

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY & LICENSING BOARD

In the Matter of) Docket No. 40-9091-MLA
)
STRATA ENERGY, INC.,) ASLBP No. 12-915-01-MLA
)
(Ross In Situ Recovery Uranium Project)) September 12, 2014

NATURAL RESOURCES DEFENSE COUNCIL'S & POWDER RIVER BASIN
RESOURCE COUNCIL'S RESPONSE STATEMENT IN SUPPORT OF
ENVIRONMENTAL CONTENTIONS 1, 2 AND 3

INTRODUCTION

In accordance with 10 C.F.R. § 2.1207 and this Board's Orders of July 25, 2014 and August 7, 2014, Intervenors Natural Resources Defense Council and Powder River Basin Resource Council (Joint Intervenors) hereby submit this Response Statement in support of Environmental Contentions 1, 2 and 3 as previously admitted in this proceeding. This statement is supported by the Pre-filed Rebuttal Testimony of Dr. Richard Abitz (Joint Intervenors' Exhibit 51 (hereinafter JTI051)), the Pre-filed Rebuttal Testimony of Dr. Lance Larson (JTI052), and exhibits thereto (JTI001-062).¹

As directed by the Board's July 25, 2014 Order (at 4), this Response Statement responds to the important legal issues identified in Staff and SEI's Opening Statements (Section I); provides the key points made in the testimony of Joint Intervenors' two rebuttal witnesses (Section II); and responds to Staff and SEI's requests for relief (Section III).

¹ As before, Joint Intervenors will also be relying upon select exhibits supplied by NRC Staff and SEI in support of their contentions. Further, Joint Intervenors will file a revised JTI001 and JTI003 with the exhibit labeling on Tuesday, September 16, per the Board's September 10, 2014 Order. Joint Intervenors will also file a revised Exhibit List on Tuesday, September 16, per item no. 6 in the Board's Order.

Before turning to these matters, however, Joint Intervenors will briefly address the Board's September 10, 2014 Order directing Joint Intervenors to correct certain aspects of its August 25, 2014 filing no later than September 16, 2014. Joint Intervenors will fully comply with the Order and apologize for the administrative oversights in demarking exhibits identified by the Board.²

However, Joint Intervenors have a concern with one aspect of the Board's Order, concerning Joint Intervenors' Exhibit 5. In particular, the .pdf submitted as JTI005 refers the Board to two NRC databases and two expert-created applications. Those links containing both underlying NRC spreadsheet data and Story Maps created by Joint Intervenors' expert witness, who used that NRC data and has presented it in a manner designed to assist the Board in understanding that data. The Board has directed that Joint Intervenors file the underlying NRC data and Story Maps as .pdfs, which of course we will do. *See Order of Sept. 9, 2014 at 2.*

To ensure compliance with the Board's directive Joint Intervenors will submit .pdfs of a wide sampling of the NRC data and Storyboard maps. However, as we will explain next week in a short motion, it is not feasible to use .pdfs to show all the possible variations of Dr. Larson's Storymaps. The NRC data is contained in complex spreadsheets that will turn into *hundreds* of pages of .pdfs from the NRC data found on the agency websites listed in JTI005. We will do our utmost to make the spreadsheet data in .pdf form conform to the Board's directions. But in contrast, Dr. Larson's Story Maps are comparable to the potential state of play at any moment on a chess board, where there

² As regards duplicate exhibits in particular, Joint Intervenors made every effort to comply with the Board's instruction (as did SEI and Staff) and removed many such duplicates, but note that compliance was difficult because we did not receive Staff and SEI's final exhibit lists until very late in the process.

are far too many variations to capture all the potential visuals in static .pdf files. Indeed, the Story Maps themselves, as created by Dr. Larson from the NRC's data, are not static and allow his reader to access the NRC's data in the application. By relying on Dr. Larson's expert application in its intended visual form – which contain all the data, and all the variations – then the Board will obtain a complete picture of Dr. Larson's testimony on the comparable ISL sites on which Joint Intervenors are relying.³

Accordingly, Joint Intervenors intend to shortly file a motion for clarification to determine the Board's willingness to accept Dr. Larson's applications into evidence based on a fuller understanding of their relevance and significance, and the obstacles to submitting the complete set of all potential visuals of the Story Maps via .pdf form.

DISCUSSION

I. Joint Intervenors' Response to Legal Issues Identified in SEI and Staff Opening Statements

Applicable Legal Standards

In their opening position statement, Joint Intervenors explained the legal standards applicable to this proceeding. *See* JTI Initial Position Statement at 7-10. SEI and Staff do not dispute that the applicant carries the burden of proof. *See* 10 C.F.R. § 2.325; SEI Initial Position Statement at 17. Additionally, NRC staff have the burden of meeting standards related to NEPA for its FSEIS. Staff Initial Statement of Position at 11.

³ Because the Board's July 25, 2014 Order recognized that parties may put into evidence material that is not from a .pdf, *see* Order at 4, n.7 (discussing audio and visual filed), Joint Intervenors assumed that the applications would be considered here, given the substantial evidentiary foundation supplied in Dr. Larson's pre-filed direct testimony. Indeed, neither Staff nor SEI has raised a concern. Moreover, Joint Intervenors did not seek advance approval for the submission because, unlike audio or visual files, it was possible to provide the Board with this evidence through the .pdf filed as JTI005.

In its Initial Statement of Position, SEI argues that “[a]djudicatory findings on NEPA become part of the environmental record of decision and can supplement the FSEIS.” SEI Initial Position Statement at 18 (citing several Commission rulings). In this case, however, where the license has already been issued, the Board’s findings cannot change the FSEIS, and thus if the Board finds the FSEIS does not comply with NEPA the license must be vacated until the FSEIS is appropriately amended.

An environmental impact statement (or supplement) is a “final agency action,” and “judicial review of [a] final agency action must ‘be based on the full administrative record that was before the (decisionmaker) *at the time he made his decision.*’” *Izaak Walton League of Am. v. Marsh*, 655 F.2d 346, 369 (D.C. Cir. 1981) (emphasis added) (citing *Citizens to Preserve Overton Park, Inc. v. Volpe*, 401 U.S. 402, 420, (1971)). The decision may not, as SEI suggests, be defended based on *new* evidence brought forth only *after* the EIS is complete. *Env'l. Def. Fund, Inc. v. Costle*, 657 F.2d 275, 284 (D.C. Cir. 1981) (“[t]he focal point for judicial review should be the administrative record already in existence, *not some new record completed initially in the reviewing court*”) (emphasis added); *Walter O. Boswell Mem'l Hosp. v. Heckler*, 749 F.2d 788, 792 (D.C. Cir. 1984) (“To review more than the information before the Secretary at the time she made her decision risks our requiring administrators to be prescient or allowing them to take advantage of post hoc rationalizations.”). In short, as the Supreme Court has made clear “an agency’s action must be upheld, if at all, on the basis articulated by *the agency itself*” and “justified by” the record before the agency. *Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 50; 42 (1983) (emphasis added).

These principles have particular application to this specific proceeding, because not only has the Commission already issued its final SEIS, but it has *already issued the license decision for which the SEIS was prepared*. Since the entire purpose of the NEPA process is to *inform* agency decision-making, it would turn the statutory scheme on its head – and turn the NEPA process into a meaningless exercise – to allow the SEIS to be amended based on new information even *after the licensing decision is issued*. See, e.g., *Metcalf v. Daley*, 214 F.3d 1135 (9th Cir. 2000) (vacating NEPA document issued *after* the agency’s underlying decision for which the NEPA document was prepared had been made); see also 40 C.F.R. 1500.1(b) (“NEPA procedures must insure that environmental information is available to public officials and citizens *before* decisions are made and before actions are taken”) (emphasis added).

Thus, for example, if the Board were to determine, after reviewing all the evidence in this case, that, in fact, the Ross Project is likely to cause significant uranium contamination and excursions, resulting in large and irreversible adverse impacts on groundwater quality in and around the Ross site, it must vacate and remand the SEIS and license for reconsideration in light of those findings. Only by providing such relief could the Board satisfy NEPA’s requirements that the *agency* decide whether to permit the Ross Project in light of an accurate picture of the environmental consequences of proceeding. Of course, the agency might decide to approve the project in any event. But only by making that decision in light of that new – and for the first time accurate – picture of environmental consequences could the Commission fulfill NEPAs aims.

On the other hand, if, as SEI asserts, such findings simply “amend” the SEIS, the NEPA process will mean nothing. While the Board will have acknowledged, in an adjudicatory context, that Staff approved the project based on a fundamentally erroneous assessment of anticipated water quality impacts, the agency will never have to *decide* whether it would approve the project based on that knowledge.

Accordingly, and contrary to SEI’s assertion, the Board’s decision does not and cannot “amend” the SEIS, and if the Board determines that the SEIS either failed to consider relevant evidence or reached a conclusion at odds with the evidence, the appropriate remedy is to vacate the FSEIS, ROD and license for additional consideration.

Legal Issues Regarding Contention 1

NRC Staff’s main response to Joint Intervenors’ Contention 1 is a false dichotomy of what information is required for a legally sufficient SEIS as compared to the information that will be collected post-licensing. The Staff allege that “there are generally two different types of groundwater quality information that an ISR applicant/licensee must provide to the NRC – (1) ‘pre-licensing, site-characterization,’ or ‘baseline,’ groundwater quality information; and (2) ‘post-licensing, pre-operational,’ or ‘background,’ groundwater quality information.” NRC Staff Initial Statement of Position at 16. Likewise, SEI alleges that there are three phases of groundwater data collection: pre-operational, operational, and restoration, and that “only general site characterization is necessary pre-license issuance.” SEI Initial Statement of Position at 35.

There is no legal or factual basis for this distinction in the applicable NRC and CEQ rules. These particular phrases cannot be found in the NRC rules governing NEPA

analysis, nor can they be found in the 10 CFR Part 40, Appendix A criteria relating to the operation of uranium mills and disposition of wastes from the extraction or concentration of source material from uranium ore. Therefore this supposed distinction cannot be the basis for limiting the Staff's NEPA obligations in this matter.

In essence, these phrases are fictions of expedience, with the apparent intent of routinely accommodating what Dr. Abitz describes as a technically insufficient investigation of baseline water quality prior to the granting of a license, thereby easing the future definition of what constitutes an adequately protective groundwater cleanup of the mined portion of the aquifer, and any surrounding aquifers that may become contaminated as a result of the leach-mining activity.

There appears to be no dispute among the parties that an adequate description of the "Affected Environment" for the purposes of NEPA analysis requires a description of baseline water quality, so that the environmental impacts of the proposed uranium solution mining activity can be accurately assessed. At issue is the required scope, timing, and accuracy of this required "baseline" investigation. For applicable authority on this question, Criterion 7 (Pt. 40 App. A) is telling: "At least one full year prior to any major site construction [i.e. "pre-licensing], a preoperational monitoring program must be conducted *to provide complete baseline data on a milling site and its environs*" (emphasis added). Intervenors note no distinction is made in Appendix A between "baseline data" collected "at least one full year prior to major site construction," – and further described as "a preoperational monitoring program." In other words, the Staff's distinction between its self-described "pre-licensing" versus "post-licensing, pre-

“operational” stage of “background” groundwater quality assessment does not exist. On the contrary, Intervenors note Criterion 7 unambiguously identifies the phrase “pre-operational” with a “*baseline data*” investigation that occurs “*at least* one full year prior to major site construction,” and further specifies that “throughout the construction and operating phases of the mill, [i.e. “post-licensing”] an *operational* – not ‘pre-operational’ – monitoring program must be conducted to measure or evaluate compliance with applicable standards and regulations...” In other words, Staff’s approval of a “post-licensing” but “pre-operational” program to establish more detailed “background” groundwater quality information, which information effectively revises and replaces the initial pre-licensing “baseline” data set, has no legal foundation under the applicable rules. This view is reinforced by the fact that paragraph 7A of Criterion 7 further defines the *post-licensing* monitoring program as a “*detection* monitoring program,” the “initial purpose” of which is “to *detect leakage of hazardous constituents*” [specified in the license] “so that the need to set groundwater protection standards is monitored.”

Paragraph 7A of Criterion 7 further specifies: “If leakage is detected, the second purpose of the program is to generate data and information needed for the Commission to establish the standards under Criterion 5B.” Once again, Intervenors maintain there is no specific mention in these regulations of Staff engaging in a “post-licensing” but “preoperational” exercise to set so-called “background” values that are distinct from the “baseline” values for hazardous constituents in groundwater established pursuant to the program required under Criterion 7.

Criterion 5B is about establishing standards for *detecting* and *remediating* the *leakage of hazardous constituents* liberated by uranium mining from the host rock at a Commission established “point of compliance” some distance from the source of the contamination. It says nothing about when and how such “background” concentrations of constituents should be established in preparation for their “approval” by the Commission, as the first of three potentially applicable groundwater protection standards – “conceptually, background concentrations pose no incremental hazards...but...may not be achievable at a specific site.” (Pt. 40 App. A, Criterion 5B(6)). In the absence of any competing or conflicting description in the Rules of when and how the Staff may establish “baseline” groundwater quality, Intervenors contend the “complete baseline data” program required under Criterion 7 is controlling.

Joint Intervenors’ reading of the NRC Rules is also consistent with NEPA’s obligations. It is also the case that the necessary scope, timing, and fidelity of this required “baseline” water quality investigation, when used to support a NEPA decision document, is established by NEPA’s general requirement that “environmental information” gathered by agencies “must be of high quality,” “[be] available to public officials and citizens before decisions are made and before actions are taken,” and that “accurate scientific analysis” is “essential to implementing NEPA” (see 40 CFR 1500.1, defining the “Purpose” of NEPA). Almost by definition, “background water quality information” that is gathered *after* the decision has been made to grant a license, and *after* the inception of “major construction” actions, is in violation of these NEPA requirements.

Moreover, contrary to SEI’s claim, SEI Opening Statement at 30-32, and as we

have explained (see Joint Intervenors' Opening Statement at 11), the definition of prohibited pre-license "construction" activities poses no bar to the collection of the required data. To the contrary, collecting baseline water quality information does not constitute such "construction," because the regulation excludes as prohibited "construction" any "[s]ite exploration, including necessary borings to determine foundation conditions or other preconstruction monitoring to establish background information related to the suitability of the site, the environmental impacts of construction or operation, or the protection of environmental values." 10 C.F.R. § 40.4 (emphasis added). Indeed, SEI ignores that the Board has indicated agreement with Joint Intervenors' interpretation of these regulations. LBP 12-3, 75 NRC 164, 193 (Feb. 10, 2012 (SEI and Staff are "incorrect in their . . . assertion that 10 C.F.R. § 40.32(e) prohibit[s] the applicant from gathering complete information on baseline water quality"); *see also* May 24, 2014 Order at 5 (migrating this contention to the FSEIS)).

SEI and Staff also argue that irrespective of these requirements the extent of data collected is sufficient to satisfy the agency's obligations under NEPA. *E.g.* Staff Opening Statement at 11, 15 (arguing an EIS is not a "research document" and that it was sufficient for Staff to review SEI's application documents and responses to requests for additional information, rather than requiring collection of robust water quality data); *id.* at 24-25 (asserting the FSEIS does not need to contain "a *quantitative* analysis involving a comparison of water quality," rather it need only provide a "qualitative and descriptive evaluation" to characterize groundwater at the site) emphasis in original); *id.* at 25

(“[f]urther empirical analysis of the groundwater data would be superfluous to the Staff’s qualitative assessment. . .”).

Once again, this misapprehends NEPA’s substantive requirements, which do not simply permit an agency to rely on whatever data is available. To the contrary, as Joint Intervenors have explained (Opening Statement at 9), NEPA’s implementing regulations expressly require where there is data “essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, *the agency shall include the information in the environmental impact statement.*” 40 C.F.R. § 1502.22(a) (emphasis added). Here, should the Board agree that the ban on “construction” did not prohibit the collection of additional data, it could not be more clear that such additional data could – and should – be collected to inform the agency’s decisions, for all the reasons outlined by Joint Intervenor’s expert witnesses.

Legal Issues Regarding Contention 2

Remarkably, NRC Staff maintain that “potential groundwater impacts from the Ross Project would be SMALL and temporary, notwithstanding the potential future need for an ACL at the site.” NRC Staff Initial Position Statement at 33. NRC Staff acknowledges that “the Staff’s conclusion in the FSEIS regarding potential impacts to groundwater from the Ross Project assumes that a Commission-approved ACL *of any amount* would have only a SMALL impact on groundwater at the site.” *Id.* at 32-33 (emphasis in original). In other words, NRC Staff contend that *no matter what the future ACL is*, impacts will be SMALL.

This conclusion is flawed as a legal matter, since it means that there is no impact threshold that NRC would consider to be LARGE. It is also without basis and is contrary to the data that Dr. Larson discusses in detail in his direct and rebuttal testimonies. While NRC Staff allege that in the FSEIS they carried out a “bounding analysis of potential groundwater quality impacts at restoration based on the historical experience of aquifer restoration at other NRC-regulated ISR sites,” NRC Initial Position Statement at 30, Dr. Larson explains that the information included in the FSEIS did not, in fact, provide an accurate description of groundwater restoration at these other sites and therefore did not provide an accurate assessment of likely groundwater impacts at the Ross Site. Dr. Larson explains that the ACL criteria established by Criterion 5(B) – relied upon the NRC Staff and SEI to allege that any impacts of an ACL will be SMALL⁴ – is inherently flexible and allows for a great variety of restoration values, some many times greater than pre-mining or baseline groundwater quality levels. See JTI052 (Dr. Larson’s Rebuttal Testimony at 3-7, Q&A.4.).

In response to public comments and this proceeding, Staff attempted to carry out some semblance of a “bounding analysis” of the historical environmental consequences of employing ACL’s at a few sites in its FSEIS – but with nothing that would indicate, within this range of outcomes, which are likely to apply to the specific geology and water quality of the Ross Site. And indeed, as Dr. Larson demonstrates in both his pre-filed direct and rebuttal testimony, the paltry examples that are presented are both inaccurate and inadequate to demonstrate ISL uranium recovery’s significant and irreversible environmental impacts. From the well-established “hard look” NEPA perspective,

⁴ See SEI Initial Position Statement at 44-45; NRC Staff Initial Position Statement at 29, 33.

Staff's meager and inaccurate bounding analysis neglects and obscures an appreciation of the environmental benefits and risks of fully informing state- and federal-agency policy and project decisions with the irreversible and plain environmental impacts of this ISL licensing.

As a legal matter, Staff seeks refuge in the limitations inherent in NEPA, which does not require complete certainty, but rather an appropriate “*estimate* of anticipated (not unduly speculative) impacts.” Staff Initial Statement at 31(emphasis in original). However, as detailed in Joint Intervenors’ expert witness’s testimony, Joint Intervenors’ contention does not turn on asserted impacts that are speculative or unlikely to occur. Rather, based on the NRC’s own empirical data from other ISL sites and a rigorous scientific explanation of the deficient manner in which Staff has considered and presented other sites in the FSEIS, Joint Intervenors’ expert witnesses have demonstrated that it is the *Staff’s* FSEIS conclusions about the likely post-restoration values at the Ross site that are entirely too speculative to satisfy NEPA, which requires information “of high quality.” 40 C.F.R. 1500.1(b) (“Accurate scientific analysis [is] essential”); *id.* at 1502.24 (“Agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements”).

Legal Issues Regarding Contention 3

The issue central to Contention 3 is whether the FSEIS accurately assessed impacts to groundwater resources that could result from a lack of aquifer confinement at the Ross Project site. The FSEIS concluded that impacts would be SMALL. The NRC Staff maintains the FSEIS sufficiently analyzes fluid migration risks associated with

unplugged drillholes and argues that the Staff had sufficient information to conduct an informed fluid migration impact assessment. *See* NRC Initial Position Statement at 35-43. SEI alleges that the aquifers are “hydrologically isolated” “regardless of the alleged presence of unplugged exploratory boreholes.” SEI Initial Position Statement at 55.

First, the presence of unplugged exploratory boreholes is not “alleged” as SEI argues. It is *confirmed* by the FSEIS itself which documents that SEI has yet to properly plug and abandon the vast majority of wells at the site. As Drs. Abitz and Larson explain, the presence of these wells create a risk of fluid migration that must be properly assessed by NRC Staff in its NEPA analysis. As Joint Intervenors’ experts explain, this analysis is critical, irrespective of a license condition requiring SEI to plug and abandon wells prior to mining. Merely relying upon mitigation – without evaluation of whether that mitigation *will be effective* – is not sufficient to meet NEPA’s requirements. *See, e.g.* *Southfork Band Council v. Interior*, 588 F.3d 718, 727 (9th Cir. 2009) (“An essential component of a reasonably complete mitigation discussion is an assessment of whether the proposed mitigation measures can be effective”); *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 352 (1989) (“omission of a reasonably complete discussion of possible mitigation measures would undermine the ‘action-forcing’ function of NEPA”).

Moreover, as Joint Intervenors have explained (Opening Statement at 14), it is well-established that an agency may not rely on “conclusory or unsupported suppositions,” *McDonnell Douglas Corp. v. U.S. Dep’t of the Air Force*, 375 F.3d 1182, 1186-87 (D.C. Cir. 2004), and it is insufficient to simply *assert* that an effect will be resolved at some

point in the future. Moreover, courts have frequently rejected agency's use of conclusory labels like "small" and "moderate" to characterize impacts, where the agency does not explain the basis for these labels. *E.g. Greater Yellowstone Coal. v. Kemphorne*, 577 F. Supp. 2d 183, 201 (D.D.C. 2008); *Sierra Club. v. Mainella*, 459 F. Supp. 2d 76, 100-01 (D.D.C. 2006). Finally, as Dr. Larson extensively documents, Staff's understanding and associated presentation of uranium subsurface geochemistry regarding contaminant fate and transport is significantly dated and thus, the FSEIS is lacking in its treatment of the matter. *See* 40 C.F.R. 1500.1(b) ("Accurate scientific analysis [is] essential").

II. Summary of Key Points Made in Joint Intervenors' Rebuttal Testimony.

A. Joint Intervenors' Witnesses

As noted in our initial Statement of Position and today's filing, Intervenors' offer two witnesses in support of Contentions 1, 2 and 3. These witnesses are Drs. Lance Larson and Richard Abitz, both of whom have submitted pre-filed direct testimony supporting the contentions. *See* JTI003 and JTI001, respectively for the first iteration and JTI052 and JTI051 for today's filings. Their professional and educational qualifications are described in their respective *curriculum vitae*'s. JTI002 and JTI004. Today Drs. Abitz and Larson have filed rebuttal testimony, addressing several items in NRC Staff's Initial Testimony (hereinafter "Staff Testimony") and SEI's expert witnesses (hereinafter "SEI/Knode, SEI/Griffin," etc.).

B. Summary of Joint Intervenors' Evidence

The testimony, facts, and evidence provided by Dr. Larson and Dr. Abitz on August 25 and this day, demonstrate that SEI and NRC Staff have demonstrably failed to

comply with NEPA's mandate to take the requisite "hard look" at the environmental impacts of the planned ISL uranium recovery operations in the Lance District.

Specifically, Drs. Abitz and Larson demonstrate that: (1) adequately characterizing baseline groundwater quality is crucial to a sound, meaningful NEPA analysis and, just as important, can be performed in a technically defensible manner that will allow the public and decision-makers to understand the environmental impacts and risks posed by the uranium mining operations, a core purpose of a NEPA document, which is intended to provide necessary information *before* the agency decision is taken; (2) the NRC staff did not adequately assess the impacts stemming from the high likelihood that the Lance District will remain contaminated at the conclusion of the restoration process and the information added to the FSEIS on other sites does not and cannot fulfill Staff's NEPA obligation to disclose the likely outcome – including, at minimum, a bounding analysis of likely results – at this site; and (3) the FSEIS was technically inadequate because it (a) failed to disclose and assess the high risks of fluid migration from unplugged boreholes that fundamentally compromise the assumption of confined (and therefore non-contamination transporting) aquifers, (b) was based on SEI's pump tests that were inadequate to demonstrate aquifer confinement, and (c) did not require the use of excursion parameters likely to detect uranium excursions when they occur.

i. Rebuttal Evidence Supporting Contention 1

Dr. Abitz is the main expert witness for Joint Intervenors in support of their Contention 1, which demonstrates that the FSEIS failed to adequately characterize

baseline (i.e., original or pre-mining) groundwater quality. In his pre-filed direct testimony, on August 25, 2014, Dr. Abitz explained how a technically sound “baseline” can be established and the FSEIS does not meet those standards. In his rebuttal testimony filed today he explains why the assertions offered by Staff’s and SEI’s experts on August 25, 2014 in defense on the FSEIS’s discussion of baseline water quality have no merit.

Dr. Abitz begins his rebuttal testimony by responding to Staff’s witnesses’ testimony claiming that the baseline water quality information included in the FSEIS was sufficient to satisfy NEPA dictates. He explains that the Staff testimony fails to demonstrate the adequacy of the FSEIS in light of the undisputed fact that SEI never collected representative water samples from randomly placed wells, and that, as to the data that was collected, the methods utilized led to artificially high readings for several constituents of concern. JTI051 at 2. He later explains that the mere fact that these methods may reflect “conventional techniques,” as Staff witnesses claim, does not undermine his conclusions, since Staff is well aware that such techniques introduce oxygen into the ore body and bias results. *Id.* at 8.

Dr. Abitz then responds to Staff’s testimony concerning the need to collect samples upgradient of the disturbed area, explaining that, contrary to Staff’s witnesses, he has never claimed that every sample must be taken in this manner. *Id.* at 3-4. Rather, Staff’s witnesses ignore Dr. Abitz’s point that at RCRA and CERCLA sites background values are never calculated without *some* such samples, and that some such sampling is at bare minimum necessary to try to meaningfully characterize background. *Id.* Given the fact that the FSEIS does not even suggest, let alone demonstrate, that any of the sampling

on which the FSEIS relies was taken from upgradient wells, Staff's testimony is not responsive to Dr. Abitz's point.

Next, Dr. Abitz responds to Staff's testimony asserting that at this site it was not necessary to collect samples from upgradient locations because the groundwater upgradient of the ore body contains oxygen, making those areas geochemically distinct from groundwater in the production zone. *Id.* at 5-6. Dr. Abitz explains that there is a gradual change in oxygen as one moves across the oxidation-reduction front of a uranium ore deposit, and thus that the abrupt jump to oxygen rich, on which Staff's assertions are premised, does not exist. *Id.* He further explains that since the aquifer exemption zone surrounds the ore zone, upgradient (and downgradient) water quality information is essential to understand the environmental impacts anticipated from the project. *Id.* at 6.

Dr. Abitz also responds to Staff's witnesses' assertions that CERCLA and RCRA do not govern the siting of monitoring wells for this project, explaining that he has not argued that this is a CERCLA or RCRA site, but rather that those regulations and guidance provide an industry standard for what is necessary to establish a baseline, and the failure to follow those requirements demonstrates the failure of the FSEIS. *Id.* at 6. Similarly, he explains that, while Staff asserts additional data would be superfluous, that position is impossible to reconcile with the undisputed fact that the work necessary to establish baseline water quality has yet to be done. *Id.* at 7. Once again, this issue turns on one of timing, with Staff and SEI claiming as a legal matter that no additional data needed to be – or, more importantly, *could be* – collected pre-license, while Joint Intervenors assert that nothing prevented SEI from collecting the data necessary to make

a statistically valid decision on the water quality levels at a stated level of confidence.

See id.

Dr. Abitz also responds to Staff's witnesses' testimony claiming that the FSEIS approach to groundwater complies with NRC guidance. *Id.* at 7. He explains that guidance does not address the location of wells necessary to obtain representative samples, or either the proper (a) methods for well installation and development or (b) statistical methods to analyze the data. *Id.* In addition, neither Staff's witnesses, nor its brief, demonstrate why compliance with NRC guidance could or should constitute compliance with NEPA.

As regards the SEI sampling that was included in the FSEIS, Dr. Abitz responds to Staff's witnesses' testimony that the FSEIS appropriately excluded samples taken at the time of well development by explaining that, contrary to Staff's premise, the impacts of that development continued well into 2010 and remain today for radium-226, thereby biasing the data on which the FSEIS centrally relies. *Id.* at 8. He further explains that other drill techniques must be utilized to avoid these biased results. *Id.*

Dr. Abitz next addresses Staff's witnesses' claim that the water quality data included in the FSEIS was not biased toward elevated concentrations because they were screened over the entire ore-zone aquifer. He explains that the FSEIS shows that, in fact, the well screens do not pass through the entire sand thickness. *Id.* at 9.

Next, Dr. Abitz explains why Staff is mistaken in asserting that the impacts of Nubeth mining are not reflected in the samples taken. *Id.* at 10. He goes on to explain why this fact is important, because those elevated values are not representative of the

entire Ross site. *Id.* at 11. Once again, he demonstrates that the FSEIS would have reached different results had SEI undertaken a meaningful effort to collect baseline data, rather than relying on data from the six well sets drawing samples from areas adversely impacted by Nubeth mining. *Id.*

Dr. Abitz next addresses Staff's witnesses' failure to confront the implications of what has happened at other sites for the reasonably anticipated impacts in the Lance District. *Id.* at 11-12. For example, he explains that the data from the Kingsville Dome ISL site demonstrates how the drilling methods to be used in the Lance District will degrade the baseline. *Id.* He further explains that Staff's witnesses' assumptions that excursions would have no impact because of the "net inward hydrologic gradient" are unreliable, because Staff is simply *assuming* sediments in the aquifer are homogeneous and isotropic with regard to hydraulic conductivity, which are the only conditions that could support such an assumption, and no such data is included in the FSEIS or otherwise exists. *Id.* at 13.

Finally, Dr. Abitz responds to SEI's witnesses testimony asserting that groundwater quality will correct itself over time, and that there is no basis for concern about contaminating the aquifer through exploratory drilling. *Id.* at 13-16. As Dr. Abitz explains, as to the first assertion, even putting aside the lack of any scientific reference or empirical data to support it, the claim is in fact refuted by the concrete empirical data demonstrating that excursions have occurred at all ISL sites, registered at monitoring wells hundreds of feet away from the production well – which demonstrates uranium can move hundreds of feet in just a few years. *Id.* at 14. As to the second point, Dr. Abitz

again explains that SEI's witness makes conclusory assertions without any empirical support, and further explains that while the assertion may be true when comparing a small number of wells in an enormous aquifer, the witness does not address the inevitable contamination associated with a larger number of wells in a smaller aquifer. *Id.* at 15.

ii. Rebuttal Evidence Supporting Contention 2

Dr. Larson is the main expert witness supporting Joint Intervenors' Contention 2, and on August 25, 2014, he showed that the FSEIS failed to analyze the environmental impacts that will occur if the applicant cannot restore groundwater to primary or secondary limits. He explained that based upon the past history of ISL facilities, it is a virtual certainty that SEI will not be able to restore the impacted aquifers to primary or secondary limits. Even with ACLs approved by NRC, Dr. Larson explained, past ISL projects have resulted in significant impacts to aquifers and to date, no ISL project has successfully restored an aquifer. After reviewing extensive restoration data from other ISL projects, he concluded that the likelihood of similar impacts occurring at the Ross Project have not been adequately assessed in the FSEIS.

In his rebuttal testimony filed today Dr. Larson explains why the assertions offered by Staff's and SEI's experts on August 25, 2014 in defense on the FSEIS's discussion of likely post-restoration water quality have no merit. In particular, he addresses the new explanations offered by Staff that the anecdotal and misinterpreted evidence in the FSEIS on the matter of groundwater restoration constitutes a sufficient "bounding analysis" to comply with NEPA.

Dr. Larson begins his rebuttal testimony by responding to Staff's witness testimony claiming that the impacts of the project to water quality will be "SMALL" *regardless* of whether an Alternative Concentration Limit (ACL) is permitted, because SEI is required to comply with Criterion 5B. Dr. Larson explains that, in light of the extensive data he has reviewed from other ISL sites, an ACL is the reasonably foreseeable outcome in the Ross Project, and, in fact, that ACL is likely to be set at a level that would make the water quality impacts "LARGE" rather than small. Larson Rebuttal Testimony at 2.

Dr. Larson next responds to Staff's witnesses' claim that the data from other ISL sites indicates that if an ACL is requested for the Ross Project it is likely to be no more than 71 times background levels. He explains that the Staff could not have reasonably reached such a conclusions based on the available data from Crow Butte and Smith Ranch. *Id.* at 3-6.

With regard to Crow Butte, Dr. Larson explains neither the FSEIS nor the testimony provides a risk or dose calculation to support the conclusion that uranium at many times background levels would not pose risks to human health and the environment, and thus that it is inaccurate to characterize the impacts as "small." *Id.* at 3-5. For example, he explains that at Crow Butte the Staff itself had initially found that the contamination levels ultimately approved (18 times more than background) were *not* protective of human health and the environment, only to later reverse course without explanation. *Id.* at 3-4. This suggests, he explains, that at the Ross Project it is entirely foreseeable that the Staff will approve an ACL magnitudes higher than background, and

that the “protective of human health and the environment” determination cannot be expected to result in an ultimate contamination level that has only a “small” impact. *Id.* at 5.

With regard to Smith Ranch, Dr. Larson explains that the reference to an approved concentration level 71 times higher than background is misleading and thus not useful, because it represents an *average* of concentration levels found at Smith Ranch. *Id.* at 5. He explains that in order for the Smith Ranch data to be compared to the likely outcome in the Ross Project, the FSEIS would need to account for the much *higher* contamination levels found in *individual* Smith Ranch wells, and explain why it concluded that the average levels at Smith Ranch are likely to be comparable to the average ultimate contamination levels in the Ross Project. *Id.* A meaningful bounding analysis, he explains, would also disclose not just average possible values but the range of concentration values likely to remain in each well, and the FSEIS contains no such analysis. *Id.* As he notes, his review of the Smith Ranch data revealed wells with as much as 383 times background levels, and Staff cannot ignore those likely results in wells in the Ross Project by simply averaging results across wells, for to do so fails to properly disclose environmental impacts. *Id.* at 6. To further demonstrate the kind of bounding analysis necessary, Dr. Larson provides a cumulative histogram of Smith Ranch wellfield A using NRC’s own data, showing contamination levels of 100 times safe drinking water standards for 40% of the post restoration samples. *Id.*

Dr. Larson next responds to Staff’s witnesses claim that Borch *et al.* shows declining uranium concentrations and demonstrates that natural attenuation is occurring.

He explains that Borch *et al.* addresses this issue, disclosing that the results could also be due to precisely the opposite reason, that is, more uranium leaving with groundwater than the influx of uranium. *Id.* at 8. He goes on to explain that the data he has reviewed from Smith Highland and Christensen mine unit 5-2 demonstrates a trend toward *increasing* uranium concentrations. *Id.* at 9.

Next, Dr. Larson responds to Staff's witnesses' arguments that it would not shed further light on the likely outcome in the Ross Project for the Staff to conduct further analysis of the restoration values for Irigary Mine Units 1-9, as the results would not show levels beyond those included in the 'bounding analysis' included in the FSEIS. He explains that looking at actual cumulative distribution for baseline data from Willow Creek and Smith Highland, it is evident that the results are higher than roughly 85% and 75% of observed baseline samples, respectively, and thus, again, that Staff is inappropriately discounting likely environmental impacts by averaging values. *Id.* at 11. He further explains that pre-mining leach activities at Irigary mine unit 1 profoundly impacted the 'average baseline concentrations,' skewing the baseline for units 2-9 to substantially higher values, and that looking at the actual range of values at mine units 2-9 (rather than averages) reveals increases over baseline by as much as 125 times, well beyond the values in the FSEIS's 'bounding analysis.' *Id.* at 11-12. He concludes by explaining that the fundamental problem Staff ignores with regard to the Irigary data is that the 'baseline' values used to determine the extent to which the project caused contamination were artificially elevated, and thus did not provide an accurate picture of

environmental impacts. Similarly, for the Ross project, the FSEIS ignores the impacts of prior Nubeth activities on the baseline values, as well as other potential impacts.

iii. Rebuttal Evidence in Support of Contention 3

Both Dr. Abitz and Dr. Larson will serve as expert witnesses providing testimony in support of Joint Intervenors' Contention 3, which provides that the FSEIS failed to include adequate hydrological information to demonstrate SEI's ability to contain groundwater fluid migration. Their opening testimonies explained that the FSEIS fails to disclose the likely impacts of fluid migration because it inappropriately assumes those impacts will not occur. As they explain, for several reasons – including the large number of unplugged boreholes that will serve as migration pathways, and the fact that SEI will not even be using uranium as an excursion parameter – fluid migration is likely, and thus the FSEIS fails to provide an accurate picture of the likely impacts.

In their rebuttal testimonies, Dr. Larson and Dr. Abitz explain why the assertions offered by Staff's and SEI's experts on August 25, 2014 in defense of the FSEIS's finding that fluid migration is unlikely have no merit. Dr. Abitz first responds to SEI's witnesses claim that the existence of excursions at other sites is irrelevant to likely environmental impacts in the Lance district because excursions merely reflect the detection of fluid migration, and SEI will take appropriate corrective actions when such detections are made. Dr. Abitz explains that the argument is based on the false premise that an excursion will be detected before uranium has migrated beyond the monitoring wells and the aquifer exemption zone. Dr. Abitz Rebuttal Testimony at 16. As he explains, in fact because uranium can move faster than chemicals used as excursion

parameters, it may be too late by the time an excursion is detected as he has showed occurred at the Kingsville Dome Texas site. *Id.* at 16-17.

Dr. Larson begins his rebuttal testimony on contention 3 by responding to Staff's argument that it is appropriate for uranium to not be used as an excursion parameter because other parameters are more likely to reach the monitoring wells more quickly than uranium in light of adsorption and precipitation. He explains that the rate of uranium transport is significantly more site-specific than Staff suggests and that factors at this site, in particular the large number of unplugged exploratory boreholes, suggest that here uranium transport rates are likely to be significantly higher than might be the case under different conditions. Dr. Larson Rebuttal Testimony at 14-16. He goes on to examine data from Christenson Ranch ISL mine unit 5 to show why uranium transport is likely to be much faster in the Lance district than the FSEIS assumes. *Id.* at 17-18. In particular, he explains that the FSEIS's conclusions are premised on uranium adsorption that was not shown to have occurred at that site. *Id.* at 19. He further explains that new models of uranium transport, not considered in the FSEIS, show migration much faster and further than the FSEIS assumes. *Id.* at 20.

Dr. Larson next explains that the FSEIS's other premise for slow uranium transport – precipitation – is also flawed, based on samples from Kingsville Dome in Texas, where elevated uranium concentrations were detected under reducing conditions. *Id.* at 20-21. He concludes that the Staff's claim that uranium transport will be slower than the excursion parameters is not based on the current state of scientific knowledge concerning uranium transport, which shows that, in fact, in the Ross Project the opposite

may well be true, with uranium as a potentially leading contaminant moving through the aquifer rather than a slow, trailing element. *Id.*

Dr. Larson next addresses the question of whether excursions are appropriately remediated even if they are detected. *Id.* at 23-24. He explains that while Staff has relied on well 5MW66 to show successful remediation where an excursion occurs, in fact elevated uranium concentrations were detected even when the three excursion parameters were below detection levels. *Id.* at 23. Finally, Dr. Larson addresses Staff's dismissal of the possibility of fluid migration and associated excursions via the boreholes at the Ross site. He explains that a sizable number of unfilled and unlocated boreholes remain, notwithstanding a license condition that assures us the holes will be filled. He notes the example cited by Dr. Abitz where a Texas regulator issued a "Notice of Violation" that detailed losing track of the boreholes and failing to properly manage them (*see* JTI026; p. 3-8), all in direct violation of express license conditions.

III. Response to Staff and SEI's requests for relief

Staff and SEI urge the Board to dismiss Joint Intervenor's contentions. Staff Opening Statement at 44; SEI Opening Statement at 62. Joint Intervenors urge the Board not to dismiss the contentions, but rather to conclude that the FSEIS is deficient in the manner outlined by Joint Intervenors' witnesses. On that basis, as Joint Intervenors' explained in their Opening Statement (at 59), they urge the Board to declare that NRC staff violated NEPA in approving the FSEIS and subsequent license for SEI's Ross Project; require NRC staff to correct the legal deficiencies in its FSEIS created by the NEPA violations; vacate the Ross License and Enjoin the Ross Project until such

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deficiencies are corrected; and grant any such further relief that the Board may consider to be just and proper.

Respectfully submitted,

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Date: September 12, 2014

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CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing *Natural Resources Defense Council's & Powder River Basin Resource Council's Response Statement in Support of Environmental Contentions 1, 2 and 3* and accompanying attachments in the above-captioned proceeding were served via the Electronic Information Exchange (EIE) on the 12th day of September 2014, which to the best of my knowledge resulted in transmittal of same to those on the EIE Service List for the captioned proceeding.

Geoffrey H. Fettus (electronic signature)

Date: September 12, 2014