

June 8, 2015

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	
CROW BUTTE RESOURCES, INC.)	Docket No. 40-8943-OLA
)	
(License Renewal for the In Situ Leach)	ASLBP No. 08-867-02-OLA-BD01
Facility, Crawford, Nebraska))	

NRC STAFF'S REBUTTAL STATEMENT OF POSITION

The Staff of the U.S. Nuclear Regulatory Commission (NRC Staff) responds to the initial statements of position and initial testimony of the Consolidated Intervenors (CI) and the Oglala Sioux Tribe (OST) (collectively Intervenors) on Contentions A, C, D, F, 1, 6, 9, 12, and 14.¹ In these contentions the Intervenors challenge the Final Environmental Assessment (EA) that the Staff prepared for Crow Butte Resources, Inc.'s (CBR's) license renewal application (LRA) for the Crow Butte In Situ Uranium Recovery (ISR) facility.² The Intervenors allege that in preparing the EA and related documentation for the Crow Butte facility the Staff violated the National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA).

I. Summary of Staff's Position

The Staff complied with NEPA by evaluating how renewal of CBR's license might affect groundwater, cultural resources, and other resources. The Staff also complied with the NHPA by engaging in extensive consultation with Native American tribes, including the Oglala Sioux

¹ Consolidated Intervenors' and Oglala Sioux Tribe's Joint Position Statement (May 8, 2015) (Joint Position Statement); Oglala Sioux Tribe's Supplemental Position Statement (May 8, 2015) (OST Supplemental Position Statement).

² Pursuant to the Board's decision in LBP-15-11, Contentions A, C, D, and F migrated from challenging the LRA to challenging the EA. *Crow Butte Resources, Inc.* (In Situ Leach Facility, Crawford, Nebraska), LBP-15-11, 81 NRC ___ (slip op. at 10) (March 16, 2015) (LBP-15-11).

Tribe. For the reasons set forth below and in the Staff's Initial Statement of Position,³ the Board should dismiss the contentions and affirm that the Staff's review of the license renewal application for the Crow Butte ISR facility complied with applicable law.

II. The Staff's Expert Witnesses

The Staff submitted initial testimony from seven expert witnesses: David Back (providing testimony on Contentions A, C, D, F, 6, and 9); Tianqing Cao (providing testimony on Contention 14); Nathan Goodman (providing testimony on Contentions D, 1, 12, and 14); Thomas Lancaster (providing testimony on Contentions A, C, D, F, 6, 9, and 14); Paul Nickens (providing testimony on Contention 1); Mirabelle Shoemaker (providing testimony on Contention 1); and Elise Striz (providing testimony on Contentions A, C, D, F, 6, 9 and 14). Each of these witnesses will be offering rebuttal testimony on one or more of the contentions on which he or she initially testified.

In addition, the Staff is submitting testimony from one additional witness, Dr. Mark Fuhrmann, to help rebut the Intervenor's testimony on Contentions D and 9. Dr. Fuhrmann is a Geochemist in the NRC's Office of Research. He holds a B.S. in Marine Sciences from the State University of New York (SUNY) Empire College, a M.S. in Geology from Adelphi University, and a Ph. D. in Earth Sciences (concentrating on geochemistry) from SUNY Stony Brook. Since coming to NRC in 2007, he has worked on a variety of topics including reviews of the proposed remediations of the Shieldalloy and Cimarron sites, and reviews of U.S. Department of Energy (DOE) High Level Waste Tank Closures at Savannah River. He served as a member of the committee rewriting the Aging Management Program section on buried piping and is a member of the NRC committee that is reviewing U.S. Environmental Protection Agency (EPA) documents on "Multiagency Radiation Survey and Site Investigation" (MARSSIM). He is the program manager for research topics that include bioremediation of

³ NRC Staff's Initial Statement of Position (May 8, 2015).

uranium recovery sites, leaching of contaminants from slags and concrete, the long-term durability of engineered covers for uranium mill tailings, and the scoping study on the consequences of aqueous releases from severe reactor accidents. Prior to joining the NRC, Dr. Fuhrmann worked for 26 years at Brookhaven National Laboratory as a geochemist, where he was ultimately appointed to the position of Staff Scientist with a continuing appointment. At Brookhaven, he served as Principal Investigator for many projects, including projects involving radionuclide-contaminated soils and disposal of low-level radioactive waste.

III. The Staff's Position on Individual Contentions

In their initial statements of position and initial testimony,⁴ the Intervenorers rely on numerous arguments that they submitted previously in support of their contentions challenging CBR's LRA and the Staff's EA for the Crow Butte license renewal. Through its Initial Statement of Position and Initial Testimony,⁵ the Staff has already addressed the vast majority of these arguments. In the sections below, the Staff addresses the Intervenorers' new arguments and any arguments requiring further discussion. As the Staff explains below, when reviewing CBR's application for renewal of its source and byproduct materials license for the CBR facility, the Staff complied with NEPA, the NHPA, and other applicable law. Therefore, the Board should

⁴ The Intervenorers submitted the following statements, declarations, and opinions in support of their positions on the admitted contentions: Exhibit (Ex.) INT-021 (Statement of Debra White Plume); Ex. INT-022 (Opinion Letter by Dr. Louis Redmond); Ex. INT-031 (Declaration of Michael Catches Enemy); Ex. INT-032 (Declaration of Dennis Yellow Thunder); INT-043 (Additional Testimony of Dr. Hannan LaGarry); Ex. INT-046 (Testimony of Dr. David Kreamer); Ex. INT-047 (Testimony of Mr. Michael Wireman); Ex. INT-048 (Opinion of Dr. Linsey McLean), Ex. OST-001 (Statement of Charmaine White Face). In addition to these statements, declarations and opinions, the Intervenorers submitted opinions previously prepared in support of earlier filings. These include the 2008 opinions of Dr. Hannan LaGarry, Dr. Richard Abitz, Dr. Paul Robinson, and JR Engineering provided in support of Consolidated Intervenorers' original petition to intervene, and the 2015 opinion of Dr. Hannan LaGarry provided in support of the Intervenorers' new contentions on the Staff's EA. See Ex. INT-002 through INT-005, Ex. INT-013. The Intervenorers did not list Drs. Abitz and Robinson or the authors of the JR Engineering Opinion (Paul Ivancie and W. Austin Creswell) as witnesses in this proceeding, nor did those individuals provide direct testimony on any of the Intervenorers' contentions.

⁵ Ex. NRC-001.

dismiss all of the admitted contentions because the Staff has provided evidence sufficient to show that the Intervenor's contentions lack merit.

A. Contention A: The Intervenor's Fail to Show that the EA Contains an Inadequate Assessment of Non-Radiological Impacts

In their Joint Position Statement, the Intervenor's assert that

CBR's ISL mining operation has the potential for a number of specific non-radiological health impacts from spills, excursions or other unintended release and that the current groundwater monitoring program operated by CBR and approved by NRC Staff is insufficient to detect significant potential contamination rendering it inadequate to protect public health and safety.⁶

The Intervenor's do not acknowledge the Commission's finding that the Board limited the scope of the admitted contention to the question of whether Crow Butte's spill contingency plan adequately addresses non-radiological contaminants, and specifically in that regard, the scope of the admitted contention is limited to the OST's claims that there is "no valid scientific reason" to exclude uranium as an excursion indicator and that a biweekly testing plan was too infrequent to detect possible excursions.⁷ Nowhere in their Joint Position Statement or in the testimony of the witnesses proffered by the Intervenor's for Contention A do the Intervenor's advance arguments concerning the monitoring frequency for contaminants or the use of uranium as an excursion indicator. Relevant arguments concerning the use of uranium as an excursion indicator appear only in the Abitz Opinion, submitted as an exhibit by the Intervenor's.⁸ The Staff addressed these arguments in their initial testimony.⁹

As support for Contention A, the Intervenor's rely upon testimony filed by Dr. LaGarry, Dr. Kreamer, Mr. Wireman, and Dr. McLean.¹⁰ The OST also offers the testimony of Ms. White

⁶ Joint Position Statement at 86.

⁷ *Crow Butte Resources, Inc.* (In Situ Leach Facility, Crawford, Nebraska), CLI-09-9, 69 NRC 331, 346-47 (2009) (CLI-09-9).

⁸ Ex. INT-002.

⁹ See Ex. NRC-001 at A.A.7 through A.A.10.

¹⁰ Joint Position Statement at 86-88.

Face in support of Contention A.¹¹ Rather than addressing Contention A as a separate matter, all of the Intervenor's witnesses' testimony is grouped together so as to address multiple contentions at the same time. As explained above, most if not all of the testimony offered by the Intervenor's witnesses falls outside of the scope of Contention A as admitted and limited by the Board and Commission, and appears to apply to other contentions in this proceeding. As the Staff explains in its rebuttal testimony, to the extent that the testimony offered by the Intervenor's witnesses raises concerns that relate to other admitted contentions, those concerns are addressed by the Staff in their testimony relating to the relevant admitted contentions.¹²

The Staff notes that Mr. Wireman states in his testimony that "[th]ere should be a more complete analyte list that includes metals, [total dissolved solids (TDS)] and selected anions" for domestic water supply wells and other monitoring wells.¹³ The Staff responds that, to the extent this comment is intended to apply to CBR's excursion monitoring program, it would not make sense to sample a complete analyte list when the purpose of excursion monitoring wells are to detect the existence of excursions.¹⁴ For this purpose CBR is required to sample for conservative, leading edge monitoring parameters that the NRC has determined will enable the licensee to identify an excursion most quickly.¹⁵ As the Staff explains, it has determined that CBR's operational ground water monitoring program satisfies the applicable regulatory requirements and the acceptance criteria of NUREG-1569.¹⁶

The Staff also responds in its rebuttal testimony to Dr. Kreamer's claims regarding CBR's groundwater monitoring programs. First, the Staff explains that Dr. Kreamer's testimony

¹¹ OST Supplemental Position Statement at 1; Ex. OST-001.

¹² See Ex. NRC-076 at A.A.3 through A.A.6.

¹³ Ex. INT-047 at 8.

¹⁴ Ex. NRC-076 at A.A.6.

¹⁵ *Id.*; see also Ex. NRC-001 at A.A.7 through A.A.9.

¹⁶ Ex. NRC-076 at A.A.6 (citing Ex. NRC-009 at 130-31).

appears to conflate the different types of monitoring wells used for excursion and restoration monitoring.¹⁷ The Staff explains that CBR's groundwater excursion monitoring program is oriented at the detection of excursions; in other words, it has no other purpose but to detect the existence and source of an excursion.¹⁸ The Staff points out that while Dr. Kreamer alleges that the monitoring program "has the potential" to provide inaccurate information and does not provide early warning of contaminant migration, he does not support his allegations with evidence that this is in fact the case.¹⁹

The Staff further notes that Dr. Kreamer claims that the use of a limited number of water quality parameters is atypical of "most rigorous monitoring programs," but he does not provide any information about these monitoring programs to which he alludes, or their relevance to CBR's excursion monitoring program.²⁰ By contrast, as the Staff explained in its initial testimony and in the EA, CBR's excursion monitoring program has identified excursions and enabled the Staff to find that there has been no measurable impact to ground water beyond the licensed area from Crow Butte operations.²¹ This is evidence in practice that the selection of chloride, conductivity and total alkalinity as indicator parameters for excursions has been, and will continue to be, effective at identifying excursions at the Crow Butte facility.²² Finally, the Staff notes that Dr. Kreamer's claim – that "mining activities release potential 'tracers' that can be used to determine the potential influence of ISL on groundwater, often sequentially in advance of the arrival of any contaminants," and that "[u]se of these indicators . . . are potentially very beneficial and can act as an early warning system, but are largely ignored in stated future efforts

¹⁷ Ex. NRC-076 at A.A.2.

¹⁸ *Id.*

¹⁹ *Id.*

²⁰ *Id.*

²¹ *Id.* (citing Ex. NRC-010 at 79).

²² *Id.*

at the site” – actually calls for sampling that CBR is already required to perform.²³ The Staff concludes that the Intervenor’s witnesses have not provided any information to give the Staff cause to revisit its analysis or conclusions in the EA with respect to the issues admitted for hearing in Contention A.²⁴

The Intervenor’s conclude that the “Staff’s cursory review of the potentially deleterious health effects capable of persisting in the environment for many thousands of human lifetimes is inadequate to protect human health and safety.”²⁵ The Intervenor’s assert that Staff’s “description in the Final EA is inaccurate.”²⁶ Besides failing to specify which description in the EA is purported to be inaccurate, the Intervenor’s have not shown by their testimony or legal arguments that the EA violates the strictures of NEPA or other governing law. As the Staff explains in its testimony, the Intervenor’s witnesses do not provide supporting evidence for the claims and general assertions that they make, and on occasion appear to indiscriminately direct sweeping claims at many of the different types of monitoring wells and programs in place at the CBR facility.²⁷ By contrast, the Staff’s testimony is supported by NRC guidance and operating experience at the CBR site.²⁸ Finally, and most significantly, the Intervenor’s have not carried forward the arguments that were actually admitted for hearing by the Board and Commission.²⁹ Therefore, for these reasons, as well as for those described in the Staff’s Initial Statement of Position,³⁰ the Intervenor’s have not established that the Staff has failed to comply with NEPA,

²³ *Id.*

²⁴ Ex. NRC-076 at A.A.9.

²⁵ Joint Position Statement at 88-89.

²⁶ *Id.* at 89.

²⁷ See Ex. NRC-076 at A.A.2 and A.A.6.

²⁸ *Id.* at A.A.6; see also Ex. NRC-001 at A.A.5, A.A.6.

²⁹ See Staff’s Initial Statement of Position at 20-22 (describing procedural history of Contention A).

³⁰ See *id.* at 20-28.

the NRC's NEPA-implementing regulations, or other governing law.

B. Contention C: The Staff Thoroughly Considered Potential Impacts to Surface Waters, Including the White River

The Intervenors assert that Contention C is a factual dispute “regarding the hydraulic characterization of the CBR site, particularly as relates to the White River and its alluvium.”³¹

The Intervenors later assert that their experts' statements “point to a decidedly different characterization of the White River alluvium and its potential contamination from spills at the CBR mine site.”³² The Intervenors' further assert, more specifically, that “CBR and NRC Staff's relative lack of specificity regarding the gaining and losing reaches of the White River is evidence of their incomplete understanding of this hydraulic characterization.”³³ The Intervenors do not explain how these assertions relate to the issue in Contention C that was admitted by the Board and affirmed by the Commission: whether the Staff adequately addressed potential impacts to surface waters, including the White River.³⁴

To support their claim that the Staff misunderstands the hydraulic characterization, the Intervenors cite several statements by Dr. LaGarry regarding potential contaminant pathways to the White River, including surface spills, water transmitted through the mined aquifer, faults, and artesian flow.³⁵ The Intervenors cite similar statements by Dr. Kreamer.³⁶ The Staff addressed these claims in its initial testimony, explaining specifically why each of these general proposed

³¹ Joint Position Statement at 90.

³² *Id.* at 92.

³³ *Id.*

³⁴ See *Crow Butte Resources, Inc.* (In Situ Leach Facility, Crawford, Nebraska), LBP-08-24, 68 NRC 691, 725 (2008) (LBP-08-24); *Crow Butte*, CLI-09-9, 69 NRC at 351-352.

³⁵ Joint Position Statement at 90, quoting INT-003 at 3 and INT-013 at 6.

³⁶ Joint Position Statement at 92, quoting INT-046 at 3.

pathways is not plausible at the CBR facility.³⁷ The Staff also addresses Dr. Kreamer's claims in its rebuttal testimony, echoing arguments made in the Staff's initial testimony.³⁸

The Intervenors also cite several statements from Mr. Wireman regarding uncertainty in groundwater flow direction, hydraulic connection between the Brule aquifer and nearby surface waters, and the importance of identifying gaining and losing reaches of the White River.³⁹ As explained in the Staff's rebuttal testimony, the various descriptions of groundwater flow are consistent, but more importantly, the direction of groundwater flow is immaterial because CBR's monitoring program is designed to effectively monitor the Brule aquifer regardless of groundwater flow direction.⁴⁰ With regard to connectivity between the Brule aquifer and surface waters, the Staff acknowledges in its testimony that the overlying Brule aquifer is a potential pathway for contamination to travel from the CBR site to the White River.⁴¹ However, the Staff then explains that the controls, procedures, and monitoring employed at the CBR facility make such contamination unlikely, and cites over 20 years of monitoring results as evidence that contamination has not occurred.⁴² With regard to Mr. Wireman's testimony claiming that it is important to identify gaining and losing reaches of the White River, the Staff explains in its

³⁷ Ex. NRC-001 at A.C.4, A.C.5, A.C.6, A.C.8.

³⁸ Ex. NRC-076 at A.C.2.

³⁹ Joint Position Statement at 91 (quoting INT-047 at 3). The Intervenors also cite Mr. Wireman's assertion that CBR should review its offsite monitoring programs and make modifications to accommodate "new understandings and new mining units and satellite ore bodies." It is not clear how this assertion relates to whether renewal of the CBR license will impact surface waters. As noted by the Staff in its rebuttal testimony, the "new understandings" are not identified, there are no new mine units planned for the CBR facility, and if "satellite ore bodies" refers to the proposed CBR expansion areas, those areas are subject to separate licensing proceedings and are outside the scope of this proceeding. Ex. NRC-076 at A.C.14.

⁴⁰ Ex. NRC-076 at A.C.6.

⁴¹ *Id.* at A.C.3; Ex. NRC-001 at A.C.4.

⁴² Ex. NRC-076 at A.C.3; NRC-001 at A.C.4, A.C.5, and A.C.10.

rebuttal testimony that such identification is irrelevant based on the comprehensive design of the CBR monitoring program.⁴³

Finally, the Intervenor cite statements by Dr. Kreamer regarding lack of explicit quantitation of potential horizontal translation of groundwater along ephemeral stream courses and the effects of large pulses of infiltrating precipitation.⁴⁴ Neither the Intervenor nor Dr. Kreamer provide any additional explanation to support these general assertions. The Staff addresses the first concern in its rebuttal testimony, stating that monitoring has not identified any contamination impacts from groundwater discharges into ephemeral streams.⁴⁵ With regard to the impacts of infiltrating precipitation, the Staff explains in its rebuttal testimony that it is unaware of any impacts from precipitation events experienced over the operational lifetime of the CBR facility that were not addressed in the EA.⁴⁶

Dr. Kreamer and Mr. Wireman make additional assertions in their testimony regarding the need for further characterization of the Brule aquifer. The Staff explains in its rebuttal testimony that such characterization is unnecessary because the network of monitoring wells in the Brule aquifer is designed to detect excursions independent of any areas of secondary porosity that may be present.⁴⁷

Finally, Dr. Kreamer and Mr. Wireman make several assertions regarding the ground water monitoring program and responses to spills. Mr. Wireman asserts that the ground water monitoring program is “inadequate and poorly reported,” although he does not elaborate on the reasons for this claim.⁴⁸ In response, the Staff explains that the excursion monitoring program

⁴³ Ex. NRC-076 at A.C.3.

⁴⁴ Joint Position Statement at 92.

⁴⁵ Ex. NRC-076 at A.C.2.

⁴⁶ *Id.* at A.D.9.

⁴⁷ *Id.* at A.C.4, A.C.6, A.C.7, A.C.9.

⁴⁸ Ex. INT-047 at 8.

is described in detail in the SER and License Condition 11.5, that information on depth and location of offsite private wells that are in conjunction with the effluent and environmental monitoring program is provided in the EA and LRA, and that over 20 years of monitoring data indicate no excursions moving offsite and offsite wells continuing to show preoperational levels of radionuclides.⁴⁹ Dr. Kreamer asserts that increased monitoring contingencies and plans for future spills are not well addressed.⁵⁰ In response, the Staff describes in its rebuttal testimony the increased monitoring that occurs in the event of an excursion and refers to the description in the Staff's initial testimony of the controls, procedures and monitoring to address spills and leaks.⁵¹ Dr. Kreamer also asserts that the use of "early warning" tracers is "largely ignored," but the Staff explains in its rebuttal testimony that, in fact, the excursion monitoring program uses such tracers and the indicators used have been shown to be effective and reliable.⁵²

As stated earlier, the issue in Contention C is whether the Staff adequately considered potential impacts to surface waters, including the White River. The Intervenors have provided no evidence that contamination is reaching surface waters, or that CBR's controls, procedures, and monitoring are inadequate to address spills, leaks and excursions and to prevent them from moving offsite. Therefore, the Intervenors have not shown that the Staff's conclusion in the EA that impacts to surface water are SMALL was inappropriate. Because the Intervenors have failed to demonstrate a NEPA violation, the Board should decide this contention in favor of the Staff.

⁴⁹ Ex. NRC-076 at A.C.10.

⁵⁰ Ex. INT-046 at 5.

⁵¹ Ex. NRC-076 at A.C.12.

⁵² *Id.* at A.C.13.

C. Contention D: The Staff Properly Concluded There is No Communication Among Aquifers and Appropriately Limited its Environmental Justice Review

As originally admitted, OST Contention D raised a concern about adequate confinement, claiming that the Basal Chadron Sandstone aquifer (the mined aquifer at the CBR facility) communicates with the aquifer that provides drinking water to the Pine Ridge Reservation.⁵³ In LBP-15-11, the Board merged portions of the intervenors' EA contentions 3, 5 and 10 into OST Contention D. Specifically, the Board admitted the intervenors' claim in EA Contention 5 questioning the accuracy of the Staff's modeling of the White River feature, specifically the use of data from the North Trend Expansion Area, as well as the accuracy of the Staff's determination that the White River feature is a fold.⁵⁴ The Board also found the intervenors' EA Contention 3 on environmental justice (EJ) admissible on the issue of whether the Staff's analysis of EJ, including its analysis of cumulative effects, should be expanded to consider potential impacts on the aquifer that provides drinking water to the Pine Ridge Reservation.⁵⁵ The Staff addresses each of these distinct issues in turn.

1. Communication Among Aquifers

The crux of Contention D, as originally admitted, was whether or not CBR had demonstrated adequate confinement of the Basal Chadron Sandstone aquifer, and thus, had demonstrated that there is no "communication" between the Basal Chadron Sandstone aquifer and other aquifers, specifically the aquifer that provides drinking water to the Pine Ridge Reservation.⁵⁶ In their Joint Position Statement, the Intervenors make no specific arguments in support of this issue, but assert generally that the opinions of Dr. LaGarry, Dr. Kreamer, and Mr. Wireman support their claim that there is communication between these aquifers, and thus the

⁵³ Oglala Sioux Tribe's Request for Hearing and/or Petition to Intervene at 18 (July 28, 2008).

⁵⁴ LBP-15-11 at 25-26.

⁵⁵ *Id.* at 19.

⁵⁶ *Crow Butte*, LBP-08-24, 68 NRC at 725-727; *Crow Butte*, CLI-09-9, 69 NRC at 352-354.

possibility of contamination of drinking water.⁵⁷ In their testimony, Dr. LaGarry, Dr. Kreamer, and Mr. Wireman make various assertions related to this issue. Broadly, these assertions include the following: secondary permeability in the form of faults and joints allows migration of contaminants; faults and joints have not been adequately characterized; the site hydrological conceptual model is based on inappropriate assumptions; aquifer pumping tests were inadequate and inappropriate analysis methods were used to interpret their results; and the overlying confinement was inadequately characterized.

With regard to the assertions that faults and joints could serve as contaminant pathways, these claims are similar to statements made by Dr. LaGarry in his 2008 and 2015 opinions (INT-003 and INT-013). The Staff addressed this issue extensively in its initial testimony,⁵⁸ and reiterates in its rebuttal testimony that there is no evidence of faults capable of transmitting fluids from the Basal Chadron Sandstone aquifer through the overlying confinement to the Brule aquifer.⁵⁹ The Staff explains that there are multiple lines of evidence demonstrating vertical confinement (and thus demonstrating the absence of faults), including hydrological characteristics of the confining layers, results of aquifer pumping tests, differences in potentiometric surface between the Brule and Basal Chadron Sandstone aquifers, and differences in geochemistry between the two aquifers.⁶⁰ The Staff notes that Dr. Kreamer refers to “recent literature” on faults (INT-046 at 2) but does not identify any specific documents, and that Mr. Wireman’s references to indications of secondary permeability (INT-047 at 2-3) are on a regional level and are not site-specific.

With regard to inadequate characterization of faults, Dr. LaGarry asserts that recent research by Balmat and Maher and Schuster demonstrates the existence of faults at the CBR

⁵⁷ Joint Position Statement at 93.

⁵⁸ Ex. NRC-001 at A.D.3, A.D.5, A.D.7, A.D.9 through A.D.12, A.D.14, A.D.15, A.D.17 and A.D.18.

⁵⁹ Ex. NRC-076 at A.D.3 through A.D.8.

⁶⁰ *E.g.*, Ex. NRC-076 at A.D.2, A.D.3 (citing Ex. NRC-001 at A.D.3).

site.⁶¹ The Staff explains in its rebuttal testimony that Dr. LaGarry has drawn overbroad conclusions from Balmat's work on lineaments, that Maher and Schuster's research involved fieldwork at locations distant from the CBR facility, and that, in the end, Dr. LaGarry provides no hard evidence of "ground truthed" faults at the CBR site.⁶² In its rebuttal testimony, the Staff also addresses Dr. LaGarry's claims regarding evidence of faults on a 1982 map, explaining that these claims, too, are speculative and unverified.⁶³ The Staff responds similarly to Mr. Wireman's assertion that additional mapping and hydraulic testing is needed to assess the extent of secondary permeability resulting from structural deformation of rocks,⁶⁴ stating that Mr. Wireman fails to provide a basis for this assertion and that such efforts are not necessary given the multiple lines of site-specific evidence of confinement and lack of evidence of faults at the CBR site.⁶⁵ Finally, Dr. Kreamer and Mr. Wireman also make several broad assertions regarding insufficient consideration of secondary permeability and faults in their testimony. In response, the Staff explains in its rebuttal testimony that Dr. Kreamer does not identify the "recent literature" or "available scientific evidence" he refers to in support of his claims. Moreover, the Staff reiterates that multiple lines of site-specific evidence support the conclusion that confinement and lateral containment have been demonstrated, and that faults affecting confinement are not present at or near the CBR site.⁶⁶

Dr. Kreamer and Mr. Wireman also advance several claims related to CBR's aquifer pumping tests. For example, Dr. Kreamer asserts that the data analysis methods used are

⁶¹ Ex. INT-043 at 2-4.

⁶² Ex. NRC-076 at A.D.2 through A.D.4.

⁶³ *Id.* at A.D.5.

⁶⁴ Ex. INT-047 at 6.

⁶⁵ Ex. NRC-076 at A.D.8. These lines of evidence include hydrological characteristics of the confining layers, results of aquifer pumping tests, differences in potentiometric surfaces of the aquifers, and differences in geochemistry between the aquifers. Ex. NRC-001 at A.D.3.

⁶⁶ Ex. NRC-076 at A.D.6, A.D.7.

inappropriate for the site conditions. In its rebuttal testimony, the Staff explains that Dr. Kreamer provides no explanation for this assertion, and that the methods are widely accepted and incorporated into standard test methods.⁶⁷ The Staff also explains that these methods are used with the understanding that no hydrogeological system is truly homogeneous and isotropic.⁶⁸ Mr. Wireman claimed that aquifer pumping tests were inadequate to characterize the overlying confinement; that minor leakage in tests indicates the possibility of inter-formation flow; and that analysis of vertical migration was based on a clay layer that may not occur over the extent of the site.⁶⁹ In response to these specific claims, the Staff explained that the lack of response in the Brule aquifer during pumping tests demonstrated confinement irrespective of any characterization of the overlying confinement,⁷⁰ and the analysis of the confining characteristics of overlying confinement were based not on a single clay layer that overlies the Basal Chadron Sandstone aquifer, but on the entire 200-500 foot thick confining layer, which contains significant amounts of clay.⁷¹

Finally, the Intervenors argue that renewing the license is inimical to public health and safety because the lack of adequate confinement allows toxic heavy metals to reach humans, animals, plants and wildlife.⁷² The Intervenors rely on the testimony of Dr. McLean as support for this argument. But the issues raised in Dr. McLean's opinion are outside the scope of Contention D, which alleges that there is communication among aquifers (specifically, between the Basal Chadron Sandstone aquifer at the CBR site and the Arikaree aquifer that supplies drinking water to the Pine Ridge Reservation). Dr. McLean's testimony deals primarily with

⁶⁷ Ex. NRC-076 at A.D.11.

⁶⁸ *Id.*

⁶⁹ Ex. INT-047 at 4-5.

⁷⁰ Ex. NRC-076 at A.D.13 and A.D.14.

⁷¹ *Id.* at A.D.15.

⁷² Joint Position Statement at 93-94.

health effects of uranium and various metals on human health and the environment.⁷³ She also makes general, unsupported assertions regarding excursions at ISR mines, inability to restore water at ISR facilities to baseline groundwater quality, the proliferation of Superfund sites, and similar statements.⁷⁴ Because nothing in Dr. McLean's testimony addresses whether the Staff adequately assessed the confinement of the Basal Chadron Sandstone aquifer,⁷⁵ the Board should not consider this argument or Dr. McLean's testimony in ruling on Contention D.

2. Modeling and Interpretation of White River Structural Feature

The Staff discussed its modeling of the White River feature at length in its initial testimony.⁷⁶ The specific factual issue admitted by the Board with respect to the modeling of the White River structural feature was whether the Staff's use of data from the North Trend Expansion Area (NTEA) site in the model was appropriate. The Intervenors have presented no testimony or other evidence supporting their position on this specific issue. Instead, The Intervenors argue generally that the testimony of Dr. LaGarry, Dr. Kreamer, and Mr. Wireman support the Intervenor's position that the NRC's modeling of the White River structural feature and related analyses "are not sound."⁷⁷ In their testimony, Dr. Kreamer and Mr. Wireman make various assertions regarding the Staff's modeling of the White River feature that are outside the scope of the admitted issue. For example, Dr. Kreamer asserts that the Staff inappropriately assumed horizontal layers that are heterogeneous, isotropic, and of uniform thickness. In its rebuttal testimony, the Staff explains that such assumptions were not made in modeling the White River feature, but rather layers of varying thickness based on borehole log information

⁷³ See *generally* Ex. INT-048. The Staff also notes that Dr. McLean did not indicate that her testimony applies to Contention D. *Id.* at 1.

⁷⁴ *Id.*

⁷⁵ *Id.*

⁷⁶ Ex. NRC-001 at A.D.9, A.D.10, A.D.17, A.D.18, A.D.20, A.D.21.

⁷⁷ Joint Position Statement at 94.

were used, along with site specific parameters.⁷⁸ In response to Dr. Kreamer's claim that "model validation, model numerical stability, uniqueness of solutions, grid intervals, and evaluation of more realistic scenarios beyond testing of a single fault" are not reported,⁷⁹ the Staff explains that its model was stochastic, not deterministic, and therefore the selection of parameters and assumptions used were appropriate.⁸⁰ The Staff also notes, in response to Mr. Wireman's assertion that modeling is a "poor substitute for empirical data from drilling,"⁸¹ that CBR did in fact perform close-spaced drilling in the vicinity of the White River structural feature and developed a three-dimensional geological model of the feature based on the drilling results.⁸² The Staff also reiterates in its rebuttal testimony that the model was not essential to the Staff's conclusions regarding the interpretation of the White River structural feature or its effects on confinement, but rather served as an additional line of evidence.⁸³

With respect to the Staff's interpretation of the White River structural feature as a fold, not a fault, the Intervenors argue that testimony by Dr. LaGarry, Dr. Kreamer, and Mr. Wireman, as well as two exhibits (the Petersen letter and the Elliot Report), support an interpretation of the White River structural feature as a fault.⁸⁴ In its initial testimony, the Staff explained in detail the bases for concluding that the White River structural feature is a fold that does not affect confinement of the Basal Chadron Sandstone aquifer.⁸⁵ In its rebuttal testimony, the Staff addresses the statements and documents cited by the Intervenors and explains why the

⁷⁸ Ex. NRC-076 at A.D.18.

⁷⁹ Ex. INT-046 at 2.

⁸⁰ Ex. NRC-076 at A.D.18.

⁸¹ Ex. INT-047 at 3.

⁸² Ex. NRC-076 at A.D.18.

⁸³ *Id.*

⁸⁴ Joint Position Statement at 95.

⁸⁵ Ex. NRC-001 at A.D.9, A.D.10, A.D.17.

referenced statements and documents do not support the Intervenor's argument.⁸⁶ Specifically, the Staff explains that, with the exception of Mr. Wireman, the Intervenor's witnesses and cited documents address faults generally or on a regional level, and either identify the White River structural feature as a fault without further explanation, or do not mention it at all.⁸⁷ With regard to Mr. Wireman's assertion that the nature of the White River feature is "very uncertain," the Staff responds in its rebuttal testimony that Mr. Wireman provides no basis for this assertion.⁸⁸ The Staff then points to the extensive discussion of the basis for the Staff's interpretation of the White River feature in its initial testimony, as well as the NDEQ's independent assessment that such an interpretation was plausible.⁸⁹

3. Environmental Justice

The specific environmental justice (EJ) issue that was merged with Contention D was whether the Staff's analysis of EJ, including its analysis of cumulative effects, should be expanded to consider potential impacts on the aquifer that provides drinking water to the Pine Ridge Reservation.⁹⁰ In its initial testimony, the Staff explained the basis for choosing a 4-mile radius for the EJ review area and the reasons why the Staff did not expand its EJ analysis to include potential impacts to drinking water on the Pine Ridge Reservation.⁹¹ The Staff explained that, based on its determination that impacts to surface and groundwater would be SMALL, there would be no significant impacts and thus no EJ impacts.⁹²

⁸⁶ Ex. NRC-076 at A.D.17.

⁸⁷ *Id.*

⁸⁸ *Id.*

⁸⁹ *Id.*

⁹⁰ LBP-15-11 at 19.

⁹¹ Ex. NRC-001 at A.D.27, A.D.28.

⁹² *Id.* at A.D.28.

In their Joint Position Statement, the Intervenors attempt to broaden the scope of this portion of Contention D by asserting a disparate impact on cultural resources.⁹³ This asserted impact is outside the scope of the contention as admitted by the Board, which was limited to EJ in the context of potential impacts on the drinking water aquifer at the Pine Ridge Reservation.⁹⁴

In its supplemental position statement, the OST asserts that CBR operations impact water quality in wells at the Pine Ridge Reservation.⁹⁵ The OST bases this argument on Ms. White Face's testimony.⁹⁶ Ms. White Face asserts that uranium liberated during ISR operations at the CBR facility is being transported through aquifers to the Arikaree aquifer at the Pine Ridge Reservation and raising uranium levels in wells on the reservation that are completed in that aquifer.⁹⁷ She claims, specifically, that CBR pumps lixiviant into the Arikaree aquifer, that ISR operations at the CBR facility change the ratio of U-238 to U-234 in naturally occurring uranium, and that the pumping action of wells increases the flow of contaminants toward the reservation.⁹⁸

In its rebuttal testimony, the Staff responds to Ms. White Face's assertions by explaining that CBR is injecting lixiviant into the Basal Chadron Sandstone aquifer, not the Arikaree, and that there is no pathway through which uranium could travel from the Basal Chadron Sandstone aquifer at the CBR site to the Arikaree aquifer at Pine Ridge.⁹⁹ The Staff also explains that ISR operations do not change the ratio of U-234 to U-238, and that Ms. White Face's analysis of well water test results is inaccurate because she compares activity ratios (pCi/L) to natural

⁹³ Joint Position Statement at 103.

⁹⁴ See LBP-15-11 at 17-19.

⁹⁵ OST Supplemental Position Statement at 4.

⁹⁶ *Id.*, citing Ex. OST-001.

⁹⁷ Ex. OST-001 at 3-4.

⁹⁸ *Id.* at 3-5.

⁹⁹ Ex. NRC-076 at A.D.20 through A.D.23.

abundance (mass) ratios.¹⁰⁰ The Staff also notes that the activity ratios (U-234/U-238) in her test results are typical of natural groundwater and consistent with results of tests conducted in 1995 for a United States Geological Survey (USGS) study of water quality in wells on the Pine Ridge Reservation.¹⁰¹ Finally, the Staff explains that, for the reasons discussed above, Ms. White Face's testimony does not provide information that would lead the Staff to revise its choice of a 4-mile radius for the EJ review area or its conclusion that there are no EJ impacts to residents of the Pine Ridge Reservation.¹⁰²

The Intervenors provide no other testimony or evidence to support the claim that the Staff should have expanded its EJ analysis to assess potential effects on the drinking water aquifer. The Staff conducted its EJ analysis consistent with NEPA, and the Board should find in favor of the Staff on this portion of Contention D.

4. EJ/Cumulative Impacts

The Staff explained in its initial testimony the basis for concluding that no significant cumulative impacts from EJ were expected.¹⁰³ The Intervenors have not provided any testimony or evidence related to cumulative impacts and EJ.¹⁰⁴ Instead, they have reverted to their original argument, rejected by the Board in LBP-15-11,¹⁰⁵ that the Staff failed to consider cumulative impacts of the proposed CBR expansion areas.¹⁰⁶ Because the Intervenors have

¹⁰⁰ *Id.* at A.D.23.

¹⁰¹ *Id.*

¹⁰² *Id.* at A.D.24, A.D.25.

¹⁰³ Ex. NRC-001 at A.D.29.

¹⁰⁴ Although the Intervenors state that their claim is supported by the LaGarry Opinion, the testimony of Dr. Kreamer and Mr. Wireman, and the Abitz Opinion, none of those documents address cumulative impacts.

¹⁰⁵ LBP-15-11 at 39.

¹⁰⁶ Joint Position Statement at 95-96. In fact, the Intervenors attempt to expand the scope of their original contention by claiming that the EA must consider cumulative impacts of the Dewey-Burdock ISR project in South Dakota in addition to the impacts of the proposed CBR expansion areas. *Id.* at 96.

not provided testimony or evidence supporting this aspect of Contention D, and for the reasons set forth in the Staff's Initial Statement of Position, the Board should find in the Staff's favor on this portion of Contention D.

D. Contention F: The Staff Properly Considered Recent Geological Research in its Environmental Review

In Technical Contention F, as migrated to the EA, CI argue that the Staff failed to include recent research in its analysis of environmental impacts.¹⁰⁷ As noted in the Staff's initial position statement, CI provided two specific bases for this contention: first, that the Staff improperly applied the "layer cake concept" which overestimates thickness and areal extent of stratigraphic units, and second, that the Staff ignored recent interpretations of the stratigraphic formations at and near the CBR facility and continued to use "outdated nomenclature" in referring to the stratigraphic units.¹⁰⁸ In admitting this contention, the Board also cited a reference to outdated EPA documents as another example of failure to use recent research.¹⁰⁹ Thus, the contention as admitted was limited to those specific issues.¹¹⁰

The Intervenors do not make any specific arguments in their statement of position regarding the issues of outdated nomenclature or the use of outdated EPA documents. Nor do the Intervenors provide any testimony or other evidence related to those issues. The Staff addressed both of those issues in its initial testimony.¹¹¹ With regard to the "layer cake concept," Dr. Kreamer asserts in his testimony that the site hydrological conceptual model uses inappropriate assumptions such as horizontal layers with homogeneous and isotropic

¹⁰⁷ *Crow Butte*, LBP-08-24, 68 NRC at 738; LBP-15-11 at 5.

¹⁰⁸ Ex. INT-003 at 3, Ex. INT-013 at 4. *See also Crow Butte*, CLI-09-9, 69 NRC at 357.

¹⁰⁹ *Crow Butte*, LBP-08-24, 68 NRC at 738-39.

¹¹⁰ As the Commission has held, "the scope of an admitted contention is defined by its bases." *Crow Butte Resources, Inc.* (North Trend Expansion Area), CLI-09-12, 69 NRC 535, 553 (2009).

¹¹¹ Ex. NRC-001 at A.F.5 through A.F.9.

conductivity.¹¹² In its rebuttal testimony, the Staff explains that it did not make these assumptions for all layers; rather, the Staff used site-specific data to describe the collective groundwater behavior of subsurface layers.¹¹³ The Staff explains further that over 20 years of performance monitoring validates the Staff's interpretation of the site conceptual model.¹¹⁴

In their Joint Position Statement, the Intervenors attempt to broaden Contention F beyond its stated bases by asserting generally that various documents "call into question . . . the reliability of CBR's scientific evidence, nomenclature, assumptions, and quality of analysis."¹¹⁵ These general assertions of deficiencies that the Intervenors now claim to be failures to use recent research were not raised in the original contention and thus do not fall within the scope of the contention as originally pled.¹¹⁶ The Intervenors cite specific portions of Dr. LaGarry's opinions and Dr. Kreamer's testimony as support for this argument.¹¹⁷ The cited statements by Dr. LaGarry relate to nomenclature and the "layer cake" concept, which the Staff addressed in its initial testimony.¹¹⁸ Several of the cited statements by Dr. Kreamer address the appropriateness of simplifying assumptions in the model and analysis methods used for aquifer

¹¹² Ex. INT-046 at 2.

¹¹³ Ex. NRC-076 at A.F.2.

¹¹⁴ *Id.*

¹¹⁵ Joint Position Statement at 107. Although the Intervenors cite the opinions of Paul Robinson, Dr. Abitz, and JR Engineering, the individuals responsible for those opinions are not witnesses in this proceeding, and their opinions have not been adopted by the Intervenors' witnesses.

¹¹⁶ The Commission has stated that "[t]he scope of a contention is limited to issues of law and fact pled with particularity in the intervention petition, including its stated bases, unless the contention is satisfactorily amended in accordance with our rules." *Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), CLI-10-5, 71 NRC 90, 100 (2010). The purpose of limiting the scope of a contention in this way is to allow the board and parties to be on notice of the issues to be litigated, and to ensure focused and fair proceedings. *Id.* An intervenor "is not free to change the focus of its admitted contention, at will, as the litigation progresses." *Public Service Co. of New Hampshire* (Seabrook Station Units 1 and 2), ALAB-899, 28 NRC 93, 97 & n.11 (1988), *aff'd in part and remanded in part on other matters*, *Massachusetts v. NRC*, 924 F.2d 311 (D.C. Cir.), cert. denied, 502 U.S. 899 (1991).

¹¹⁷ Joint Position Statement at 107, citing *id.* at 9, 12, 15, 16, 19.

¹¹⁸ Ex. NRC-001 at A.F.5 through A.F.8.

pumping tests.¹¹⁹ Except for one general, unsupported assertion about “old data and research,” those statements address the appropriateness of methods and assumptions, not failures to use recent research.¹²⁰ The Intervenor also cite two statements by Dr. Kreamer related to impacts of water use that were provided in support of Contention 6.¹²¹ These statements address sufficiency of evidence to support estimates of water use and appropriateness of equations, not failures to use recent research. As noted above, all of these cited statements go beyond the scope of Contention F as originally pled.

The Intervenor has provided a single statement in testimony addressing one of the three issues that comprise Contention F as admitted. The Staff addressed that issue (the “layer cake” concept) in both its initial and rebuttal testimony. The Staff also addressed the other issues – nomenclature and outdated EPA documents – in its initial testimony. The other claims of failure to use recent research raised in the Intervenor’s Joint Position Statement and testimony are outside the scope of this contention as admitted. For these reasons, and for the reasons provided in the Staff’s Initial Statement of Position, there is no failure to comply with NEPA and the Board should decide Contention F in favor of the Staff.

E. Contention 1: The Cultural Resource Surveys Relied on in the EA Form a Sufficient Basis for the EA’s Conclusions

As narrowed by the Board, the scope of disputed factual issues in Contention 1 is limited to whether “the cultural surveys performed and incorporated into the EA formed a sufficient basis on which to renew Crow Butte’s permit.”¹²² The large majority of the Intervenor’s

¹¹⁹ Joint Position Statement at 15-16, quoting INT-046 at 1-2.

¹²⁰ See *id.* As discussed in the Staff’s rebuttal testimony, Dr. Kreamer does not identify the “old data and research,” does not explain why its age makes it invalid, and does not identify the more current research that he claims is available. Ex. NRC-076 at A.D.11. Because these statements by Dr. Kreamer address issues that relate to confinement, the Staff addresses them in its rebuttal testimony for Contention D, explaining why the assumptions and methods used were appropriate for the site conditions. *Id.* at A.D.6, A.D.10, A.D.11, A.D.12, A.D.18.

¹²¹ Joint Position Statement at 107; INT-046 at 6.

¹²² LBP-15-11 at 61.

arguments are addressed in the Staff's initial testimony. For example, the Intervenor argue that the Staff "relied on old surveys that were done in 1982 and 1987," referring to the Class III field inventories conducted in support of the initial license application.¹²³ In its initial testimony, the Staff explains at length why the surveys remain valid, as well as the additional information-gathering measures the Staff took to supplement those surveys.¹²⁴ Similarly, the Staff responded in its initial testimony to Dr. Redmond's opinion regarding survey work done in support of the Marsland Expansion Area application, explaining that several of Dr. Redmond's criticisms of field inventories at a new site were inapplicable to a license renewal, which does not involve new land or significant construction.¹²⁵

The Intervenor also argue that the EA "fails to demonstrate adequate confinement and protection of cultural resources."¹²⁶ But that argument is outside the scope of the factual issue admitted by the Board—whether the Staff's reliance on the cultural resources surveys as one category of evidence supporting its finding that renewing CBR's license would not significantly impact cultural resources violated NEPA. While the Staff maintains that conditions in CBR's license do protect potential cultural resources located at the site, that is not an issue encompassed by this contention.

Although the majority of the Intervenor's Contention 1 arguments simply replicate those submitted in their motions to submit new contentions on the EA and have already been addressed by the Staff, the Intervenor do proffer a new argument in their analogy to the recent decision in the *Powertech* proceeding.¹²⁷ In *Powertech*, the Board resolved a cultural resources

¹²³ Joint Position Statement at 66.

¹²⁴ Ex. NRC-001 at 66-70, 71-73.

¹²⁵ *Id.* at 77-78.

¹²⁶ Joint Position Statement at 66.

¹²⁷ *Id.* at 83-86 (citing *Powertech USA, Inc.* (Dewey-Burdock In Situ Uranium Facility), LBP-15-16, ___ NRC ___ (slip op.) (April 30, 2015)) (LBP-15-16).

contention against the Staff, finding that the Staff had not taken the required “hard look” at cultural resources under NEPA. But the circumstances in the CBR license renewal review differ significantly from those in the review of the Dewey-Burdock application. First, *Powertech* involved a license for a new facility. As the Staff has explained, certain concerns inherent to a new facility are not applicable to a license renewal, given the lack of significant construction and the information from previous surveys. Second, the *Powertech* Board specifically found that the FSEIS did not comply with 10 C.F.R. § 51.71(b), which requires an EIS to include “an analysis of significant problems and objections raised by . . . any affected Indian tribes and by other interested persons.”¹²⁸ But that provision contains specific requirements for EISs, not requirements for EAs, as was prepared here. An EA by its nature requires less detail and has less strict content requirements than an EIS.¹²⁹ Finally, critical to the *Powertech* Board’s decision was its finding that “the Staff’s efforts to comply with NHPA and NEPA did not contain any tribal ethnographic studies, oral histories or a survey of sites of significance to the intervenor, the Oglala Sioux Tribe.”¹³⁰ Here, the Staff specifically interviewed “local experts in the history and ethnohistory of the area,” including “Oglala Sioux experts during a 2011 field visit to the project area.”¹³¹ This was part of an effort to give “special emphasis . . . to potential Lakota places of significance, especially for the nearby Oglala Sioux Tribe.”¹³² Ultimately, the resolution of a cultural resources contention in a separate proceeding and under significantly different circumstances is of limited relevance here. Because the Staff has demonstrated that it

¹²⁸ LBP-15-16 at 39.

¹²⁹ See, e.g., 10 C.F.R. §§ 51.70 and 51.71 (draft EIS), 10 C.F.R. §§ 51.90 and 51.91 (final EIS), 40 C.F.R. §§ 1502.15 and 1502.16 (all EISs); see also *Friends of Congaree Swamp v. Fed. Highway Admin.*, 786 F. Supp. 2d 1054, 1062 (D.S.C. 2011) (“An EA is, by definition, a less intensive inquiry than an EIS, because it is meant to be a precursor to the preparation of either an EIS or a FONSI. There is no universal formula for what an EA must contain and consider . . .”).

¹³⁰ LBP-15-16 at 40 n.219.

¹³¹ Ex. NRC-076 at A.1.8; see also Ex. NRC-051A at 3; Ex. NRC-051C at 6-8; Ex. NRC-050.

has taken a hard look at the impacts to cultural resources from renewing CBR's license, the Board should resolve Contention 1 in favor of the Staff.

F. Contention 6: The Staff Properly Concluded that Short-Term Impact to Groundwater Quantity From Aquifer Restoration are MODERATE

In admitting Contention 6, the Board made clear that its scope was narrowed to whether “the short-term impacts from consumptive ground water use during aquifer restoration are MODERATE.”¹³³ A MODERATE impact, as defined in NUREG-1748, is “sufficient to alter noticeably, but not to destabilize important attributes of the resource.”¹³⁴ LARGE impacts are “clearly noticeable and are sufficient to destabilize important attributes of the resource.”¹³⁵ At issue, then, is whether the Staff's conclusion that in the short-term restoration activities at CBR will not destabilize the Basal Chadron Sandstone aquifer violates NEPA.

The Intervenors argue that the Staff bases this conclusion on two unsupported premises: (1) that drawdowns from aquifer restoration will be insufficient to desaturate the aquifer and (2) that water levels in the aquifer will eventually recover over time.¹³⁶ As an initial matter, the Staff's determination that water levels will recover with time is relevant to its assessment of long-term impacts, not short-term impacts, and is thus outside the scope of Contention 6. Furthermore, the Staff's analysis of short-term impacts assumes no recharge to the Basal Chadron Sandstone aquifer.¹³⁷ Therefore, the sole issue in dispute is whether the Staff's conclusion that drawdowns from aquifer restoration at CBR will not desaturate the aquifer violates NEPA. The Intervenors argue that it does, because (1) the EA's estimate of the

¹³² Ex. NRC-076 at A.1.8.

¹³³ LBP-15-11 at 61; *see also id.* at 30.

¹³⁴ Ex. NRC-048 at 4-14.

¹³⁵ *Id.*

¹³⁶ Joint Position Statement at 108.

¹³⁷ Ex. NRC-001 at A.9.4; Ex. NRC-076 at A.6.8.

number of pore volumes required to restore the remaining mine units at CBR is low; (2) the EA does not adequately discuss recharge of the Basal Chadron Sandstone aquifer; and (3) the equations used to describe drawdown in the mining area are inappropriate for the conditions in the aquifer.¹³⁸

The Intervenor's first argument fails for two reasons. First, contrary to Intervenor's assertion, the Staff did not engage in an "uncritical acceptance of CBR's estimate of 11 pore volumes" for restoration of the remaining mine units.¹³⁹ As the Staff explains in its testimony, the Staff concluded that CBR may need more than 11 pore volumes to restore remaining mine units. This conclusion was based on CBR's restoration experience with Mine Unit 1 and current information regarding ongoing efforts to restore Mine Units 2 and 3.¹⁴⁰ Specifically, the Staff evaluated CBR's submission of a third party analysis of efficiency improvements that concluded that the application of a model based restoration plan enabled restoration with far fewer pore volumes—between 3.6 and 6.0—than had been required previously.¹⁴¹ Based on its review, the Staff's estimate that restoration of remaining mine units may require at least 11 pore volumes was conservative. Second, as the Staff witnesses explain, the important factor in analyzing short-term consumptive use impacts is not the total number of pore volumes used, but rather the rate of drawdown. Because CBR is limited to restoring no more than five mine units at one time, the rate of drawdown from restoration activities is limited as well.¹⁴² The Staff has described its drawdown analysis in detail in its initial testimony.¹⁴³

¹³⁸ Joint Position Statement at 108-110; Ex. INT-047 at 5-6; Ex. INT-046 at 5.

¹³⁹ Joint Position Statement at 109.

¹⁴⁰ Ex. NRC-076 at A.6.3.

¹⁴¹ *Id.*; Ex. NRC-086 at PDF 16-17.

¹⁴² Ex. NRC-076 at A.6.5.

¹⁴³ Ex. NRC-001 at A.6.7 to A.6.10.

The Intervenor next argue that the EA does not discuss recharge to the Basal Chadron Sandstone aquifer. But to be conservative, the Staff estimated drawdown rates in the aquifer assuming no recharge. Any inclusion of recharge in the analysis would only reduce the estimates of drawdown, further bolstering the Staff's conclusion that restoration activities will result in far too little drawdown to destabilize the water resource.¹⁴⁴

Finally, the Intervenor cite Dr. Kreamer's testimony that "[t]he basic equations used to describe the impacts and drawdown of water tables in piezometric surfaces in the mining area are inappropriate for the indicated heterogeneous, anisotropic conditions" in the aquifer.¹⁴⁵ But Dr. Kreamer does not explain why the aquifer's conditions render the equations inappropriate. As the Staff explains, "at some scale all geologic systems are heterogeneous and anisotropic, and application of these 'basic equations' to these systems is done with an understanding of the assumptions inherent to their use."¹⁴⁶ And in any event, when compared with actual observed drawdowns at CBR, the "basic equations" actually provided a conservative estimate of drawdown in every instance.¹⁴⁷ The Staff has demonstrated that it took a hard look at the short-term water quantity impacts from restoration activities, and the Board should thus resolve Contention 6 in favor of the Staff.

G. Contention 9: The EA's Discussion of Ground Water Restoration Mitigation Measures is Adequate

In admitting Contention 9, the Board limited the issue for litigation to whether "the EA's discussion of ground water restoration mitigation measures is inadequate."¹⁴⁸ While the

¹⁴⁴ Ex. NRC-076 at A.6.8; Ex. NRC-001 at A.9.4.

¹⁴⁵ Ex. INT-046 at 5.

¹⁴⁶ Ex. NRC-076 at A.6.9.

¹⁴⁷ *Id.*

¹⁴⁸ LBP-15-11 at 36.

Intervenors cite multiple regulations and cases specific to EISs,¹⁴⁹ the Board has already noted that “NEPA does not require that Environmental Assessments include a discussion of mitigation strategies.”¹⁵⁰ Rather, when an EA is prepared, mitigation measures need be discussed only where an associated FONSI depends on the effectiveness of those measures.¹⁵¹ Mitigation measures are measures that are actively implemented to avoid, reduce, or redress adverse environmental effects.¹⁵²

Intervenors’ arguments revolve around their claim that restoration efforts at CBR have failed to be effective thus far, and will continue to fail in the future. But in asserting this claim, the Intervenors continue to suggest that restoration to background levels is the only means of achieving “effective” restoration, and that restoration to an alternative concentration limit (ACL), should one be necessary and ultimately granted, is inherently “ineffective.” In fact, the Commission has established in 10 C.F.R. Part 40, Appendix A, Criterion 5B(5) three acceptable restoration standards: (a) the Commission approved background concentration of that constituent in ground water; (b) the respective value 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

¹⁴⁹ Joint Position Statement at 111-13.

¹⁵⁰ LBP-15-11 at 36-37 (quoting *Akiak Native Cmty. v. U.S. Postal Serv.*, 213 F.3d 1140, 1147 (9th Cir. 2000) (emphasis in original).

¹⁵¹ See Final Guidance for Federal Departments and Agencies on the Appropriate Use and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact, 76 Fed. Reg. 3,843, 3,844 (January 21, 2011); see also *Detroit Edison Co.* (Fermi Nuclear Power Plant, Unit 3), LBP-12-23, 76 NRC 445, 467 (2012).

¹⁵² 40 C.F.R § 1508.20, defining “mitigation” as:

- (a) Avoiding the impact altogether by not taking a certain action or parts of an action.
- (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- (e) Compensating for the impact by replacing or providing substitute resources or environments.

listed or; (c) a site-specific ACL established by the Commission. An ACL may only be established for a specific site when the licensee has shown that restoration to background levels is not practicable, when the proposed ACL poses no significant hazard, and when the Commission has determined that the ACL is as low as reasonably achievable.¹⁵³ As the Board has made clear, “[t]o the extent intervenors challenge the use of an ACL, this is an impermissible challenge to an NRC regulation.”¹⁵⁴

The remainder of the intervenors’ arguments that restoration at CBR has not been and will not be effective are fact-specific and appear in the testimony of Mr. Wireman and Dr. Kreamer.¹⁵⁵ In its rebuttal testimony, the Staff witnesses address these points in turn. Contrary to the intervenors’ assertions that effective restoration is unlikely, if not impossible, the Staff explains that restoration at Mine Units 2 and 3 has been effective: according to ground water quality data submitted in 2013, “the average MU2 and MU3 ground water quality was near or below the background ground water quality for the majority of constituents.”¹⁵⁶ The Staff also corrects apparent misunderstandings regarding how background groundwater quality data is established (within each mine unit, not on an averaged basis as Dr. Kreamer asserts),¹⁵⁷ and the purpose and function of the private well monitoring program involving 19 domestic water supply wells outside the license area (radiological monitoring and dose assessment, not excursion detection as Mr. Wireman suggests).¹⁵⁸

¹⁵³ 10 C.F.R. Part 40, Appendix A, Criterion 5B(6).

¹⁵⁴ LBP-15-11 at 40-41 (citing 10 C.F.R. § 2.335(a)).

¹⁵⁵ Joint Position Statement at 115-119; Ex. INT-047 at 6-8; Ex. INT-046 at 3-4).

¹⁵⁶ Ex. NRC-076 at A.9.2; Ex. NRC-086 at PDF 7, 11.

¹⁵⁷ Ex. NRC-076 at A.9.7.

¹⁵⁸ *Id.* at A.9.8.

Ultimately, the Staff has provided sufficient evidence to show that the Intervenor's claims that restoration will not be effective at CBR lack merit. Therefore, the Board should resolve Contention 9 in favor of the Staff.

H. Contention 12: The Staff Properly Determined that NEPA Does Not Require Specific Assessment of Impacts from Tornadoes or Selenium in Water Disposed of By Land Application

In their Joint Position Statement, the Intervenor's refer to passages of LBP-15-11 and state that they incorporate by reference all of the arguments made in their original petition on the Staff's EA.¹⁵⁹ By way of reference to excerpted portions of the Board's Order, the Intervenor's note that the issues admitted for hearing in Contention 12 concern the EA's omission of a discussion relating to tornado impacts and the adequacy of the EA's discussion of impacts relating to selenium in the land application of ISR wastewater.¹⁶⁰ Due to the distinct nature of the two different claims admitted in Contention 12, the Staff addresses each of these claims in turn.

1. Impacts Related to Tornadoes

The Intervenor's offer no testimony or evidence regarding the impacts of tornadoes at Crow Butte facility.¹⁶¹ The sum of their arguments relating to tornado impacts in their petition on the Staff's EA amounts to a single claim that the EA fails to analyze the foreseeable impact of tornadoes on the facility.¹⁶² Neither the CI nor the OST provided alleged facts or expert opinion in support of this argument at the time it was made.¹⁶³ In finding Contention 12 admissible in part, the Board acknowledged that contentions of omission do not require the support of alleged

¹⁵⁹ Joint Position Statement at 120-22 (citing Ex. INT-012 at 94-97).

¹⁶⁰ Joint Position Statement at 120-21.

¹⁶¹ Ex. NRC-076 at A.12.2.

¹⁶² Ex. INT-012 at 96.

¹⁶³ See *id.*; see also "The Oglala Sioux Tribe's Renewed and New Contentions Based on the Final Environmental Assessment (October 2014)" at 108 (Jan. 5, 2015) (OST New Contentions).

facts or expert opinions.¹⁶⁴ This standard applies to contention admissibility, however, not to the evidentiary stage of a proceeding, where a preponderance of the evidence standard applies.¹⁶⁵ Because the Intervenors have not filed any testimony or evidence supporting this aspect of Contention 12, as well as for the reasons set forth in the Staff's Initial Statement of Position and testimony, the Board should dismiss this argument.

2. Impacts Related to Land Application of Treated Process Wastewater

The Intervenors rely on the testimony of Dr. Linsey McLean to support their claims regarding the potential impacts of selenium from land application of ISR wastewater.¹⁶⁶ They also submit as evidence in support of Contention 12 a PowerPoint presentation associated with Dr. McLean's testimony¹⁶⁷ and a letter and report by the U.S. Fish and Wildlife Service (FWS) on the topic of selenium contamination related to ISR mining.¹⁶⁸

With limited exceptions, Dr. McLean's concerns are outside the scope of Contention 12. As admitted by the Board in part, Contention 12 claims that "the EA's discussion of land application of ISL wastewater and selenium contamination" is inadequate.¹⁶⁹ Much of Dr. McLean's testimony relates to other issues, such as the effects of lead, cadmium, arsenic, and uranium toxicity on human health, general historical experience regarding excursions at ISR mines, the experience of ISR facilities regarding restoration of the mined aquifer to baseline groundwater quality, the proliferation of Superfund sites "all over the country and the world,"

¹⁶⁴ LBP-15-11 at 45 (citing *Calvert Cliffs 3 Nuclear Project, LLC, and Unistar Nuclear Operating Services, LLC* (Calvert Cliffs Nuclear Power Plant, Unit 3), LBP-09-4, 69 NRC 170, 190 (2009)).

¹⁶⁵ See *Calvert Cliffs 3*, LBP-09-4, 69 NRC at 190 (facts or expert opinion not required for contention admissibility); *Pacific Gas & Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-763, 19 NRC 571, 577 & n.22 (citing cases), *rev. declined*, CLI-84-14, 20 NRC 285 (1984) (stating that to carry its burden at hearing, the staff or applicant must establish that its position is supported by a preponderance of the evidence).

¹⁶⁶ Joint Position Statement at 122.

¹⁶⁷ Ex. INT-048.

¹⁶⁸ Ex. INT-018; Ex. INT-019.

¹⁶⁹ LBP-15-11 at 45-46.

contamination from leach ponds, and leach pond design.¹⁷⁰ The scope of Contention 12 is limited, however, to whether the Staff adequately assessed the potential environmental impacts of impacts of selenium resulting from land application of ISR wastewater. It does not extend to any of these other issues.¹⁷¹

With respect to the impacts of selenium related to land application of treated process wastewater at the Crow Butte facility, Dr. McLean claims that “[t]he impacts of selenium on humans and wildlife if Crow Butte uses land application of mining wastes are material, adverse and potentially fatal to humans and wildlife exposed to selenium.”¹⁷² As the Staff explains in its testimony, however, none of the information Dr. McLean provides in her testimony directly support the claim that land application of treated process wastewater at the Crow Butte site – an activity subject to strict NRC and NDEQ regulatory requirements – could be potentially *fatal* to humans and wildlife as a result of exposure to selenium in that water.¹⁷³ To the contrary, as the Staff notes in its testimony, any treated process wastewater applied to the land at Crow Butte may only contain levels of selenium equivalent to or lower than the levels of selenium that the EPA allows in drinking water.¹⁷⁴

The Intervenors claim that the Staff violated NEPA by failing to fully include the impacts described by Dr. McLean, but as the Staff explains in its testimony, the concerns raised by Dr. McLean that fall within the scope of Contention 12 as admitted lack the specificity or credibility

¹⁷⁰ See generally Ex. INT-048; see also Ex. NRC-076 at A.12.4.

¹⁷¹ See *Vogtle ESP*, CLI-10-05, 71 NRC at 100-01:

The scope of a contention is limited to issues of law and fact pled with particularity in the intervention petition, including its stated bases, unless the contention is satisfactorily amended in accordance with our rules. . . . Parties and licensing boards must be on notice of the issues being litigated, so that parties and boards may prepare for summary disposition or for hearing. Our procedural rules are designed to ensure focused and fair proceedings.

¹⁷² Ex. INT-048 at 19.

¹⁷³ Ex. NRC-076 at A.12.4.

¹⁷⁴ *Id.* (citing Ex. NRC-063; Ex. NRC-064).

necessary to inform the Staff's review.¹⁷⁵ The Staff concludes that the testimony and exhibits offered by the Intervenors in support of Contention 12 do not provide sufficient information to indicate that the Staff's analysis in the EA is deficient, or to overturn the Staff's conclusion that the potential environmental impacts would be SMALL.¹⁷⁶ In sum, none of the testimony or evidence submitted by the Intervenors indicates that the Staff violated NEPA or other governing law.

I. Contention 14: The Staff Provided Adequate Information About Seismic Activity and Adequately Addressed Impacts of Small Earthquakes on Confinement

In Contention 14, the Intervenors assert that the Staff violated NEPA and several NRC regulations¹⁷⁷ by failing to provide an analysis of impacts from earthquakes, especially as it concerns secondary porosity and adequate confinement. The Intervenors make two specific claims: first, that Section 3.4.3 of the EA fails to identify two earthquakes that occurred in 2001 and were felt in Crawford, Nebraska,¹⁷⁸ and second, that the EA fails to disclose that small earthquakes can result in greater secondary porosity and undermine the adequacy of confinement of the mined aquifer.¹⁷⁹ In its initial testimony, the Staff explained why its discussion of earthquakes in the EA was sufficient for NEPA purposes despite the omission of the two earthquakes cited by the Intervenors. The Staff also discussed in its initial testimony why small earthquakes typical of the region would not result in permanent changes in secondary porosity, and described the evidence indicating that small earthquakes occurring since the CBR facility began operating have not affected confinement of the Basal Chadron Sandstone aquifer.

¹⁷⁵ Ex. NRC-076 at A.12.3 through A.12.4.

¹⁷⁶ *Id.* at A.12.6. The Staff addressed the FWS letter and report in its initial testimony, and therefore has no further testimony to add with respect to those exhibits. *Id.* at A.12.5.

¹⁷⁷ 10 C.F.R. §§ 51.10, 51.70, and 51.71. The Staff notes that 10 C.F.R. §§ 51.70 and 51.71 pertain to EISs, not EAs.

¹⁷⁸ OST New Contentions at 115. Although not an issue raised by the Intervenors, the Board commented in its decision admitting this contention that the EA might be inadequate because it does not consider earthquakes in neighboring states. LBP-15-11 at 59.

¹⁷⁹ OST New Contentions at 115-116.

The Intervenor have provided no arguments in their Joint Position Statement other than repeating the contention as originally stated in their pleading.¹⁸⁰ In his testimony, Dr. Kreamer generally asserts that impacts of earthquakes should be addressed (INT-047 at 2) with no further explanation. Dr. Kreamer's statement does nothing more than repeat the issue raised in the contention. Although contentions of omission do not require the support of alleged facts or expert opinions at the contention admissibility stage, this standard is not applicable at the evidentiary stage of a proceeding.¹⁸¹ The sole support for the Intervenor's claim is Dr. LaGarry general assertion that "even small earthquakes represent flexing and shifting of the earth's crust, and are continuously creating, closing and redistributing the secondary porosity of the region's rocks and changing the flow pathways of the region's groundwater."¹⁸² The Staff addressed that assertion in its testimony, explaining that earthquakes typical of the area would not create permanent changes to secondary porosity in the Basal Chadron Sandstone aquifer and overlying confining layers, and that the Staff is unaware of any evidence that earthquakes in the region since CBR began operations have affected confinement.¹⁸³ Because the Intervenor have not filed any testimony or evidence supporting Contention 14, and for the reasons set forth in the Staff's Initial Statement of Position and testimony, the Intervenor have failed to demonstrate that the Staff violated NEPA and the Board should decide Contention 14 in favor of the Staff.

¹⁸⁰ Joint Position Statement at 123-124.

¹⁸¹ See *Calvert Cliffs 3*, LBP-09-4, 69 NRC at 190 (facts or expert opinion not required for contention admissibility); *Pacific Gas & Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-763, 19 NRC 571, 577 & n.22 (citing cases), rev. declined, CLI-84-14, 20 NRC 285 (1984) (stating that to carry its burden at hearing, the staff or applicant must establish that its position is supported by a preponderance of the evidence).

¹⁸² Ex. INT-013 at 3.

¹⁸³ Ex. NRC-001 at A.14.6 through A.14.11; see also Ex. NRC-076 at A.14.2 (summarizing discussion in initial testimony).

IV. Conclusion

The Board should dismiss each of the Intervenors' admitted contentions and affirm that the Staff's review of the license renewal of the Crow Butte project complied with applicable law.

Respectfully submitted,

/Signed (electronically) by/

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Dated at Rockville, Maryland
This 8th day of June, 2015