the formation were not conducted properly is inadmissible; LBP-19-4, 89 NRC 353 (2019)

groundwater sampling results will be used to define background groundwater protection standards for restoration; LBP-19-2, 89 NRC 18 (2019)

### SITE RESTORATION

groundwater restoration at ISR facilities must meet Uranium Mill Tailings Radiation Control Act standards rather than those associated with the Safe Drinking Water Act or analogous state regulations; LBP-19-2, 89 NRC 18 (2019)

groundwater sampling results will be used to define background groundwater protection standards for restoration; LBP-19-2, 89 NRC 18 (2019)

using diligent application of best practicable technologies and efforts, applicant must first attempt to return a constituent in the aquifer to the NRC-approved background concentration for that constituent; LBP-19-2, 89 NRC 18 (2019)

### SITE SELECTION

process to select site for possession and use of nuclear material must be free from discrimination against minority and low-income populations; LBP-19-4, 89 NRC 353 (2019)

### SITE SURVEY

challenges to methodology of endangered dunes sagebrush lizard surveys are not supported by any information that genuinely disputes their sufficiency; LBP-19-4, 89 NRC 353 (2019)

### SOURCE MATERIALS LICENSES

NRC has authority to issue licenses for the possession and use of source and byproduct material; LBP-19-2, 89 NRC 18 (2019)

### SPENT FUEL MANAGEMENT

after submitting its site-specific cost estimate for decommissioning, licensee must annually submit a report on the status of its funding for managing irradiated fuel; CLI-19-6, 89 NRC 465 (2019)

## SUBJECT INDEX

- contention asserting that applicant omitted discussion of high-burnup fuel storage from the environmental report is inaccurate and inadmissible; LBP-19-4, 89 NRC 353 (2019)
- contention that applicant plans to aggregate spent nuclear fuel in southeastern New Mexico for purposes of reprocessing is inadmissible; LBP-19-4, 89 NRC 353 (2019)
- contention that cladding failure due to high-burnup fuel is inadequately addressed in the environmental report is inadmissible; LBP-19-4, 89 NRC 353 (2019)
- for license transfer, NRC requires power reactor applicants to demonstrate reasonable assurance of having, or being able to obtain, the necessary funding for decommissioning and spent fuel management; CLI-19-6, 89 NRC 465 (2019)
- license to construct and operate Yucca Mountain Waste Repository would require DOE to demonstrate a reasonable expectation that it would meet specified performance standards throughout the period of geologic stability; LBP-19-4, 89 NRC 353 (2019)
- SPENT FUEL POOL EXPANSION PROCEEDING
- for proximity-based standing, 17 miles and 10 miles have been found sufficient for proposed spent fuel pool expansions; LBP-19-4, 89 NRC 353 (2019)
- SPENT FUEL STORAGE
- contention alleging that rising sea levels pose a potential risk to safe plant operations, including spent fuel storage, raises a current licensing basis safety issue that is outside the scope of this proceeding; LBP-19-3, 89 NRC 245 (2019)
- contention challenging the thermal evaluation of the HI-STORM UMAX system is inadmissible because it challenges a Commission rule; LBP-19-4, 89 NRC 353 (2019)
- contention that environmental report lacks experimental support for the safe transportation and storage of high-burnup fuel is inadmissible; LBP-19-4, 89 NRC 353 (2019)
- DOE has no authority under the NWPA to provide interim storage in the absence of a facility that has been authorized, constructed, and licensed in accordance with the Nuclear Waste Policy Act; LBP-19-4, 89 NRC 353 (2019)
- DOE was committed to begin disposing of the nuclear power plants' spent fuel no later than January 31, 1998; LBP-19-4, 89 NRC 353 (2019)
- fuel stored in the UMAX system that is maintained at a temperature below standards is in compliance; LBP-19-4, 89 NRC 353 (2019)
- HI-STORM UMAX spent fuel storage system was added to the list of approved spent fuel storage casks in a final rule and is not subject to challenge in NRC proceedings; LBP-19-4, 89 NRC 353 (2019)
- licensing requirements for an interim storage facility apply to renewable terms of no more than 40 years from the date of issuance; LBP-19-4, 89 NRC 353 (2019)
- spent fuel cladding must be protected against degradation that leads to gross ruptures in the fuel or the fuel must be otherwise confined so that degradation during storage will not pose operational safety problems when the fuel is retrieved from storage; LBP-19-4, 89 NRC 353 (2019)
- until a permanent waste repository opens, generators and owners of high-level radioactive waste and spent nuclear fuel have the primary responsibility to provide for, and the responsibility to pay the costs of, interim storage; LBP-19-4, 89 NRC 353 (2019)
- when a permanent repository failed to materialize, the power plant licensees sued and began to recover from the federal government substantial damages to cover the cost of continuing to store spent fuel at their reactor sites; LBP-19-4, 89 NRC 353 (2019)
- SPENT FUEL STORAGE CASKS
- canisters and casks for the interim storage facility that have been separately approved by the NRC are not part of the license application; LBP-19-4, 89 NRC 353 (2019)
- contention that applicant's policy of rejecting and returning canisters that have unacceptable external radioactive or structural damage will create potential exposure routes that pose radioactive contamination threats to the public, nuclear workers, and the environment is inadmissible; LBP-19-4, 89 NRC 353 (2019)
- contention that brine, contaminated groundwater, soil, and wind-blown dust could potentially degrade the HI-STORE vault and spent fuel storage canisters stored therein is inadmissible; LBP-19-4, 89 NRC 353 (2019)
- petitioner is barred by regulation from challenging either the Staff's safety evaluation report or the UMAX SAR analyses in an adjudication; LBP-19-4, 89 NRC 353 (2019)

## SUBJECT INDEX

to show a genuine material dispute, contention would have to give the board reason to believe that contamination from a defective canister could find its way outside of the cask; LBP-19-4, 89 NRC 353 (2019)

### STANDARD OF PROOF

standard for showing clear error is deliberately high, requiring that petitioner must show that, in light of the record as a whole, the board's determination is not even plausible; CLI-19-5, 89 NRC 329 (2019)  
to carry the burden of proof on safety or environmental issues, NRC Staff and/or applicant must establish that its position is supported by a preponderance of the evidence; LBP-19-2, 89 NRC 18 (2019)

See also Burden of Proof

### STANDARD OF REVIEW

Commission defers to boards on issues of contention admissibility unless the board made an error of law or abused its discretion; CLI-19-5, 89 NRC 329 (2019)

Commission defers to the board's findings with respect to the facts in a merits decision unless the findings are clearly erroneous; CLI-19-5, 89 NRC 329 (2019)

mere disagreement on how the board weighed conflicting evidence does not raise a substantial question for Commission review; CLI-19-5, 89 NRC 329 (2019)

standard for judicial review of agency action is provided in 5 U.S.C. § 706; CLI-19-1, 89 NRC 1 (2019)

### STANDARD REVIEW PLANS

absent applicant's showing that it is attempting to reach regulatory compliance by some other means, the degree to which an application reflects adherence to an SRP is a legitimate subject of inquiry; LBP-19-2, 89 NRC 18 (2019)

while recognizing the guidance nature of SRPs, the Commission has indicated that, having been developed to assist an applicant in complying with applicable regulations, such plans are entitled to special weight; LBP-19-2, 89 NRC 18 (2019)

### STANDING TO INTERVENE

although 35 miles is within the 50-mile proximity presumption that applies to licensing reactors, it is nearly twice the distance that any licensing board has found sufficient to support standing in a spent fuel storage case; LBP-19-4, 89 NRC 353 (2019)

applying the proximity presumption to reactor license renewal proceedings not only satisfies contemporaneous judicial concepts of standing, it provides clarity for litigants and licensing boards, thereby promoting efficiency in the adjudicatory process; LBP-19-3, 89 NRC 245 (2019); LBP-19-5, 89 NRC 483 (2019)

assertion of injury from spent fuel that would travel on railway track very near property was insufficient to establish standing; LBP-19-4, 89 NRC 353 (2019)

because no obvious potential for harm from an independent spent fuel storage facility exists, petitioners have the burden to show specific and plausible means for how the proposed action will affect them; LBP-19-4, 89 NRC 353 (2019)

boards have regularly declined to find that a mere increase in traffic of radioactive materials near petitioner's residence, without more, constitutes an injury traceable to a licensing decision that primarily affects a site hundreds of miles away; LBP-19-4, 89 NRC 353 (2019)

Commission applies contemporaneous judicial concepts of standing that require petitioner to allege an injury in fact that is fairly traceable to the challenged action and is likely to be redressed by a favorable decision; LBP-19-3, 89 NRC 245 (2019)

Commission has implicitly endorsed application of the proximity presumption in reactor license renewal proceedings; LBP-19-3, 89 NRC 245 (2019)

conclusory allegations about potential radiological harm are not sufficient to establish standing; LBP-19-4, 89 NRC 353 (2019)

demonstration of standing from an entity that seeks to participate as an interested governmental participant is not required; LBP-19-3, 89 NRC 245 (2019)

distance to establish proximity-based standing in a consolidated interim storage facility proceeding is likely less than 50 miles because such a facility is essentially a passive structure rather than an operating facility, and therefore has less chance of widespread radioactive release; LBP-19-4, 89 NRC 353 (2019)

even before 2004, licensing boards rejected standing arguments based on proximity to likely transportation routes; LBP-19-4, 89 NRC 353 (2019)

## SUBJECT INDEX

fifty-mile proximity presumption has been applied in a recent subsequent license renewal proceeding; LBP-19-5, 89 NRC 483 (2019)

fifty-mile proximity presumption is simply a shortcut for determining standing in certain cases; LBP-19-3, 89 NRC 245 (2019); LBP-19-5, 89 NRC 483 (2019)

for proximity-based standing, 17 miles and 10 miles have been found sufficient for proposed spent fuel pool expansions; LBP-19-4, 89 NRC 353 (2019)

in certain reactor licensing proceedings, Commission has expressly authorized use of a proximity presumption, which presumes that petitioner has standing if he or she resides, or otherwise has frequent contacts, within approximately 50 miles of the facility in question; LBP-19-3, 89 NRC 245 (2019); LBP-19-4, 89 NRC 353 (2019)

information that petitioner should include in its petition to establish standing is included in 10 C.F.R. 2.309(d), but it does not set the standard the board must apply when deciding whether that information is sufficient; LBP-19-4, 89 NRC 353 (2019)

interested governmental entity need not demonstrate standing, but must identify contentions on which it intends to participate; LBP-19-4, 89 NRC 353 (2019)

intervention petition is construed in favor of petitioner when standing is determined; LBP-19-4, 89 NRC 353 (2019)

licensing boards have routinely applied the 50-mile proximity presumption in reactor license renewal proceedings, reasoning that renewal allows operation of a reactor over an additional period of time during which the reactor could be subject to the same equipment failures and personnel errors as during operations over the original period of the license; LBP-19-3, 89 NRC 245 (2019); LBP-19-5, 89 NRC 483 (2019)

mere geographical proximity to potential transportation routes is insufficient to confer standing; LBP-19-4, 89 NRC 353 (2019)

multiple representations for standing are not allowed because they might lead to confusion; LBP-19-4, 89 NRC 353 (2019)

NRC applies contemporaneous judicial concepts of standing to determine whether petitioner has a sufficient interest; LBP-19-4, 89 NRC 353 (2019)

NRC applies contemporaneous judicial concepts of standing, requiring a showing of concrete and particularized injury that is fairly traceable to the challenged action and is likely to be redressed by a favorable decision; LBP-19-5, 89 NRC 483 (2019)

petitioner bears the burden of establishing standing, but licensing boards are to evaluate petitioner's standing, construing the petition in favor of the petitioner; LBP-19-5, 89 NRC 483 (2019)

petitioner has the burden to demonstrate that standing requirements are met; LBP-19-4, 89 NRC 353 (2019)

petitioner is allowed some latitude to supplement or cure a standing showing in its reply pleading as long as any additional arguments are supported by a supplemental affidavit; LBP-19-4, 89 NRC 353 (2019)

petitioner may show traditional standing by establishing that a person or organization has suffered or might suffer a concrete and particularized injury that is fairly traceable to the challenged action, likely redressable by a favorable decision, and arguably within the zone of interests protected by the governing statutes; LBP-19-4, 89 NRC 353 (2019)

petitioners' standing claim was denied for failing to show there would be any impact from the transport of radioactive materials to be imported; LBP-19-4, 89 NRC 353 (2019)

presumption of standing based on geographic proximity is not confined solely to Part 50 reactor licenses, but is also applicable to materials cases where the potential for offsite consequences is obvious; LBP-19-4, 89 NRC 353 (2019)

proximity presumption rests on finding that persons living within the roughly 50-mile radius of a facility face a realistic threat of harm if a release from the facility of radioactive material were to occur; LBP-19-3, 89 NRC 245 (2019)

proximity-based standing of individual living within 10 miles of spent fuel pools has been allowed; LBP-19-4, 89 NRC 353 (2019)

proximity-plus standard is applied on a case-by-case basis, taking into account the nature of the proposed action and the significance of the radioactive source; LBP-19-4, 89 NRC 353 (2019)

standing may be based on proximity to transportation routes in unique circumstances; LBP-19-4, 89 NRC 353 (2019)



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standing was denied to petitioner who resided 1 mile from likely transportation route and merely claimed that an accident along that route would cause an increased radiological dose; LBP-19-4, 89 NRC 353 (2019)

standing was found based on part-time residence 10 miles from storage facility and where the facility itself was a small fraction of the size to which the facility might grow; LBP-19-4, 89 NRC 353 (2019)  
to participate in NRC licensing proceedings, petitioner must establish standing; LBP-19-5, 89 NRC 483 (2019)

when the presumption of having the requisite interest is applied, it becomes unnecessary to establish a causal relationship between the claimed injury and the requested action; LBP-19-4, 89 NRC 353 (2019)  
where petitioner resided merely one block from route over which applicant proposed to transport radioactive materials standing was denied; LBP-19-4, 89 NRC 353 (2019)

where there is obvious potential for offsite consequences, NRC routinely grants standing to petitioners who reside within a certain distance from the power reactor under the proximity presumption, effectively dispensing with a petitioner's need to make an affirmative showing of injury, causation, and redressability; LBP-19-5, 89 NRC 483 (2019)

### STANDING TO INTERVENE, ORGANIZATIONAL

organization that seeks to intervene based on its organizational purposes must satisfy the same standing requirements as individuals seeking to intervene; CLI-19-6, 89 NRC 465 (2019)

### STANDING TO INTERVENE, REPRESENTATIONAL

employment 10 miles from site where organization member might not actually spend her workday and does not reflect for how long she expects her six-month employment to continue does not support standing; LBP-19-4, 89 NRC 353 (2019)

organization invoking representational standing on behalf of members must show that at least one of its members may be affected by the Commission's approval of the license transfer by identifying the individual and providing written authorization of such representation; CLI-19-6, 89 NRC 465 (2019)

organization may try to establish representational standing based on the standing of one or more individual members; LBP-19-4, 89 NRC 353 (2019)

organization must show that at least one member would otherwise have standing to sue in his or her own right, has authorized representation of his or her interest which is germane to the organization's purpose, and neither the claim asserted nor the relief requested requires the member to participate in the adjudicatory proceeding; LBP-19-3, 89 NRC 245 (2019); LBP-19-4, 89 NRC 353 (2019); LBP-19-5, 89 NRC 483 (2019)

### STATE REGULATORY REQUIREMENTS

finding of environmental acceptability by a competent state authority pursuant to a thorough hearing is properly entitled to substantial weight in the conduct of NRC's own NEPA analysis; LBP-19-3, 89 NRC 245 (2019)

requirements of state law are matters for state regulatory bodies; LBP-19-2, 89 NRC 18 (2019)

spent nuclear fuel transportation route identification requires separate review and approval by the NRC and the Department of Transportation, as well as by applicable states or tribes; LBP-19-4, 89 NRC 353 (2019)

### STATE STATUTES

claims under state law against an entity that is not seeking a license from the NRC are outside the scope of this proceeding; LBP-19-4, 89 NRC 353 (2019)

### STATUTORY CONSTRUCTION

analysis under the *expressio unius* principle will turn on whether, looking at the structure of the statute and perhaps its legislative history, one can be confident that a normal draftsman when he expressed the one thing would have likely considered the alternatives that are arguably precluded; LBP-19-3, 89 NRC 245 (2019)

between the general provisions in the Administrative Procedure Act and the more specific requirements in the Atomic Energy Act, the Atomic Energy Act controls; LBP-19-3, 89 NRC 245 (2019)

court declined to ignore the plain language of a statute, observing that it has refused to nullify statutes, however hard or unexpected the particular effect; LBP-19-3, 89 NRC 245 (2019)

courts are to accord a meaning, if possible, to every word in a statute; LBP-19-3, 89 NRC 245 (2019)

courts must presume that a legislature says in a statute what it means and means in a statute what it says; LBP-19-3, 89 NRC 245 (2019)

## SUBJECT INDEX

- elementary canon of construction is that federal statutes cannot be interpreted to negate their own stated purposes; LBP-19-3, 89 NRC 245 (2019)
- interpretations of a statute that would produce absurd results are to be avoided if alternative interpretations consistent with the legislative purpose; LBP-19-3, 89 NRC 245 (2019)
- petitioners' invitation to put a restrictive gloss on a silent statutory provision when that gloss is not supported by the statutory or regulatory scheme was rejected; LBP-19-3, 89 NRC 245 (2019)
- use of a federally funded multi-million-dollar dam project was halted to protect a small fish, although not operating the dam similarly could have been described as a wasteful expenditure, but the court declined to use such an excuse to go beyond the plain meaning of the Endangered Species Act; LBP-19-3, 89 NRC 245 (2019)
- when the words of a statute are unambiguous, judicial inquiry is complete; LBP-19-3, 89 NRC 245 (2019)
- STAY**
- stay standard considers irreparable injury to the stay requestor, likelihood of the stay requestor prevailing on the merits in the adjudication, harm a stay would inflict on the other participants in the adjudication, and public interest; CLI-19-1, 89 NRC 1 (2019)
- STAY OF EFFECTIVENESS**
- intervenor may seek a stay of NRC Staff authorization of a license amendment issued during pendency of evidentiary hearing; LBP-19-2, 89 NRC 18 (2019)
- use of stay standard is restricted where a significant NEPA deficiency has already been found through the hearing process; CLI-19-1, 89 NRC 1 (2019)
- See also Immediate Effectiveness
- STIPULATIONS**
- documentation of stratigraphy in one proceeding regarding a license renewal may contribute to stipulated understandings of geology and hydrogeology of another proceeding; LBP-19-2, 89 NRC 18 (2019)
- STRUCTURAL INTEGRITY**
- contention that applicant's policy of rejecting and returning canisters that have unacceptable external radioactive or structural damage will create potential exposure routes that pose radioactive contamination threats to the public, nuclear workers, and the environment is inadmissible; LBP-19-4, 89 NRC 353 (2019)
- contention that brine, contaminated groundwater, soil, and wind-blown dust could potentially degrade the HI-STORE vault and spent fuel storage canisters stored therein is inadmissible; LBP-19-4, 89 NRC 353 (2019)
- contention that environmental report has not adequately evaluated loss of ductility on fuel rods due to high-burnup fuel and the likelihood of material strength and a release of radioactive material is inadmissible; LBP-19-4, 89 NRC 353 (2019)
- spent fuel cladding must be protected against degradation that leads to gross ruptures in the fuel or the fuel must be otherwise confined so that degradation during storage will not pose operational safety problems when the fuel is retrieved from storage; LBP-19-4, 89 NRC 353 (2019)
- to show a genuine material dispute, contention would have to give the board reason to believe that contamination from a defective canister could find its way outside of the cask; LBP-19-4, 89 NRC 353 (2019)
- SUBSEQUENT OPERATING LICENSE RENEWAL**
- applicant is not required to include an analysis of impacts for Category 1 issues because they have been determined to be similar for all plants and are not required to be evaluated in a plant-specific analysis; LBP-19-5, 89 NRC 483 (2019)
- application of 10 C.F.R. 51.53(c)(3) is discussed; LBP-19-5, 89 NRC 483 (2019)
- contention that environmental report fails to address the effects of climate change during the license renewal period is inadmissible; LBP-19-3, 89 NRC 245 (2019)
- environmental report must describe in detail the affected environment around the plant, not the reasonably foreseeable environment; LBP-19-3, 89 NRC 245 (2019)
- inclusion of design-basis accident risk analysis in environmental report for subsequent license renewal is discussed; LBP-19-5, 89 NRC 483 (2019)
- NRC must consider information developed by an SLR applicant under section 51.53(c)(3)(ii) in its preparation of the draft SEIS; LBP-19-3, 89 NRC 245 (2019)

## SUBJECT INDEX

- reliance of subsequent license renewal applicant on generic environmental analyses contained in Part 51, Appendix B to Subpart A (Table B-1) is discussed; LBP-19-5, 89 NRC 483 (2019)
- section 51.53(a) approves incorporation by reference of NRC Staff-prepared final generic environmental impact statement in subsequent license renewal application; LBP-19-5, 89 NRC 483 (2019)
- section 51.53(c)(3) is silent as to SLR applicants and imposes no restrictions on the Commission's authority to allow SLR applicants to utilize these regulatory prescriptions when preparing environmental reports; LBP-19-3, 89 NRC 245 (2019)
- whether the word "initial" in section 51.53(c)(3) necessarily excludes SLRs from the regulation's scope is a matter of Commission intent, to be determined by considering whether or not the Commission's mention of one thing does really necessarily, or at least reasonably, imply the preclusion of alternatives; LBP-19-3, 89 NRC 245 (2019)
- SUBSEQUENT OPERATING LICENSE RENEWAL PROCEEDINGS**
- application of 10 C.F.R. 51.53(c)(3) to subsequent license renewals is discussed; LBP-19-3, 89 NRC 245 (2019)
- argument that NRC Staff may not rely on the generic environmental impact statement for addressing Category 1 issues in preparing a draft EIS for supplemental license renewal applications flies in the face of the 1996 regulatory language and structure; LBP-19-3, 89 NRC 245 (2019)
- board examines legal question relevant to admissibility of contention whether 10 C.F.R. 51.53(c)(3) applies to applicant's preparation of an environmental report in subsequent license renewal proceedings; LBP-19-3, 89 NRC 245 (2019)
- Category 1 issues are exempt from consideration in environmental report; LBP-19-5, 89 NRC 483 (2019)
- Commission applies contemporaneous judicial concepts of standing that require petitioner to allege an injury in fact that is fairly traceable to the challenged action and is likely to be redressed by a favorable decision; LBP-19-3, 89 NRC 245 (2019)
- contention alleging that rising sea levels pose a potential risk to safe plant operations, including spent fuel storage, raises a current licensing basis safety issue that is outside the scope of this proceeding; LBP-19-3, 89 NRC 245 (2019)
- contention that environmental report is incomplete because it fails to include a discussion of whether applicant intends to seek any power uprates during the renewal period is inadmissible; LBP-19-3, 89 NRC 245 (2019)
- contention that external operating experience is insufficient for the aging management programs for subsequent license renewal term is inadmissible; LBP-19-5, 89 NRC 483 (2019)
- contention that omission of accident risks posed by operating aging reactor equipment from environmental report is inadmissible; LBP-19-5, 89 NRC 483 (2019)
- fifty-mile proximity presumption has been applied in a recent proceeding; LBP-19-5, 89 NRC 483 (2019)
- new and significant information requirement does not override, for purposes of litigating issues in an adjudicatory proceeding, the exclusion of Category 1 issues in 10 C.F.R. 51.53(c)(3)(i) from site-specific review, but a rule waiver is required; LBP-19-3, 89 NRC 245 (2019)
- ruling that 10 C.F.R. 51.53(c)(3) applies to the preparation of environmental reports in subsequent license renewal proceedings is referred to the Commission; LBP-19-3, 89 NRC 245 (2019)
- SUMMARY DISPOSITION**
- where board granted summary disposition in favor of intervenors on NEPA contention, neither the potential that the board erred nor the need for NRC Staff to perform potentially unnecessary analysis in the environmental impact statement presented a compelling case for interlocutory review; CLI-19-5, 89 NRC 329 (2019)
- SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT**
- DSEIS for license renewal prepared under section 51.95(c) will rely on conclusions as amplified by the supporting information in the GEIS for issues designated as Category 1 in 10 C.F.R. Part 50, Subpart A, Appendix B; LBP-19-3, 89 NRC 245 (2019)
- for all nuclear plant license renewal applications, the SEIS must include a plant-specific analysis of all Category 2 issues, but it need not discuss Category 1 issues because those issues have already been addressed globally in the GEIS and codified in 10 C.F.R. Part 51; LBP-19-3, 89 NRC 245 (2019)
- in license renewal proceedings, NRC Staff is required to integrate into the DSEIS information developed for those Category 2 issues applicable to the plant under section 51.53(c)(3)(ii); LBP-19-3, 89 NRC 245 (2019)

## SUBJECT INDEX

- NRC Staff reviews applicant's environmental report and draws upon it to produce a DSEIS; LBP-19-3, 89 NRC 245 (2019)
- remand without vacatur of the underlying agency action required the agency to supplement the relevant environmental impact statement before the project moved forward; CLI-19-1, 89 NRC 1 (2019)
- when the generic environmental impact statement and the SEIS are combined, they cover all issues that NEPA requires be addressed in an EIS for a nuclear power plant license renewal proceeding; LBP-19-3, 89 NRC 245 (2019)
- SUSPENSION OF PROCEEDING**
- pending adjudication before an NRC licensing board was suspended in September 2011 when Congress stopped funding the Yucca Mountain project; LBP-19-4, 89 NRC 353 (2019)
- TECHNICAL QUALIFICATIONS**
- contention that external operating experience is insufficient for the aging management programs for subsequent license renewal term is inadmissible; LBP-19-5, 89 NRC 483 (2019)
- TEMPERATURE LIMITS**
- fuel stored in the UMAX system that is maintained at a temperature below standards is in compliance; LBP-19-4, 89 NRC 353 (2019)
- TERMINATION OF LICENSE**
- if licensee permanently ceases operation before the expiration of its license, NRC will determine the collection period for any shortfall of decommissioning funds on a case-by-case basis and will consider specific financial situation of each licensee; DD-19-1, 89 NRC 317 (2019)
- TERMINATION OF PROCEEDING**
- when petitioner withdraws its petition in a contested proceeding and there are no petitions remaining, NRC terminates the proceeding; CLI-19-4, 89 NRC 241 (2019)
- when the board has ruled on all pending contentions in the matter, ordinarily its jurisdiction in the case would be terminated; CLI-19-5, 89 NRC 329 (2019)
- TERRORISM**
- contention that environmental report must conduct an analysis concerning terrorism under NEPA is inadmissible as outside the scope of this proceeding; LBP-19-4, 89 NRC 353 (2019)
- for all licensing actions outside the Ninth Circuit, terrorist attacks are too far removed from the natural or expected consequences of agency action to require environmental analysis; LBP-19-4, 89 NRC 353 (2019)
- it is unreasonable for NRC to categorically dismiss the possibility of terrorist attack on the storage installation as too remote and highly speculative to warrant consideration under NEPA; LBP-19-4, 89 NRC 353 (2019)
- TESTIMONY**
- exception to excluding expert testimony on purely legal issues is for questions of foreign law; LBP-19-2, 89 NRC 18 (2019)
- opinion testimony that states a legal standard or draws a legal conclusion by applying law to the facts is generally inadmissible; LBP-19-2, 89 NRC 18 (2019)
- THERMAL ANALYSIS**
- contention challenging the thermal evaluation of the HI-STORM UMAX system is inadmissible because it challenges a Commission rule; LBP-19-4, 89 NRC 353 (2019)
- THREATENED SPECIES**
- contention that in light of adverse impact of continued cooling canal system operations on the threatened American crocodile and its critical seagrass habitat, the environmental report is deficient for failing to consider reasonable alternative is admissible; LBP-19-3, 89 NRC 245 (2019)
- TRANSPORTATION OF SPENT FUEL**
- analysis of required transport accident conditions is addressed in 10 C.F.R. 71.73; LBP-19-4, 89 NRC 353 (2019)
- assertion of injury from spent fuel that would travel on railway track very near property was insufficient to establish standing; LBP-19-4, 89 NRC 353 (2019)
- boards have regularly declined to find that a mere increase in traffic of radioactive materials near petitioner's residence, without more, constitutes an injury traceable to a licensing decision that primarily affects a site hundreds of miles away; LBP-19-4, 89 NRC 353 (2019)

## SUBJECT INDEX

- contention concerning the likelihood of rail accidents during transport of nuclear waste is not admissible; LBP-19-4, 89 NRC 353 (2019)
- contention requesting unconditional disclosure in the environmental report of probable transportation routes for spent nuclear fuel to the consolidated interim storage facility is inadmissible; LBP-19-4, 89 NRC 353 (2019)
- contention that applicant's policy of rejecting and returning canisters that have unacceptable external radioactive or structural damage will create potential exposure routes that pose radioactive contamination threats to the public, nuclear workers, and the environment is inadmissible; LBP-19-4, 89 NRC 353 (2019)
- contention that environmental report lacks experimental support for the safe transportation and storage of high-burnup fuel is inadmissible; LBP-19-4, 89 NRC 353 (2019)
- derivation of generic effects of transportation and fuel waste for one power reactor is based on survey of then-existing power plants; LBP-19-4, 89 NRC 353 (2019)
- even before 2004, licensing boards rejected standing arguments based on proximity to likely transportation routes; LBP-19-4, 89 NRC 353 (2019)
- mere fact that additional radioactive waste will be transported if NRC licenses a project does not ipso facto establish a reasonable opportunity for an accident or for radioactive materials to escape because of accident or nature of the substance being transported; LBP-19-4, 89 NRC 353 (2019)
- mere geographical proximity to potential transportation routes is insufficient to confer standing; LBP-19-4, 89 NRC 353 (2019)
- petitioners' standing claim was denied for failing to show there would be any impact from the transport of radioactive materials to be imported; LBP-19-4, 89 NRC 353 (2019)
- RADTRAN analysis is used to evaluate incident-free radiological transportation impacts assuming the maximum dose rate allowed for exclusive use shipments under NRC regulation; LBP-19-4, 89 NRC 353 (2019)
- spent nuclear fuel transportation route identification requires separate review and approval by the NRC and the Department of Transportation, as well as by applicable states or tribes; LBP-19-4, 89 NRC 353 (2019)
- standing may be based on proximity to transportation routes in unique circumstances; LBP-19-4, 89 NRC 353 (2019)
- standing was denied to petitioner who resided 1 mile from likely transportation route and merely claimed that an accident along that route would cause an increased radiological dose; LBP-19-4, 89 NRC 353 (2019)
- standing was denied where petitioner resided merely one block from route over which applicant proposed to transport radioactive materials; LBP-19-4, 89 NRC 353 (2019)
- vibration incident to transport is addressed in 10 C.F.R. 71.71(c)(1)(5); LBP-19-4, 89 NRC 353 (2019)
- TRITIUM**
- contention claiming that environmental report underestimates impacts related to tritium releases to groundwater is inadmissible because it lacks the requisite support; LBP-19-3, 89 NRC 245 (2019)
- URANIUM MILL TAILINGS RADIATION CONTROL ACT**
- groundwater restoration at ISR facilities must meet UMTRCA standards rather than those associated with the Safe Drinking Water Act or analogous state regulations; LBP-19-2, 89 NRC 18 (2019)
- if background concentrations are less than the UMTRCA levels in the Criterion 5C table, applicant must meet the groundwater protection standard listed for that constituent in the Criterion 5C table; LBP-19-2, 89 NRC 18 (2019)
- URANIUM MINING AND MILLING**
- in situ uranium recovery license amendment applications must meet safety requirements including specific standards for uranium mill operation and waste material disposal; LBP-19-2, 89 NRC 18 (2019)
- VACATION OF DECISION**
- Commission will vacate unreviewed Board decisions when appellate review is cut short by mootness; CLI-19-5, 89 NRC 329 (2019)
- VACATUR**
- analysis that warrants rebutting the presumption of vacatur would look to the seriousness of the order's deficiencies, and thus the extent of doubt whether the agency chose correctly, and the disruptive consequences of an interim change that may itself be changed; CLI-19-1, 89 NRC 1 (2019)

## SUBJECT INDEX

“no harm, no foul” rationale has been utilized in remand without vacatur of the underlying agency action; CLI-19-1, 89 NRC 1 (2019)

remand without vacatur of the underlying agency action required the agency to supplement the relevant environmental impact statement before the project moved forward; CLI-19-1, 89 NRC 1 (2019)

under remand-without-vacatur doctrine, court had no reason to expect that the agency will be unable to correct board-identified NEPA deficiencies; CLI-19-1, 89 NRC 1 (2019)

### VIOLATIONS

applicant’s past violations, standing alone, do not constitute sufficient information to raise a genuine dispute with the assumption that the state will enforce, and applicant will comply with, the legally mandated mitigation measures in the permits; LBP-19-3, 89 NRC 245 (2019)

claims of prior violations or past events that are raised for litigation must be directly germane to the challenged licensing action; CLI-19-6, 89 NRC 465 (2019)

contention alleging that a federal lawsuit is in play related to potential EPA violations and that plume migration threatens the water supply and federally protected bay is inadmissible; LBP-19-3, 89 NRC 245 (2019)

violation of AEA section 186 requires a willful misrepresentation; LBP-19-4, 89 NRC 353 (2019)

### WAIVER

where a party refrains from advancing an argument, that argument is deemed to be waived; LBP-19-3, 89 NRC 245 (2019)

### WAIVER OF RULE

belated opportunity to submit a waiver petition was offered after resolving an apparent ambiguity in the license renewal regulations; LBP-19-3, 89 NRC 245 (2019)

challenge to Category 1 findings in an adjudicatory proceeding is not permitted without having first sought a waiver; LBP-19-3, 89 NRC 245 (2019)

challenge to Continued Storage Rule and impact evaluations in the Continued Storage GEIS requires grant of a rule waiver; LBP-19-4, 89 NRC 353 (2019)

challenges to adequacy of the environmental report’s discussions related to altered salinity gradients in surface waters and groundwater quality degradation are Category 1 issues and therefore not subject to direct or indirect challenge absent a waiver; LBP-19-3, 89 NRC 245 (2019)

contention that challenges a Commission rule or regulation will be rejected unless petitioner makes a prima facie showing supporting a rule waiver before the licensing board, which then must certify the waiver request to the Commission; LBP-19-3, 89 NRC 245 (2019)

party to an adjudicatory proceeding can invoke 10 C.F.R. 2.335 and request that a GEIS finding for a Category 1 issue be waived with respect to that proceeding; LBP-19-3, 89 NRC 245 (2019)

to challenge incorporated analyses from Staff generic environmental impact statement in a licensing proceeding, petitioner would have to obtain a rule waiver; LBP-19-5, 89 NRC 483 (2019)

### WASTE DISPOSAL

Criteria 4(e) and 5G(2) of 10 C.F.R. Part 40, Appendix A are inapplicable to in situ uranium recovery because they concern the location of permanent tailings or waste disposal impoundments relative to a capable earthquake fault and applicant does not propose any surface impoundments nor is there any evidence of capable faults in the vicinity; LBP-19-2, 89 NRC 18 (2019)

in situ uranium recovery license amendment applications must meet safety requirements including specific standards for uranium mill operation and waste material disposal; LBP-19-2, 89 NRC 18 (2019)

### WASTE DISPOSAL SITES

environmental assessment’s clarification that land disposal is not currently being used did not change the fact that such disposal could occur during the license term; CLI-19-5, 89 NRC 329 (2019)

### WASTEWATER

contention asserting that use of wastewater to recharge the cooling canals may present a threat to drinking water, groundwater, and safe operation of the plant is inadmissible; LBP-19-3, 89 NRC 245 (2019)

### WATER POLLUTION

contention alleging that a federal lawsuit is in play related to potential EPA violations and that plume migration threatens the water supply and federally protected bay is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention asserting that use of wastewater to recharge the cooling canals may present a threat to drinking water, groundwater, and safe operation of the plant is inadmissible; LBP-19-3, 89 NRC 245 (2019)

## SUBJECT INDEX

contention that environmental report improperly fails to consider the impact of salinization on surface waters and freshwater wetlands caused by the cooling canal system is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention that environmental report improperly ignores water resource conflicts insofar as it fails to account for the effect sea level rise will have on freshwater availability, groundwater resources, and release of polluted cooling water into Biscayne Bay is inadmissible; LBP-19-3, 89 NRC 245 (2019)

contention that relates to the impact of ammonia releases during the renewal period on endangered and threatened species and their critical habitat is admissible; LBP-19-3, 89 NRC 245 (2019)

selenium and its compounds are included in the list of toxic pollutants; CLI-19-5, 89 NRC 329 (2019)

See also Groundwater Contamination

### WATER QUALITY

alternate concentration limit for hazardous constituent in groundwater is established by the Commission; LBP-19-2, 89 NRC 18 (2019)

applicant may request a license amendment for an alternate concentration limit where ACL value would be the same as the NDEQ Title 118 water quality standards as long as the request meets all the requirements of this criterion; LBP-19-2, 89 NRC 18 (2019)

challenges to adequacy of the environmental report's discussions related to altered salinity gradients in surface waters and groundwater quality degradation are Category 1 issues and therefore not subject to direct or indirect challenge absent a waiver; LBP-19-3, 89 NRC 245 (2019)

compliance with effluent standards established for toxic pollutants is required in NPDES permits; CLI-19-5, 89 NRC 329 (2019)

concentration limits for hazardous constituent in groundwater are specified in 10 C.F.R. Part 40, Appendix A, Criterion 5B(5); LBP-19-2, 89 NRC 18 (2019)

groundwater restoration at ISR facilities must meet Uranium Mill Tailings Radiation Control Act standards rather than those associated with the Safe Drinking Water Act or analogous state regulations; LBP-19-2, 89 NRC 18 (2019)

groundwater sampling results will be used to define background groundwater protection standards for restoration; LBP-19-2, 89 NRC 18 (2019)

groundwater standards for all restored aquifers must conform to the standards promulgated by the EPA in 40 C.F.R. 192.32(a)(2); LBP-19-2, 89 NRC 18 (2019)

if applicant cannot meet either of the Part 40 standards, it may seek NRC approval for an alternate concentration limit; LBP-19-2, 89 NRC 18 (2019)

if background concentrations are less than the UMTRCA levels in the Criterion 5C table, applicant must meet the groundwater protection standard listed for that constituent in the Criterion 5C table; LBP-19-2, 89 NRC 18 (2019)

in assessing adequacy of the effort in establishing an alternate concentration limit, licensee must achieve a value that is as low as reasonably achievable, after considering practicable corrective actions; LBP-19-2, 89 NRC 18 (2019)

in making constituent hazard finding, NRC Staff will consider nine factors regarding potential adverse effects on groundwater quality and the 10 factors relating to potential adverse effects on hydraulically connected surface water quality; LBP-19-2, 89 NRC 18 (2019)

using diligent application of best practicable technologies and efforts, applicant must first attempt to return a constituent in the aquifer to the NRC-approved background concentration for that constituent; LBP-19-2, 89 NRC 18 (2019)

whether water quality data should be obtained before in situ recovery operations begin is at best questionable; LBP-19-2, 89 NRC 18 (2019)

### WATER SUPPLY

contention that environmental report improperly ignores water resource conflicts insofar as it fails to account for the effect sea level rise will have on freshwater availability, groundwater resources, and release of polluted cooling water into Biscayne Bay is inadmissible; LBP-19-3, 89 NRC 245 (2019)

### WETLANDS

contention that environmental report fails to address the adverse effect of operating the cooling canal system for an additional 20 years on surface waters, freshwater wetlands, and endangered species present in those wetlands is admissible in part; LBP-19-3, 89 NRC 245 (2019)

## **SUBJECT INDEX**

### **WITHDRAWAL**

when petitioner withdraws its petition in a contested proceeding and there are no petitions remaining, NRC terminates the proceeding; CLI-19-4, 89 NRC 241 (2019)

### **WITNESSES, EXPERT**

exception to excluding expert testimony on purely legal issues is for questions of foreign law; LBP-19-2, 89 NRC 18 (2019)

neither mere speculation nor bare or conclusory assertions, even by an expert, alleging that a matter should be considered will suffice to allow the admission of a proffered contention; LBP-19-4, 89 NRC 353 (2019)

testimony regarding legal conclusions, as opposed to factual matters, generally would not be appropriate; LBP-19-2, 89 NRC 18 (2019)



## FACILITY INDEX

BEAVER VALLEY POWER STATION, Units 1 and 2; Docket Nos. 50-334, 50-412  
REQUEST FOR ACTION; April 3, 2019; DIRECTOR'S DECISION UNDER 10 C.F.R. § 2.206;  
DD-19-1, 89 NRC 317 (2019)

DAVIS-BESSE NUCLEAR POWER STATION, Unit 1; Docket No. 50-346  
REQUEST FOR ACTION; April 3, 2019; DIRECTOR'S DECISION UNDER 10 C.F.R. § 2.206;  
DD-19-1, 89 NRC 317 (2019)

DEWEY-BURDOCK IN SITU URANIUM RECOVERY FACILITY; Docket No. 40-9075-MLA  
MATERIALS LICENSE; January 31, 2019; MEMORANDUM AND ORDER; CLI-19-1, 89 NRC 1  
(2019)

HI-STORE CONSOLIDATED INTERIM STORAGE FACILITY; Docket No. 72-1051-ISFSI  
INDEPENDENT SPENT FUEL STORAGE FACILITY; May 7, 2019; MEMORANDUM AND ORDER  
(Ruling on Petitions for Intervention and Requests for Hearing); LBP-19-4, 89 NRC 353 (2019)

IN SITU LEACH FACILITY, Crawford, Nebraska; Docket No. 40-8943-OLA  
MATERIALS LICENSE AMENDMENT; May 30, 2019; MEMORANDUM AND ORDER; CLI-19-5, 89  
NRC 329 (2019)

OYSTER CREEK NUCLEAR GENERATING STATION; Docket Nos. 50-219-LT, 72-015-LT  
LICENSE TRANSFER; June 18, 2019; MEMORANDUM AND ORDER; CLI-19-6, 89 NRC 465 (2019)

PEACH BOTTOM ATOMIC POWER STATION, Units 2 and 3; Docket Nos. 50-277-SLR, 50-278-SLR  
OPERATING LICENSE RENEWAL; June 20, 2019; MEMORANDUM AND ORDER (Denying Beyond  
Nuclear's Petition to Intervene); LBP-19-5, 89 NRC 483 (2019)

PERRY NUCLEAR POWER PLANT, Unit 1; Docket No. 50-440  
REQUEST FOR ACTION; April 3, 2019; DIRECTOR'S DECISION UNDER 10 C.F.R. § 2.206;  
DD-19-1, 89 NRC 317 (2019)

TURKEY POINT NUCLEAR GENERATING Units 3 and 4; Docket Nos. 50-250-SLR, 50-251-SLR  
OPERATING LICENSE RENEWAL; March 7, 2019; MEMORANDUM AND ORDER (Granting the  
Hearing Requests of SACE and Joint Petitioners, Denying the Hearing Request of Albert Gomez,  
Granting Monroe County's Request to Participate as an Interested Governmental Participant, and  
Referring a Ruling to the Commission); LBP-19-3, 89 NRC 245 (2019)

VERMONT YANKEE NUCLEAR POWER STATION; Docket No. 50-271-LT-2  
LICENSE TRANSFER; March 11, 2019; MEMORANDUM AND ORDER; CLI-19-4, 89 NRC 241  
(2019)

WCS CONSOLIDATED INTERIM STORAGE FACILITY; Docket No. 72-1050-ISFSI  
INDEPENDENT SPENT FUEL STORAGE INSTALLATION; March 11, 2019; MEMORANDUM AND  
ORDER; CLI-19-3, 89 NRC 236 (2019)