

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	
STRATA ENERGY INC.)	Docket No. 40-9091-MLA
)	
(Ross <i>In Situ</i> Uranium Recovery)	ASLBP No. 12-915-01-MLA
Site))	

NRC STAFF'S PROPOSED FINDINGS OF FACT
AND CONCLUSIONS OF LAW

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I. INTRODUCTION

1.1. The Atomic Safety and Licensing Board issues its Initial Decision on Contentions 1, 2, and 3. In these contentions, the Natural Resources Defense Council and the Powder River Basin Resource Council (collectively Joint Intervenors) challenge the Final Supplemental Environmental Impact Statement (FSEIS) the U.S. Nuclear Regulatory Commission (NRC) staff (Staff) prepared for Strata Energy, Inc.'s (Strata's) proposed Ross Project. This initial decision rules on Contentions 1, 2 and 3 in this 10 C.F.R. Part 2, Subpart L proceeding for the Strata Ross In Situ Uranium Recovery site.

1.2. After consideration of all relevant evidence in the record, the Atomic Safety and Licensing Board dismisses Contentions 1, 2, and 3 and affirms that the NRC Staff and Strata have met their burden of demonstrating that the FSEIS complies with the dictates of NEPA and the Commission's regulations at 10 C.F.R. Part 51.

II. BACKGROUND

A. Strata's Proposed Action

2.1. On January 4, 2011, Strata Energy, Inc. (Strata or the Applicant) submitted an application for a combined NRC source and 11e.(2) byproduct material license to be used in connection with the proposed Ross in-situ uranium recovery (ISR) facility in Crook County, Wyoming.¹

2.2. Strata intends to recover uranium and produce yellowcake at the Ross Project site. The proposed Ross Project includes a Central Processing Plant, injection and recovery wells (in wellfields), surface impoundments, deep disposal wells for liquid effluents, monitoring wells throughout the Ross Project area, and other various infrastructure (e.g., additional buildings, pipelines, roads, and lighting). Strata's proposed activities include construction, operation, aquifer restoration, and decommissioning of the Ross Project.²

2.3. Strata's proposed uranium recovery method involves injecting lixiviant into an underground ore zone containing uranium deposits. The lixiviant will consist of groundwater charged with carbon dioxide, sodium carbonate and/or sodium bicarbonate, with a hydrogen peroxide or oxygen oxidant. As lixiviant is pumped through the ore zone, the uranium dissolves into the lixiviant. The uranium-bearing lixiviant is then pumped back to the surface, where the uranium is separated from the lixiviant, processed into yellowcake, and shipped to other facilities to be enriched for use as

¹ Letter from Strata Energy, Inc. Submitting Combined Source and 11e.(2) Byproduct Material License Application Requesting Authorization to Construct and Operate Proposed Ross In Situ Leach Uranium Recovery Project Site (Jan. 4, 2011) (Agencywide Documents Access and Management System (ADAMS) Accession No. ML110120055). The Application's supporting documentation can be found in ADAMS by searching under Docket No. 04009091.

² Ex. NRC009 at 1-2.

reactor fuel. After the uranium is removed, the lixiviant is recharged with oxygen and carbon dioxide and re-injected into the ore zone to repeat the cycle.³

B. Strata's Application

2.4. As part of its application, Strata submitted a Technical Report to show that it meets NRC safety requirements for granting a license.⁴

2.5. The safety requirements applicable to Strata's application are in 10 C.F.R. Part 20 and Part 40. These safety requirements include certain criteria in Appendix A to Part 40, which provides specific standards for operating uranium mills and disposing of waste material. Because an ISR facility like the Ross Project is not a conventional uranium mill, however, Strata need not satisfy all the criteria in Appendix A in order to receive an NRC license.⁵

2.6. After Strata submitted its Technical Report, it supplemented the report with responses to the Staff's requests for additional information (RAIs).⁶

2.7. Along with its license application, Strata also submitted an Environmental Report addressing its proposed facility's impact on the environment.⁷

2.8. The Environmental Report, which is required by NRC regulations in 10 C.F.R. Part 51, helps inform the Staff's independent review of a license application and thereby helps the Staff meet the requirements of the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. §§ 4321 *et seq.*

³ *Id.* at 2.

⁴ Exs. SEI014A through SEI014P.

⁵ See *Hydro Resources, Inc.* (2929 Coors Road Suite 101 Albuquerque, New Mexico 87120), CLI-99-22, 50 NRC 3, 9 (1999) ("We agree that those requirements in Part 40, such as many of the provisions in Appendix A, that, by their own terms, apply only to conventional uranium milling activities, cannot sensibly govern ISL mining.").

⁶ Letter from Ralph Knode, Strata Energy, Inc., to John Saxton, NRC (Apr. 6, 2012) (ADAMS Accession No. ML121020347).

⁷ Exs. SEI016A through SEI016E.

2.9. Since Strata submitted its Environmental Report, it has provided additional information relevant to the Staff's NEPA review, including responses to the Staff's RAIs.⁸

C. The Staff's Safety Review

2.10. After receiving Strata's application for a new ISR license, the Staff conducted a review of Strata's application to determine whether Strata met the relevant criteria in 10 C.F.R. Parts 20 and 40.

2.11. After evaluating Strata's application, as supplemented by its responses to the Staff's RAIs, the Staff found that Strata met the safety criteria for granting a license.

2.12. The Staff documented its safety findings in a Safety Evaluation Report (SER) for the Ross Project. The Staff issued its SER in February 2013.⁹

D. The Staff's NEPA Review

2.13. The Staff also prepared a supplemental environmental impact statement (SEIS) in connection with Strata's application.

2.14. The SEIS supplements NUREG-1910, "Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities."¹⁰ NUREG-1910 assesses the environmental impacts of ISR operations both generally and on a regional basis, with specific sections focusing on the Nebraska-North Dakota-Wyoming Uranium Milling Region and the Wyoming East Uranium Milling Region. These sections describe regional features in the area where Strata's facility would be located.

⁸ Letter from Mal James, Strata Energy, Inc., to John Saxton, NRC (Mar. 30, 2012) (ADAMS Accession No. ML121030406).

⁹ Ex. SEI010.

¹⁰ Exs. NRC007 and NRC008.

2.15. On March 21, 2013, the Staff issued a draft SEIS (DSEIS) for public comment.¹¹ The DSEIS addressed environmental impacts related to the construction of the Ross facility and ISR operations at the site, as well as impacts associated with the methods proposed for restoration of aquifers used during ISR operations and decommissioning of the site.

2.16. On February 28, 2014, the Staff issued the FSEIS for the Ross Project.¹²

2.17. The FSEIS updates the information in the DSEIS and the Staff's analysis of environmental impacts. The FSEIS also adds an Appendix B, which presents public comments on the DSEIS and the Staff's responses to the comments.

E. The Staff's Record of Decision

2.18. On April 24, 2014, the Staff issued its Record of Decision for Strata's Ross Project application.¹³

2.19. Also on April 24, 2014, the Staff issued NRC License SUA-1601 to Strata.¹⁴

2.20. The Record of Decision documents the Staff's decision to issue a materials license to Strata for the Ross Project. The license authorizes Strata to possess uranium source and byproduct materials at the Ross Project facility.¹⁵

III. PROCEDURAL HISTORY

3.1. In their initial hearing request, the Intervenor submitted a total of five contentions raising a variety of environmental challenges to Strata's application.

¹¹ Exs. NRC006A and NRC006B.

¹² Exs. SEI009A and SEI009B. The FSEIS is Supplement 5 to NUREG-1910 (Exs. NRC007 and NRC008).

¹³ Ex. NRC009.

¹⁴ Ex. SEI015.

¹⁵ *Id.* at 1.

3.2. On February 10, 2012, the Board admitted the Joint Intervenors as parties to this proceeding and admitted, as reformulated by the Board, four of the Intervenors' proffered contentions.¹⁶ These contentions challenged the application's characterization of baseline groundwater quality (Environmental Contention 1); its analysis of environmental impacts that will occur if the Applicant cannot restore groundwater to primary or secondary limits (Environmental Contention 2); the adequacy of the hydrological information used to demonstrate the Applicant's ability to contain groundwater fluid migration (Environmental Contention 3); and the adequacy of the application's assessment of cumulative impacts of the proposed action and the planned Lance District expansion projects (Environmental Contention 4/5A).¹⁷

3.3. On May 6, 2013, after the issuance of the Staff's DSEIS, the Intervenors sought to update or amend their admitted contentions to have them apply to the Staff's DSEIS and to add a new environmental contention.¹⁸ Resubmitted Contentions 1 through 4/5A addressed the same issues as the contentions previously admitted in this hearing – baseline groundwater quality, restoration of groundwater quality, fluid migration, and cumulative impacts – while new Contention 5 raised the new claim that the DSEIS improperly segmented the scope of the proposed federal action, which led to a failure to consider the environmental impacts of, and appropriate alternatives to, the Applicant's actual proposed project.¹⁹

¹⁶ *Strata Energy, Inc. (Ross In Situ Recovery Uranium Project)*, LBP-12-3, 75 NRC 164 (2012).

¹⁷ *Id.*

¹⁸ Natural Resources Defense Council's & Powder River Basin Resource Council's Joint Motion to Resubmit Contentions & Admit One New Contention in Response to Staff's Supplemental Draft Environmental Impact Statement (May 6, 2013).

¹⁹ *Id.*

3.4. On July 26, 2013, the Board admitted “resubmitted” Contentions 1 through 3, finding that these contentions challenged information in the DSEIS that was sufficiently similar to information in Strata’s ER.²⁰ In so doing, the Board found that the contentions “migrated” from the ER to the DSEIS.²¹ We declined to migrate admitted Contention 4/5A to the DSEIS, leaving it admitted as against the ER, and rejected the Intervenor’s remaining new contention.²²

3.5. On March 31, 2014, after issuance of the Staff’s FSEIS, the Intervenor filed a motion wherein the Intervenor sought to migrate their admitted contentions to the Staff’s FSEIS or, in the alternative, to amend their admitted contentions to have them apply to the FSEIS.²³ The Intervenor also sought admission of two new environmental contentions.²⁴

3.6. On May 23, 2014, the Board issued an order allowing Contentions 1 and 3 to migrate from the DSEIS to the FSEIS, transforming the contentions into FSEIS-related contentions.²⁵ The Board also admitted Contention 2 as an amended contention challenging the FSEIS.²⁶ We declined to migrate admitted Contention 4/5A to the FSEIS

²⁰ *Strata Energy, Inc.* (Ross In Situ Uranium Recovery Project), LBP-13-10, 78 NRC 117 (2013).

²¹ *Id.* at 136, 139, 141.

²² *Id.* at 143-44.

²³ Natural Resources Defense Council’s & Powder River Basin Resource Council’s Joint Motion to Migrate or Amend Contentions, and to Admit New Contentions in Response to Staff’s Final Supplemental Environmental Impact Statement, at 1 (Mar. 31, 2014).

²⁴ *Id.* at 2.

²⁵ Order (Ruling on Motion to Migrate/Amend Existing Contentions and Admit New Contentions Regarding Final Supplement to Generic Environmental Impact Statement) (May 23, 2014) (unpublished) (ADAMS Accession No. ML14143A184) (May 23, 2014 Order).

²⁶ *Id.* at 2.

or to admit it as an amended contention, thereby leaving it admitted as against the ER. Finally, we rejected both of the Intervenor's proffered new contentions.²⁷

3.7. On June 13, 2014, the Staff and Strata each filed a motion for summary disposition of Contention 4/5A.²⁸

3.8. On the same day, the Joint Intervenor's filed a motion for summary disposition of Contention 1.²⁹

3.9. On July 2, 2014, the Intervenor's filed a response in opposition to the Staff's and Strata's motions for summary disposition of Contention 4/5A.³⁰

3.10. On July 3, 2014, the Staff and Strata each filed a response in opposition to Joint Intervenor's motion for summary disposition of Contention 1.³¹

3.11. On July 25, 2014, the Board granted the Staff's and Strata's respective requests for summary disposition of Contention 4/5A and dismissed the contention from this proceeding.³²

3.12. On August 12, 2014, the Board denied Joint Intervenor's request for summary disposition of Contention 1, finding that material issues of fact relating to that

²⁷ *Id.*

²⁸ See NRC Staff's Motion for Summary Disposition of Contention 4/5A (Jun. 13, 2014); Licensee Strata Energy, Inc.'s Motion for Summary Disposition (Jun. 13, 2014).

²⁹ Natural Resources Defense Council's & Powder River Basin Resource Council's Motion for Summary Disposition on Environmental Contention 1 (Jun. 13, 2014) (Intervenor's Summary Disposition Motion).

³⁰ Natural Resources Defense Council's & Powder River Basin Resource Council's Opposition to Motions for Summary Disposition of Contention 4/5A (July 2, 2014)

³¹ NRC Staff Answer to Natural Resources Defense Council's and Powder River Basin Resource Council's Motion for Summary Disposition on Contention 1 (July 3, 2014); Strata Energy, Inc.'s Response in Opposition to Intervenor's Motion for Summary Disposition (July 3, 2014).

³² Memorandum and Order (Ruling on Summary Disposition Motion Regarding Environmental Contention 4/5A) (July 25, 2014).

contention remain in controversy, and that the Intervenor thus had not shown that they were entitled to judgment as a matter of law.³³

3.13. As a result of our rulings, the scope of the hearing was limited to those issues that have been pled with particularity in Contentions 1, 2 and 3.³⁴ The contentions admitted for hearing are as follows:

Environmental Contention 1: The FSEIS fails to adequately characterize baseline (*i.e.*, original or pre-mining) groundwater quality. The FSEIS fails to comply with 10 C.F.R. §§ 51.90-95; 10 C.F.R. Part 40, Appendix A; and NEPA because it lacks an adequate description of the present baseline (*i.e.*, original or pre-mining) groundwater quality and fails to demonstrate that groundwater samples were collected in a scientifically defensible manner, using proper sampling methodologies. The FSEIS's departure from NRC guidance serves as additional evidence of these regulatory violations. NRC, NUREG-1569, Standard Review Plan for In Situ Leach Uranium Extraction License Applications, §§ 2.7.1, 2.7.3, 2.7.4 (2003).

Environmental Contention 2: The FSEIS fails to analyze the environmental impacts that will occur if the applicant cannot restore groundwater to primary or secondary limits. The FSEIS fails to meet the requirements of 10 C.F.R. §§ 51.90-95 and NEPA because it fails to evaluate the virtual certainty that the applicant will be unable to restore groundwater to primary or secondary limits in that the FSEIS does not

³³ Memorandum and Order (Ruling on Summary Disposition Motion Regarding Environmental Contention 1) (Aug. 12, 2014).

³⁴ See *Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), CLI-10-05, 71 NRC 90, 100-01 (2010):

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.

provide and evaluate information regarding the reasonable range of hazardous constituent concentration values that are likely to be applicable if the applicant is required to implement an Alternative Concentration Limit (ACL) in accordance with 10 C.F.R. Part 40, App. A, Criterion 5B(5)(c).

Environmental Contention 3: The FSEIS fails to assess the likelihood and impacts of fluid migration to the adjacent groundwater, as required by 10 C.F.R. §§ 51.90-95 and NEPA, and as discussed in NUREG-1569 § 2.7, in that

1. The FSEIS fails to analyze sufficiently the potential for and impacts associated with fluid migration associated with unplugged exploratory boreholes, including the adequacy of the applicant's plans to mitigate possible borehole-related migration impacts by monitoring wellfields surrounding the boreholes and/or plugging the boreholes.

2. There was insufficient information for the NRC staff to make an informed fluid migration impact assessment given that the applicant's six monitor-well clusters and the 24-hour pump tests at four of these clusters provided insufficient hydrological information to demonstrate satisfactory groundwater control during planned high-yield industrial well operations.

3.14. On August 25, 2014, the Staff, Strata, and the Joint Intervenors, respectively, filed direct testimony and exhibits.³⁵ The parties also filed Initial Statements of Position.³⁶

3.15. On September 12, 2014, the Staff, Strata, and the Joint Intervenors filed rebuttal testimony, additional supporting exhibits, and Rebuttal Statements of Position.³⁷

³⁵ Exs. SEI001, SEI005, SEI026, SEI039, SEI042, NRC001, JTI001-R, JTI003-R.

³⁶ NRC Staff's Initial Statement of Position (Aug. 25, 2014) (ADAMS Accession No. ML14237A730) (Staff's Initial Statement); Natural Resources Defense Council's & Powder River Basin Resource Council's Statement of Position Supporting Environmental Contentions 1, 2 and 3 (Aug. 25, 2014) (ADAMS Accession No. ML14237A617) (Intervenors' Initial Statement); Strata Energy, Inc.'s Initial Statement of Position (Aug. 25, 2014) (ADAMS Accession No. ML14237A665) (Strata's Initial Statement).

³⁷ Exs. SEI045 through SEI049; NRC044-R2; JTI051-R, JTI052-R; NRC Staff's Rebuttal Statement of Position (Sept. 12, 2014) (ADAMS Accession No. ML14255A506) (Staff's Rebuttal Statement); Strata Energy, Inc.'s Rebuttal Statement of Position (Sept. 12, 2014) (ADAMS Accession No. ML14255A508) (Strata's Rebuttal Statement); Natural Resources Defense

3.16. On September 30 and October 1, 2014, the Board held an evidentiary hearing in Gillette, Wyoming, wherein the parties presented opening arguments and additional testimony on Contentions 1, 2 and 3.³⁸

3.17. The Board admitted into evidence the pre-filed testimony and exhibits of Strata, the Staff, and the Joint Intervenors.³⁹

3.18. On October 16, 2014, the Staff, Strata, and Joint Intervenors filed joint proposed corrections to the transcript for the evidentiary hearing.⁴⁰

3.19. On October 28, 2014, the Board issued an Order adopting the transcript corrections in Appendix A of its Memorandum and Order and closing the evidentiary record for Contentions 1, 2 and 3.⁴¹

IV. LEGAL STANDARDS

A. Legal Standards under NEPA

4.1. Contentions 1, 2, and 3 arise under NEPA and the NRC's regulations implementing that statute.⁴² NEPA requires that an agency prepare an environmental impact statement for any major Federal action that significantly affects the quality of the human environment.⁴³

Council's & Powder River Basin Resource Council's Response Statement In Support of Environmental Contentions 1, 2 and 3 (Sept. 12, 2014) (ADAMS Accession No. ML14255A469) (Intervenors' Rebuttal Statement).

³⁸ Official Transcript of Proceedings for Strata Energy, Inc. Ross In Situ Uranium Recovery Project (Docket No. 40-9091-MLA) (Tr.).

³⁹ *Id.* at 305-06, 374, 378, 408, 534, 518-19, 581-87, 705-06, 671-73, 742, 746-47.

⁴⁰ Joint Proposed Transcript Corrections for Hearing of September 30, 2014 through October 1, 2014 (Oct. 16, 2014) (ADAMS Accession No. ML14289A406).

⁴¹ Memorandum and Order (Adopting Transcript Corrections and Closing Evidentiary Record) (Oct. 28, 2014).

⁴² See 42 U.S.C. § 4321 (2006); 10 C.F.R. Part 51.

⁴³ 42 U.S.C. § 4332(2)(C).

4.2. Under NEPA, the NRC is required to take a “hard look” at the environmental impacts of a proposed action, as well as reasonable alternatives to that action.⁴⁴ This “hard look” is tempered by a “rule of reason” that requires agencies to address only impacts that are reasonably foreseeable.⁴⁵ Under NEPA’s rule of reason, the Staff need not address every environmental effect that could potentially result from the proposed action.⁴⁶ Rather, the Staff need only provide “[a] reasonably thorough discussion of the significant aspects of the probable environmental consequences[.]”⁴⁷

4.3. Furthermore, “NEPA gives agencies broad discretion to keep their inquiries within appropriate and manageable boundaries.”⁴⁸ To this end, “NEPA does not call for certainty or precision, but an *estimate* of anticipated (not unduly speculative) impacts.”⁴⁹ The proper inquiry is not whether an effect is “theoretically possible,” but whether it is “reasonably probable that the situation will obtain.”⁵⁰ The Staff “need not address every impact that could possibly result, but rather only those that are reasonably foreseeable or have some likelihood of occurring.”⁵¹

⁴⁴ See *Louisiana Energy Servs., L.P.* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 87-88 (1998).

⁴⁵ See, e.g., *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-156, 6 AEC 831, 836 (1973).

⁴⁶ *Ground Zero Ctr. for Non-Violent Action v. U.S. Dept. of the Navy*, 383 F.3d 1082, 1089-90 (9th Cir. 2004) (citing *NoGWEN Alliance of Lane County, Inc. v. Aldridge*, 855 F.2d 1380, 1385 (9th Cir. 1988)).

⁴⁷ *Trout Unlimited v. Morton*, 509 F.2d 1276, 1283 (9th Cir. 1974); *Warm Springs Dam Task Force v. Gribble*, 621 F.2d 1017, 1026–27 (9th Cir. 1980).

⁴⁸ *Louisiana Energy Services*, CLI-98-3, 47 NRC at 103.

⁴⁹ *Louisiana Energy Servs., L.P.* (National Enrichment Facility), CLI-05-20, 62 NRC 523, 536 (2005).

⁵⁰ *Northern States Power Co.* (Prairie Island Nuclear Generating Plant, Units 1 and 2), ALAB-455, 7 NRC 41, 49 (1978).

⁵¹ *Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), LBP-09-07, 69 NRC 613, 631 (2009).

4.4. Finally, “[a]n environmental impact statement is not intended to be ‘a research document.’”⁵² NEPA does not require the Staff to analyze “every conceivable aspect” of a proposed project.⁵³ “There is no NEPA requirement to use the best scientific methodology, and NEPA should be construed in the light of reason if it is not to demand virtually infinite study and resources.”⁵⁴ Although the Staff can always gather more data in a particular area, it “must have some discretion to draw the line and move forward with decisionmaking.”⁵⁵

B. Legal Standards Governing Staff’s Environmental Review of Groundwater Information

4.5. Every applicant for a license to possess and use source material in conjunction with uranium or thorium milling, or byproduct material at sites formerly associated with such milling, must submit an environmental report that complies with the requirements of 10 C.F.R. § 51.45. 10 C.F.R. § 51.45(b) requires an applicant to submit site-characterization groundwater quality information to inform the Staff’s review of the environmental effects of the proposed action, the environmental impacts of alternatives to the proposed action, and alternatives available for reducing or avoiding adverse environmental effects. 10 C.F.R. § 51.45(c) states that an applicant’s environmental report should contain sufficient data to aid the Commission in its development of an independent analysis.⁵⁶

⁵² *Entergy Nuclear Generation Co.* (Pilgrim Nuclear Power Station), CLI-10-22, 72 NRC 202, 208 (2010) (citing *Town of Winthrop v. FAA*, 533 F.3d 1, 13 (1st Cir. 2008)).

⁵³ *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-02-25, 56 NRC 340 (2002).

⁵⁴ *Entergy Nuclear Generation Co.* (Pilgrim Nuclear Power Station), CLI-10-11, 71 NRC 287, 315 (2010) (citing *Hells Canyon Alliance v. United States Forest Serv.*, 227 F.3d 1170, 1185 (9th Cir. 2000); *Natural Resources Defense Council v. Hodel*, 865 F.2d 288, 294 (D.C. Cir. 1988)) (internal quotation omitted).

⁵⁵ *Id.* at 315.

⁵⁶ 10 C.F.R. § 51.45(c).

V. RULINGS ON LEGAL ISSUES

A. Burden of Proof

5.1. Generally, an applicant has the burden of proof in a licensing proceeding.⁵⁷ In cases involving NEPA contentions, however, the burden is on the Staff, because the Staff, not the Applicant, has the statutory obligation of complying with NEPA.⁵⁸ According to the Commission, “NRC hearings on NEPA issues focus entirely on the adequacy of the Staff’s work.”⁵⁹ Contentions 1, 2 and 3 challenge the FSEIS prepared by the Staff and questions whether the NRC Staff has satisfied its responsibilities under NEPA. Thus, the Staff bears the burden of proof.⁶⁰

5.2. However, because “the Staff, as a practical matter, relies heavily upon the Applicant’s ER in preparing the EIS, should the Applicant become a proponent of a particular challenged position set forth in the EIS, the Applicant, as such a proponent, also has the burden on that matter.”⁶¹

5.3. In challenging the Staff’s FSEIS, Joint Intervenors must identify, with some specificity, the alleged deficiencies in the Staff’s NEPA analysis.⁶² In NRC

⁵⁷ 10 C.F.R. § 2.325.

⁵⁸ See, e.g., *Duke Power Co. (Catawba Nuclear Station, Units 1 & 2)*, CLI-83-19, 17 NRC 1041, 1049 (1983).

⁵⁹ *Southern Nuclear Operating Co. (Early Site Permit for Vogtle ESP Site)*, CLI-07-17, 65 NRC 392, 395 (2007); see also *Progress Energy Florida, Inc. (Levy County Nuclear Power Plant, Units 1 and 2)*, CLI-10-2, 71 NRC 27, 34 (2010) (stating that “the ultimate burden with respect to NEPA lies with the NRC Staff”).

⁶⁰ See, e.g., *Levy County*, CLI-10-2, 71 NRC at 34.

⁶¹ *Louisiana Energy Servs., L.P. (Claiborne Enrichment Center)*, LBP-96-25, 44 NRC 331, 339 (1996), *rev’d on other grounds, Louisiana Energy Servs., L.P. (Claiborne Enrichment Center)* CLI-97-15, 46 NRC 294 (1997) (citing *Pub. Serv. Co. of New Hampshire (Seabrook Station, Units 1 and 2)*, ALAB-471, 7 NRC 477, 489 n.8 (1978)).

⁶² See *Hydro Resources, Inc.*, CLI-99-22, 50 NRC at 13.

adjudications, it is the Intervenor's burden to show the significance and materiality of mistakes in the EIS.⁶³

5.4. The Staff's NEPA analysis is deemed adequate unless NRC Staff "has failed to take a 'hard look' at significant environmental questions – i.e., Staff has unduly ignored or minimized pertinent environmental effects."⁶⁴ "Boards do not sit to 'flyspeck' environmental documents or to add details or nuances If the ER (or EIS) on its face comes to grips with all important considerations, nothing more need be done."⁶⁵

5.5. Finally, the standard of proof in this proceeding is preponderance of the evidence.⁶⁶ Because NEPA does not require certainty or precision or the use of the best methodology, the Staff need not prove, and this Board need not find, that its results are the most accurate or were performed with the best methodology.⁶⁷

B. Scope of the Contested Proceeding

5.6. NRC hearings are limited to the scope of the admitted contentions, and if intervenors proffer testimony or evidence outside the scope of the admitted contentions, it should not be considered.⁶⁸

⁶³ See *Exelon Generation Co.* (Early Site Permit for Clinton ESP Site), CLI-05-29, 62 NRC 801, 811 (2005) (*Clinton ESP*).

⁶⁴ *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 & 2; Catawba Nuclear Station, Units 1 & 2), CLI-03-17, 58 NRC 419, 431 (2003).

⁶⁵ *Clinton ESP*, CLI-05-29, 62 NRC at 811 (quoting *System Energy Resources, Inc.* (Early Site Permit for Grand Gulf Site), CLI-05-4, 61 NRC 10, 13 (2005)).

⁶⁶ See *Pacific Gas and Electric Co.* (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), CLI-08-26, 68 NRC 509, 521 (2008) (applying a preponderance of the evidence standard to resolution of an environmental contention).

⁶⁷ See *Louisiana Energy Services*, CLI-05-20, 62 NRC at 536 (stating that NEPA does not require certainty or precision); *Pilgrim*, CLI-10-11, 71 NRC at 315 (stating that NEPA does not require use of the best methodology).

⁶⁸ See *Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), CLI-10-5, 71 NRC 90, 100-01 (2010) (agreeing with the Staff that the licensing board properly excluded the intervenors' testimony and exhibits that were outside the scope of the admitted contention).

5.7. The scope of an admitted contention is limited to the 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 NRC's rules.⁶⁹ The Board may not consider matters not in the evidentiary record.⁷⁰

C. Post-Licensing Establishment of Background Water Quality Values

5.8. The parties disagree over whether Strata was required to provide in its license application, and the Staff to analyze in its FSEIS, the "Commission approved background concentration" of hazardous constituents in the groundwater at the site, as required under 10 C.F.R. Part 40, Appendix A, Criterion 5B(5). The Joint Intervenors argue that complete information on the background levels of hazardous constituents in the groundwater must be collected prior to issuance of a license, and that the Staff's FSEIS is consequently deficient for failing to analyze such information.⁷¹ The Staff and Strata, on the other hand, argue that the precise Commission-approved background values need only be established prior to commencement of licensed operations, and that the establishment of these values prior to issuance of a license is in fact precluded by the Commission's Construction Rule, 10 C.F.R. § 40.32(e).⁷²

5.9. Pursuant to 10 C.F.R. § 40.31(h), every applicant for an ISR license is required to include in a license application proposed specifications relating to milling operations and the disposition of tailings or wastes resulting from such milling

⁶⁹ *Vogle ESP*, CLI-10-5, 71 NRC at 100.

⁷⁰ See *Pacific Gas & Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 & 2), ALAB-580, 11 NRC 227, 230 (1980) (stating that "it is a statutory requirement that the adjudicatory decisions of this Commission stand or fall on the basis of the record on which they rest").

⁷¹ The Intervenors also acknowledge that these concerns are levied at the NRC's licensing process generally, rather than the Staff's review of the Strata Ross application in particular. Tr. at 433-34.

⁷² Staff's Initial Statement at 15-21; Strata's Initial Statement at 29-41.

activities.⁷³ Appendix A to 10 C.F.R. Part 40 sets forth, among other things, the technical criteria for applicants and licensees relating to the siting, operation, decontamination, decommissioning, and reclamation of mills and tailings or waste systems and sites at which such mills and systems are located.⁷⁴ Although the Appendix A criteria were developed for conventional uranium milling facilities, they have since been applied in limited fashion to ISR facilities.⁷⁵

5.10. Appendix A requires applicants and licensees to provide two types of water quality information to the Commission: (1) complete baseline water quality information that describes the existing groundwater conditions at an ISR site, collected at least one year prior to the commencement of any major site construction (Criterion 7); and (2) water quality information collected prior to the commencement of operations that is used to set the “Commission approved background concentration” of constituents in the groundwater, and which is used only to detect lixiviant excursions and to establish standards for aquifer restoration after uranium recovery is complete (Criterion 5B(5)).

5.11. Criterion 7 of 10 C.F.R. Part 40, Appendix A, requires the licensee to establish two groundwater monitoring programs, the first of which consists of a preoperational monitoring program that is used to provide “complete baseline data” on the milling site and its environs. Criterion 7 states, “At least one full year prior to any major site construction, a preoperational monitoring program must be conducted to provide complete baseline data on a milling site and its environs.”

⁷³ 10 C.F.R. Part 40, Appendix A, *Introduction*.

⁷⁴ *Id.*

⁷⁵ See *Hydro Resources, Inc.*, CLI-99-22, 50 NRC at 8-9 (“While, as a general matter, Part 40 applies to ISL mining, some of the specific requirements in Part 40, such as many of those found in Appendix A, address hazards posed only by conventional uranium milling operations, and do not carry over to ISL mining”) (internal reference omitted).

5.12. Criterion 5B(5), by contrast, requires that at the point of compliance⁷⁶ the concentration of a hazardous constituent must not exceed: (a) the Commission approved background concentration of that constituent in the groundwater; (b) the respective value given in the table in paragraph 5C of Appendix A if the constituent is listed in the table and if the background level of the constituent is below the value listed; or (c) an alternate concentration limit established by the Commission.

1. Regulatory Construction of 10 C.F.R. Part 40, Appendix A

5.13. Joint Intervenors claim that in the absence of alternative regulatory authority, the requirement to collect “complete baseline data” at the site “[a]t least one full year prior to any major site construction” governs the timeframe for the collection of the Commission-approved background concentrations referenced in Criterion 5B(5).⁷⁷ In support of their argument, they point to Criterion 7A of Appendix A, which requires the licensee to establish a detection monitoring program to detect leakage of hazardous constituents from the site disposal area and to enable the Commission to set site-specific groundwater protection standards under Criterion 5B(1).⁷⁸ The Intervenors emphasize that this program is an *operational*, rather than *pre-operational*, program, and that therefore there is no authority in the regulations that supports the post-licensing, pre-operational establishment of a program to collect the Commission-approved background values.⁷⁹

5.14. We are not persuaded by Joint Intervenors’ argument. Criterion 7A, and Criterion 5B(1) to which it refers, both contemplate that the program enabling the

⁷⁶ The “point of compliance” is the site-specific location in the uppermost aquifer where the groundwater protection standard must be met. 10 C.F.R. Part 40, Appendix A, *Introduction*.

⁷⁷ Intervenors’ Rebuttal Statement at 6-10.

⁷⁸ 10 C.F.R. Part 40, Appendix A, Criterion 7A.

⁷⁹ Intervenors’ Rebuttal Statement at 8.

Commission to set the background values for hazardous constituents will be established by license conditions.⁸⁰ Criterion 5B(1) directly connects the license condition-based program required by Criterion 7A to the establishment of the Criterion 5B(5) values: “Specified concentration limits are those limits established by the Commission as indicated in paragraph 5B(5) of this criterion.”⁸¹

5.15. While the regulations may not contain such specificity as to timing as the Intervenor may like, they do indicate that the process for developing the Commission-approved background concentrations must be set through one or more conditions in an issued license. And unless the terms of the license condition conflict with the provisions of governing law or regulation, the Staff may determine, as they have here, that the information required to support the Commission’s establishment of hazardous constituent concentration limits must be provided prior to the commencement of ISR operations.⁸² Therefore, we do not find that the Intervenor’s interpretation of Criteria 7 and 7A is supported by the regulatory scheme of Part 40, Appendix A.

2. Operation of 10 C.F.R. 40.32(e)

5.16. The Intervenor also argue that 10 C.F.R. § 40.32(e), the Construction Rule governing *in situ* uranium recovery facilities, does not preclude installation of the Criterion 5B(5) background wells, and contend that the essential legal question presented by Contention 1 is one of interpretation of 10 C.F.R. Part 40’s definition of

⁸⁰ See 10 C.F.R. Part 40, Appendix A, Criterion 7A (“The licensee shall establish a detection monitoring program needed for the Commission to set the site-specific ground-water protection standards in paragraph 5B(1) of this appendix. . . . For licenses in effect September 30, 1983, the detection monitoring programs must have been in place by October 1, 1984.”); see also 10 C.F.R. Part 40, Appendix A, Criterion 5B(1) (“The Commission shall identify hazardous constituents, establish concentration limits, set the compliance period, and may adjust the point of compliance if needed to accord with developed data and site information as to the flow of ground water or contaminants, when the detection monitoring established under Criterion 7A indicates leakage of hazardous constituents from the disposal area.”).

⁸¹ 10 C.F.R. Part 40, Appendix A, Criterion 5B(1).

⁸² Ex. SEI015.

“construction.”⁸³ Section 40.32(e) declares that the commencement of construction prior to the Staff’s determination that a license should be issued is grounds for denial of such license.⁸⁴ As defined in 10 C.F.R. § 40.4, “construction” includes “the installation of wells associated with radiological operations (e.g., production, injection, or monitor well networks associated with in-situ recovery or other facilities).”⁸⁵

5.17. Joint Intervenors state that the collection of baseline water quality information does not constitute “construction” as defined in 10 C.F.R. § 40.4 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.”⁸⁶ They also note that this Board has, in previous rulings, upheld this interpretation of the regulation.⁸⁷ The Intervenors’ argument, however, fails to acknowledge the distinction in the regulations between baseline water quality information necessary to characterize the ISR site and baseline water quality information necessary to establish excursion monitoring and restoration values.

5.18. The pre-licensing, site-characterization “baseline” water quality information gathered by an applicant is used to describe existing groundwater conditions at an ISR site. It is used to characterize the resource that could be impacted by the

⁸³ Intervenors’ Initial Statement at 11.

⁸⁴ 10 C.F.R. § 40.32(e).

⁸⁵ 10 C.F.R. § 40.4.

⁸⁶ Intervenors’ Rebuttal Statement at 10 (quoting 10 C.F.R. § 40.4).

⁸⁷ Intervenors’ Rebuttal Statement at 10 (citing *Strata Energy, Inc.*, LBP-12-3, 75 NRC 164, 193 (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”); May 24, 2014 Order at 5 (migrating this contention to the FSEIS)).

proposed project.⁸⁸ This information must be submitted to the NRC under 10 C.F.R. § 51.45(b), which requires that the applicant submit an Environmental Report that describes the affected environment. This information must also be submitted under Criterion 7 in Appendix A of 10 C.F.R. Part 40, which states that an ISR applicant or licensee must provide complete baseline data on a milling site and its environs. The parties agree that, under Part 51, baseline site-characterization groundwater information must be collected and analyzed in the FSEIS prior to issuance of a license. As the Staff explains, this information is described Section 3.5.3.3 of the FSEIS, and data supporting the Staff's discussion is provided in Appendix C to the FSEIS.⁸⁹

5.19. By contrast, post-licensing, preoperational background water quality information is gathered to establish the water quality standards in designated regulatory compliance monitoring wells used to detect lixiviant excursions and to establish standards for aquifer restoration after uranium recovery is complete.⁹⁰ These monitoring wells are used by a licensee to generate background data before operations in a wellfield begin, as required under Criterion 5B(5), from the same wells that will be used to measure restoration success.⁹¹ Many of these wells are then used for production as injection and recovery wells.⁹² The information gathered from these wells is not used to characterize the ISR environment generally, but rather to establish specific standards for excursion monitoring and for aquifer restoration once activities in the wellfield have

⁸⁸ Tr. at 463-64, 465-66.

⁸⁹ Ex. NRC001 at A.1.4.

⁹⁰ *Id.*; see also Tr. at 381-82 (“The reason why we use that as the Commission-approved background is because . . . we want the same wells before operations to be the same wells that are measured [sic] restoration success.”)

⁹¹ *Id.*; Tr. at 382.

⁹² Tr. at 312-13.

ceased.⁹³ Condition No. 11.3 of Strata's license requires it to establish these background concentrations from the monitoring well network that will be used for excursion and restoration monitoring.⁹⁴

5.20. In *Hydro Resources, Inc.*, the Commission affirmed the use of license conditions to require a licensee to submit additional information on water quality *after* it has received a license.⁹⁵ The Commission explained that the site-specific data needed to confirm proper baseline water quality values cannot be collected until after an *in situ* leach wellfield has been installed.⁹⁶

5.21. As we found in our previous rulings, we continue to find that 10 C.F.R. § 40.32(e) does not prohibit an applicant from gathering complete information on baseline water quality.⁹⁷ This finding is appropriately limited, however, to the activities required to develop the baseline water quality information that must be provided as part of a license application pursuant to 10 C.F.R. § 51.45(b). We did not address in our previous rulings the matter of whether this exemption from the definition of construction applies to the collection of information required specifically to establish the Criterion 5B(5) concentrations. We do so now.

5.22. Appendix A of Part 40 differentiates between baseline groundwater information for site characterization purposes and groundwater information for the purposes of operational monitoring and restoration. To achieve the Commission-approved background concentrations of hazardous constituents used for monitoring and

⁹³ Ex. NRC012 at 5-6; Tr. at 325-26, 333-35.

⁹⁴ See Ex. NRC012 at ¶ 9.

⁹⁵ *Hydro Resources, Inc.* (P.O. Box 777, Crownpoint, New Mexico 87313), CLI-06-1, 63 NRC 1, 5-6 (2006) (footnotes omitted).

⁹⁶ *Id.*; see also Tr. at 312-13.

⁹⁷ See *Strata Energy, Inc.*, LBP-12-3, 75 NRC at 193; May 24, 2014 Order at 5 (migrating this contention to the FSEIS).

restoration purposes, the licensee must know the extent of the wellfield from which uranium is to be recovered and have installed the monitoring well network from which the samples will be collected.⁹⁸ As 10 C.F.R. § 40.32(e) prohibits the commencement of construction prior to issuance of a license, and as 10 C.F.R. § 40.4 includes monitoring well networks in the definition of “construction,” we find that there is a clear basis in the law to conclude that 10 C.F.R. § 40.32(e) operates to prohibit the development of the information required to establish the Criterion 5B(5) Commission-approved background constituent concentrations.

D. Expert Witness Qualifications

5.23. An expert opinion is only admissible if the witness is competent to give an expert opinion and adequately states and explains the factual basis for the expert opinion.⁹⁹ An admissible expert opinion must be “based upon sufficient facts or data to be the product of reliable principles and methods that the witness applied to the facts of the case.”¹⁰⁰

5.24. In addition, a party bears the burden of demonstrating that its witness is qualified to serve as an expert.¹⁰¹ “A witness may qualify as an expert by knowledge, skill, experience, training, or education to testify [i]f scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue.”¹⁰²

⁹⁸ See *Hydro Resources, Inc.*, CLI-06-1, 63 NRC at 5-6; see also Tr. at 313.

⁹⁹ *Duke Cogema Stone & Webster* (Savannah River Mixed Oxide Fuel Fabrication Facility), LBP-05-04, 61 NRC 71, 81 (2005).

¹⁰⁰ *Id.* at 80.

¹⁰¹ *Duke Energy Corp.* (Catawba Nuclear Station, Units 1 and 2), CLI-04-21, 60 NRC 21, 27 (2004).

¹⁰² *Id.* at 27-28.

5.25. In this proceeding, the qualifications of the expert witnesses have not been challenged. The Board finds that NRC Staff, Applicants and Joint Intervenors have demonstrated that each of their witnesses is qualified to serve as an expert.¹⁰³

VI. FINDINGS OF FACT

6.1. The Board finds that the Staff prepared the Ross Project FSEIS consistent with the requirements of NEPA. For the reasons stated below, the Board dismisses each of the Intervenors' admitted contentions.

A. Contention 1

6.2. In Contention 1, Joint Intervenors challenge the adequacy of FSEIS's analysis of the baseline groundwater quality in the Ross Project area. We have previously addressed and resolved the Intervenors' argument that Strata is required to establish, and the FSEIS is required to assess, the Commission-approved background concentration values in the groundwater at this time.¹⁰⁴ Therefore, we assess each of the Intervenors' remaining claims to the extent that they do not call for the provision of information that is precluded by 10 C.F.R. § 40.32(e).

1. Adequacy of Baseline Groundwater Quality Information

6.3. Joint Intervenors assert that it is essential to have a precise knowledge of baseline water quality for two purposes – remediation efforts aimed at restoring a contaminated aquifer, and to understand the environmental impacts at a site such as an ISR.¹⁰⁵ Thus, according to the Intervenors, by relying on only six well clusters and “some other existing data in the FSEIS,” rather than undertaking a scientifically and

¹⁰³ *Id.*

¹⁰⁴ *See supra* at 5.22.

¹⁰⁵ Ex. JTI001-R at A.13.

statistically valid baseline water quality effort, the NRC has failed to disclose or consider in the FSEIS the actual baseline water quality at the Ross Project site.¹⁰⁶

6.4. The Intervenors rely on a U.S. Environmental Protection Agency (EPA) guidance document (EPA Unified Guidance) that was prepared “to assist EPA’s Regions, the States and the regulated community in testing and evaluating groundwater monitoring data under 40 C.F.R. Parts 264 and 265 and 40 C.F.R. Part 258.”¹⁰⁷ We note, however, that these are regulations implementing the Resource Conservation and Recovery Act (RCRA), which governs hazardous waste treatment, storage, and disposal facilities and municipal solid waste landfills.¹⁰⁸ These RCRA regulations, and the EPA guidance supporting them, are not directly applicable to the Staff’s NEPA-mandated review of the Ross Project in the FSEIS.

6.5. To support their assertion that a “precise” knowledge of baseline water quality is required to understand the environmental impacts of the Ross Project, they refer to a provision in the EPA Unified Guidance that states: “High quality background data is the single most important key to a successful statistical groundwater monitoring program, especially for detection monitoring.”¹⁰⁹ We do not find that this statement supports the proposition for which it is cited. This provision is directed at the need for background water quality data for groundwater monitoring and detection, not for environmental site characterization for NEPA purposes. The data required for monitoring programs must be supplied by Strata when it submits its wellfield package in

¹⁰⁶ Ex. JTI001-R at A.18.

¹⁰⁷ Ex. JTI006; *see* Tr. at 435-36.

¹⁰⁸ Ex. NRC044-R2 at A.1.2.

¹⁰⁹ Ex. JTI001-R at A.13 (quoting Ex. JTI006 at 5-1).

accordance with the license application approved by the NRC in its safety evaluation report (SER) and Conditions 10.13 and 11.3 of Strata's license.¹¹⁰

6.6. The Intervenors assert, "precisely the same rigorous and statistically valid protocols for the collection of baseline water quality are appropriate and necessary" for establishing baseline groundwater quality for the Staff's NEPA review of Strata's ISR license application as are required for the purposes of RCRA and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).¹¹¹ A review of the record, however, reveals no authority for this claim other than the general assertion of the Intervenors' expert witness. In light of the NRC's regulatory distinction between the collection of water quality data for site characterization purposes and for groundwater monitoring and restoration purposes,¹¹² we are not persuaded to adopt the Intervenors' premise.

6.7. The Intervenors further assert that there are "fundamental scientific reasons" why "the baseline water quality effort" must occur before an ISR license is issued.¹¹³ They assert that baseline "must be established" in a specific way – "using groundwater samples obtained from an aquifer that has not been contaminated by extensive exploration drilling; with monitoring wells randomly located and installed and developed through the entire sand thickness with non-oxidizing drilling fluids and gases to ensure that the uranium ore zone remains under reducing conditions."¹¹⁴ However, the record reveals only limited documentary support for the assertion that these

¹¹⁰ Ex. SEI015; *see also* Tr. at 310-11. We note that the Intervenors have not challenged the Staff's analysis or conclusions in the SER in this proceeding.

¹¹¹ Ex. JTI001-R at A.15; Tr. at 428.

¹¹² *See supra* at 5.18 and 5.19.

¹¹³ Ex. JTI001-R at A.17.

¹¹⁴ *Id.*; *see also* Tr. at 411-12.

practices are necessary to produce a legally sufficient NEPA document for an ISR site. The document upon which the Intervenor rely as the source for these requirements is a U.S. Geological Survey report, dated 1997.¹¹⁵ As the Staff's witnesses point out, the USGS report is not a prescriptive document, but rather compiles the various standard methods in use today, and notes the advantages and disadvantages of the different methods described.¹¹⁶

6.8. The Staff and Strata explain that the site characterization wells used to develop the water quality information described in the FSEIS were screened over a larger interval than the mineralized zone thickness;¹¹⁷ that the drilling process for monitoring and operational wells does not induce sufficient oxygen in a small diameter bore hole to impact the geochemistry of an entire aquifer system;¹¹⁸ and that repeated sampling of monitoring wells, including those used to develop site characterization information for the Ross Project, does not reveal that standard well drilling and sampling techniques have a long-term impact on water quality.¹¹⁹ Strata avers that the use of nitrogen drilling techniques is practically unheard of in the ISR industry,¹²⁰ and the Staff points to a recent study using techniques to preclude oxidation that resulted in uranium levels consistent with those found in the data used in the Ross Project FSEIS.¹²¹

6.9. The Intervenor state that the EPA Unified Guidance recommends a minimum of 8 to 10 independent samples, including samples gathered hydrologically

¹¹⁵ See Ex. JTI001-R at A.22 through A.26.

¹¹⁶ Ex. NRC044-R2 at A.1.5.

¹¹⁷ Tr. at 336.

¹¹⁸ *Id.* at 345.

¹¹⁹ Ex. NRC001 at A.1.8; Tr. at 366-67, 388-89.

¹²⁰ Tr. at 366-67.

¹²¹ *Id.* at 390-91 (citing Ex. NRC047).

upgradient of contamination zones.¹²² The Intervenor also cite the Standard Review Plan, Section 2.9.3 acceptance criteria and Regulatory Guide 4.14 to support their claim that wells must be installed hydrologically upgradient to develop water quality background samples.¹²³ Section 2.9.3 does not itself describe the standards for acceptance of monitoring programs to establish background radiological characteristics, but points to Section 1.1 of Regulatory Guide 4.14.¹²⁴ Section 1.1.2 of Regulatory Guide 4.14 states that, as part of the preoperational sampling program, groundwater samples should be collected from one well “located hydrologically up gradient from the tailings area (to serve as a background sample).”¹²⁵

6.10. We note that Regulatory Guide 4.14 was implemented initially to provide guidance for conventional uranium milling facilities, and it has not been subsequently amended to address ISR facilities specifically.¹²⁶ According to the Staff, the guidance for a uranium mill as envisioned by Regulatory Guide 4.14 is not directly applicable to an ISR facility in at least two respects.¹²⁷ First, upgradient water quality at an ISR site is not necessarily representative of the background water quality in the ISR production zone, because the groundwater upgradient of the ore body contains oxygen and is geochemically distinct from the groundwater in the same horizon through the production zone, which is generally oxygen-deficient.¹²⁸ Second, at an ISR site, a net inflow of groundwater is required to reduce the likelihood of excursions from the wellfield, and

¹²² Ex. JTI001-R at A.14 (citing Ex. JTI006 at 5-3).

¹²³ *Id.* (citing Ex. SEI007 at 2-32 and Ex. SEI008).

¹²⁴ Ex. SEI007 at 2-32.

¹²⁵ Ex. SEI008 at 4.14-2.

¹²⁶ *See generally* Ex. SEI008; *see also* Ex. NRC044-R2 at A.1.3.

¹²⁷ Ex. NRC044-R2 at A.1.3.

¹²⁸ Exs. NRC001 at A.1.7, NRC044-R at A.1.3.

therefore the natural hydraulic conditions applicable to a conventional uranium mill differ from those at an ISR site.¹²⁹

6.11. The Staff also points out that the EPA's regulations implementing RCRA, specifically 40 C.F.R. § 264.97(a)(1)(i), allow that a determination of background groundwater quality may include sampling of wells that are not hydraulically upgradient of the waste management area where sampling at non-upgradient wells will provide an indication of background groundwater quality that is representative or more representative than that provided by upgradient wells.¹³⁰ Consequently, we are not persuaded that the Intervenors have established that a sample from an upgradient well is a necessary element of the Staff's characterization of the groundwater at the Ross Project.

6.12. The Intervenors also claim that the FSEIS's description of baseline conditions at the Ross Project site are already biased as a result of the previous ISR operations conducted by Nubeth, an organization that had previously explored for uranium and conducted ISR research and development within the area of the Ross Project in the late 1970s.¹³¹ They attest that the impacts of this operation are clearly visible in the relationship between uranium and radium-226 levels in the site groundwater.¹³² The Staff asserts, however, that there is no consistent relationship between levels of uranium and radium-226 in the groundwater, and moreover, the high

¹²⁹ Ex. NRC044-R2 at A.1.3

¹³⁰ Ex. NRC001 at A.1.7.

¹³¹ Ex. JTI001-R at A.32.

¹³² Ex. JTI051-R at A.12; Tr. at 449.

levels of radium in in the Ross Project groundwater existed prior to any mining taking place on the site.¹³³

6.13. We consider that the Intervenor have not established that the impacts of the Nubeth project, if any, cast doubt on the accuracy of the FSEIS's characterization of the Ross Project groundwater. As the Staff observed, the affected environment studied in the FSEIS is the environment as it existed just prior to the submission of Strata's license application.¹³⁴ Even if the Nubeth operation did in fact affect the levels of uranium and radium-226 at the site, those conditions are nevertheless representative of the existing groundwater at the time of the FSEIS review.¹³⁵ The study of any historical cumulative impacts from the operations of the Nubeth facility are examined as part of the FSEIS's cumulative impacts assessment, an assessment that is not the subject of an admitted contention in the current proceeding.¹³⁶ In addition, to the extent that the Intervenor call for the FSEIS to account for a "pre-industrial," i.e. pre-Nubeth baseline at the site, we find that such an exercise would be a highly speculative endeavor unsuited to a NEPA review document.¹³⁷

6.14. The Staff explains that it concluded as part of its safety evaluation of the Ross Project application that the empirical data on groundwater quality collected by Strata met the requirements of Criterion 7 and was consistent with guidance in Section 2.7 of the Standard Review Plan and Wyoming Department of Environmental Quality (WDEQ) guidelines.¹³⁸ The Staff determined that Strata provided information from a

¹³³ Tr. at 449-52.

¹³⁴ Ex. NRC001 at A.1.8(2); Tr. at 452-53.

¹³⁵ Ex. NRC001 at A.1.8(2).

¹³⁶ Tr. at 452-53.

¹³⁷ See *Louisiana Energy Services*, CLI-05-20, 62 NRC at 536.

¹³⁸ Exs. NRC001 at A.1.4, NRC044-R2 at A.1.1; Tr. at 424.

sufficient number of wells to support the Staff's review of its application for the Ross Project, that Strata's reported sampling and analytical methods were acceptable as industry standard practices, and that the parameters analyzed were consistent with recommendations in Regulatory Guide 4.14.¹³⁹ The Staff found that the data provided by Strata was adequate for the Staff to use for its characterization of the baseline groundwater conditions at the Ross Project site and to support its conclusion that the potential impacts from the Ross Project would be SMALL.¹⁴⁰

6.15. While the Standard Review Plan is not itself binding on the Board, the Commission has stated that Staff guidance is "implicitly endorsed by the Commission and therefore is entitled to corresponding special weight."¹⁴¹ The Standard Review Plan declares that it is "general guidance to the staff on the type of information that is commonly acceptable for evaluating the environmental impact of a proposed licensing action,"¹⁴² and as such, the Staff's determinations in accordance with this guidance regarding the adequacy of the baseline groundwater information submitted by Strata is relevant to the Staff's NEPA review. Accordingly, we find the Staff's determination that the empirical data provided by Strata satisfied the SRP acceptance criteria to be highly indicative of the sufficiency of the information forming the basis of the FSEIS's characterization and assessment of groundwater quality.

¹³⁹ Ex. NRC001 at A.1.4.

¹⁴⁰ Exs. NRC001 at A.1.6 through A.1.8, NRC044-R2 at A.1.1, A.1.4.

¹⁴¹ *Clinton ESP Site*, CLI-05-29, 61 NRC at 375 n.26 (quoting Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), ALAB-900, 28 NRC 275, 290 (1988)).

¹⁴² Ex. SEI007 at 10.

2. Empirical Characterization of Baseline Groundwater Quality

6.16. Joint Intervenors allege that the FSEIS fails to present any empirical characterization of the pre-mining baseline water quality values that will be used to assess the impacts of the Ross Project on the exempted aquifer, to detect horizontal and vertical migration of lixiviant outside the exempted aquifer, and to establish binding and achievable water quality values for aquifer restoration. They argue that in order to comply with NEPA, the Staff must perform a quantitative and statistical analysis on data that is sampled from wells installed according to “approved procedures and valid statistical sampling plans, upgradient of known or suspected contamination zones, with sampling occurring more than 8 times.”¹⁴³

6.17. The Staff details in its testimony how it addressed the pre-licensing, site-characterization groundwater-quality data for the Ross Project area in the FSEIS.¹⁴⁴ The site-characterization baseline groundwater sampling methodology and results submitted by Strata are discussed in FSEIS Section 3.5.3.3, and referred to in FSEIS Section 2.1.1.1.¹⁴⁵ The FSEIS states that Strata developed the site characterization water quality data from samples gathered from a site-characterization monitoring well network installed at the Ross Project site, from sampling and analysis of existing water supply wells, and from historical data from the former Nubeth operation.¹⁴⁶ Section 3.5.3.3 describes the timeframe for the collection of samples, the number and location of water

¹⁴³ Intervenors’ Initial Statement at 47.

¹⁴⁴ Ex. NRC001 at A.1.4.

¹⁴⁵ *Id.* (citing SEI009A at 2-25).

¹⁴⁶ *Id.*

supply wells sampled by Strata, and the water quality data related to the operation and restoration of the Nubeth project.¹⁴⁷

6.18. The FSEIS provides the full set of data from the monitoring well network and the 29 water supply wells in Appendix C, and compares that data to the WDEQ's and EPA's water-quality standards for constituents.¹⁴⁸ The FSEIS describes the results of the comparison for each aquifer unit.¹⁴⁹ The FSEIS also included a qualitative comparison between the pre-licensing, site-characterization water quality data collected by Nubeth and Strata's data from the monitoring wells completed in the ore zone.¹⁵⁰

6.19. To meet the requirements of 10 C.F.R. Part 51, the FSEIS must succinctly describe the environment to be affected by the proposed action, with data and analyses in the statement to be described at a level of detail commensurate with the importance of the impact – less important material is to be summarized, consolidated, or simply referenced. We find the Staff's approach conforms to the requirements in 10 C.F.R. Part 51 for the preparation of an EIS.¹⁵¹ We find that it is likewise consistent with NUREG-1748, which directs the Staff to describe the affected environment in "sufficient detail to provide the necessary data for other reviews dealing with water resources."¹⁵² Moreover, this level of analysis is consistent with the approach utilized in the GEIS for ISR facilities, which this FSEIS supplements.¹⁵³ Therefore, we find no grounds to

¹⁴⁷ *Id.*

¹⁴⁸ Ex. NRC001 at A.1.2.

¹⁴⁹ *Id.*

¹⁵⁰ *Id.*

¹⁵¹ See 10 C.F.R. Part 51.

¹⁵² 10 C.F.R. Part 51, Appendix A to Subpart A(6); Ex. NRC013 at 5-8.

¹⁵³ Ex. NRC044-R2 at A.1.4; see *also* Tr. at 468-69.

conclude that a quantitative analysis of groundwater data at the Ross Project site is mandated by NEPA.

3. Effect of Analytical Approach on Impacts Determination

6.20. The Intervenors assert that the use of their recommended analytical and wellfield sampling methods would compel the Staff to conclude that the actual environmental impacts of the Ross Project on groundwater quality would be “LARGE.”¹⁵⁴ The Staff responds that the Intervenors’ claim disregards the established definitions for impacts used in the GEIS, and adopted in the FSEIS.¹⁵⁵

6.21. The FSEIS concludes that the long-term impacts of the Ross Project would be SMALL because the requirements imposed by 10 C.F.R. Part 40, the requirements imposed by the Environmental Protection Agency and Wyoming Department of Environmental Quality, and the conditions in Strata’s source and byproduct materials license, would collectively ensure that the groundwater would be available to be used after restoration in the manner that it was being used prior to licensing and in a manner that would be protective of public health and the environment.¹⁵⁶

6.22. The Staff explains that the FSEIS, in conformance with the GEIS, defines a LARGE impact as one that is clearly noticeable and is sufficient to destabilize important attributes of the resource considered.¹⁵⁷ By contrast, an impact that is

¹⁵⁴ See, e.g., Intervenors’ Initial Statement at 49-50.

¹⁵⁵ See Staff’s Rebuttal Statement at 6; see *a/so* Ex. NRC044-R2 at A.1.4, A.2.1.

¹⁵⁶ Ex. NRC044-R2 at A.1.4.

¹⁵⁷ Ex. SEI009A at xxi (emphasis added).

expected to be SMALL is one that is not detectable or is so minor that it will neither destabilize nor noticeably alter any important attribute of the resource considered.¹⁵⁸

6.23. The Staff testifies that it considers the important attributes of groundwater quality to be those that are related to the current and future uses of the groundwater.¹⁵⁹ The Staff states that it would have found that groundwater quality impacts are LARGE if they destabilize the quality of the groundwater in such a way that its current use becomes compromised.¹⁶⁰ According to the Staff, the degradation of the quality of groundwater that is currently used as a source of drinking water such that the groundwater could no longer be safely used for this purpose could be considered a LARGE impact, as this would be a destabilization of an important attribute of the groundwater.¹⁶¹ Therefore, to show that the impacts of the Ross Project would be LARGE, the Staff claims that the Intervenors must demonstrate that the important attributes of the groundwater would be destabilized after operation and restoration of the Ross Project such that it could not be restored to a state that would be protective of public health and the environment.¹⁶²

6.24. We agree with the Staff that while the Intervenors claim that the impacts to groundwater quality for the Ross Project will be LARGE, they do not explain why they believe that the impacts will be both “clearly noticeable” and “sufficient to destabilize important attributes” of the groundwater. A significant obstacle to the Intervenors’ position is the fact that the Wyoming Department of Environmental Quality (WDEQ), with

¹⁵⁸ *Id.* at xx.

¹⁵⁹ Ex. NRC044-R2 at A.1.4.

¹⁶⁰ *Id.*

¹⁶¹ *Id.*

¹⁶² *Id.*

the EPA's concurrence, has formally determined that the ore zone aquifer does not currently (and will not in the future) serve as a source of drinking water.¹⁶³ We agree with the Staff that the Intervenors have put forward no evidence to suggest that a quantitative analysis of groundwater data, collected in the precise manner called for by the Intervenors, would show that the Ross Project would impact the exempted aquifer to such an extent that the aquifer could no longer be safely used for the purposes to which it was put prior to the commencement of ISR operations.

6.25. In sum, we conclude that the Staff analyzed baseline groundwater quality to the extent required under NEPA. The Staff did so by reviewing the information in Strata's application documents, requesting additional information in numerous areas, and evaluating Strata's RAI responses.¹⁶⁴ Based on this information, the Staff was able to characterize the environment potentially affected by the Ross Project and evaluate how the Project might affect baseline groundwater quality at the project site and environs.¹⁶⁵ Although the Intervenors argue that the Staff should have obtained more information in various areas or utilized different methodologies to assess this information, none of their arguments establishes a violation of controlling law.

B. Contention 2

6.26. In Contention 2, Joint Intervenors argue that the FSEIS fails to analyze the environmental impacts that will occur if Strata cannot restore groundwater to primary or secondary limits. They argue that the FSEIS does not provide and evaluate information regarding the reasonable range of hazardous constituent concentration values that are likely to be applicable if Strata must implement an alternate concentration

¹⁶³ Ex. NRC001 at A.1.11; Tr. at 503, 514, 549.

¹⁶⁴ Ex. NRC001 at A.1.2.

¹⁶⁵ *Id.* at A.1.4.

limit (ACL) for the Ross Project, in accordance with 10 C.F.R. Part 40, Appendix A, Criterion 5B(5)(c).

6.27. When we admitted Contention 2 for hearing, we did so on the basis of an underlying assumption that Strata might not be able to restore groundwater to pre-mining baseline quality or to drinking water quality standards, necessitating that the Applicant obtain an alternate concentration limit (ACL).¹⁶⁶ While recognizing that an ACL likely cannot be accurately determined until the post-operational decommissioning process, we found that the Staff could ameliorate the difficulties of such an endeavor by conducting a bounding analysis of a range of possible ACLs based on the historical experience of other ISR sites. Therefore, we concluded that NEPA required “a public explanation of the impacts of being unable to restore the mined aquifer to primary or secondary baseline and, instead, having to use an ACL, as that alternate limitation might be implemented per a reasonable bounding analysis.”¹⁶⁷

6.28. With the issuance of the DSEIS for the Ross Project, the Staff included a description the potential environmental impacts to groundwater quality due to excursions and analyzed the impacts following the aquifer-restoration phase of the Ross Project.¹⁶⁸ The DSEIS explained that if the aquifer cannot be returned to post-licensing, pre-operational groundwater quality conditions, the NRC would require that the aquifer be restored to either the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) provided in 10 C.F.R. Part 40, Appendix A, Table 5C, or to a Commission-approved ACL.¹⁶⁹ As a result, the DSEIS concluded that the potential

¹⁶⁶ See *Strata Energy, Inc.*, LBP-12-3, 75 NRC at 197-98.

¹⁶⁷ *Id.* at 197.

¹⁶⁸ Ex. NRC001 at A.2.1.

¹⁶⁹ Ex. NRC006B at 32.

impacts to water quality of the uranium-bearing aquifer as a result of ISR operations would be expected to be SMALL and temporary.¹⁷⁰

6.29. Nevertheless, while we found that the DSEIS did address as a general matter the environmental impacts that might result should an ACL be necessary for the Ross Project, it did not address the crux of the contention, i.e., since an ACL may realistically be necessary, “within a reasonable range,” what is the potential ACL likely to look like and what might be the associated impacts.¹⁷¹

6.30. When the Staff issued its FSEIS, it included a new discussion of historic approvals of aquifer restoration activities by the NRC. This analysis consists of an examination of three facilities¹⁷² – Crow Butte Wellfield 1, Smith Ranch-Highland A Wellfield, and Irigaray Mine Units 1-9 – that received the Commission’s approval for aquifer restoration activities and the groundwater quality parameters in those wellfields for which the NRC approved restoration.¹⁷³ To provide this information, the Staff reviewed the licensing documents related to the Commission’s approval of groundwater restoration activities at these sites, and the information submitted by each licensee in support of its request for restoration approval.¹⁷⁴

6.31. For each of the three facilities for which the Commission approved restoration, the FSEIS describes the proportion of constituents that were restored to post-licensing, pre-operational concentrations, to the existing Wyoming Class I Domestic

¹⁷⁰ *Id.*

¹⁷¹ *Strata Energy, Inc.*, LBP-13-10, 75 NRC at 138.

¹⁷² The FSEIS notes that a fourth facility, Cogema Mining Company’s Christensen Ranch Mine Units 2-6, has requested approval of restoration from the NRC. Ex. NRC001 at A.2.7.

¹⁷³ Ex. NRC001 at A.2.6.

¹⁷⁴ *Id.* at A.2.6.

Use standards, or to the EPA's drinking water maximum contaminant levels (MCLs).¹⁷⁵

The range of concentrations of constituents for which there are no EPA MCLs or Wyoming Class I Domestic Use standards are described in the FSEIS as: (1) a percentage above the post-licensing, pre-operational baseline concentration for those constituents; or (2) in the qualitative terms used in the approval documents.

6.32. Using the information described in the FSEIS, the Staff explains that it determined the uranium concentrations at the time of restoration were 1.73 mg/L, or 18 times background levels, at Crow Butte Wellfield 1; 1.83 mg/L, or 4 times background levels, at Irigaray Mine Units 1-9, and 3.53 mg/L, or 71 times background levels at Smith Ranch A-Wellfield.¹⁷⁶ Therefore, extrapolating from the available historical record of uranium concentrations at the close of active restoration, the Staff concluded that if an ACL is requested by Strata for the Ross Project, it is likely to range between 1.7 mg/L and 3.5 mg/L, or 4 to 71 times the post-licensing, pre-operational background values for uranium that ranged from 0.05 to 0.52 mg/L.¹⁷⁷

6.33. Joint Intervenors counter that information the Staff provided in the FSEIS concerning the historical experience of other sites' approved restoration values "does not and cannot fulfill Staff's NEPA obligation to disclose the likely outcome – including, at a minimum, a bounding analysis of likely results – at this site[.]"¹⁷⁸ In addition, they raise several allegations regarding the adequacy of the information underlying the discussion of historical aquifer restoration activities in the FSEIS.

¹⁷⁵ Ex. SEI009A at 4-46.

¹⁷⁶ Ex. NRC001 at A.2.6.

¹⁷⁷ *Id.* at A.2.6.

¹⁷⁸ Intervenors' Initial Statement at 46.

6.34. Specifically, the Intervenor contend that the FSEIS is deficient for failing to provide a quantitative analysis of the impacts of the increased radium-226 and uranium concentrations at the Crow Butte facility and the increased uranium and heavy metal concentrations at the Smith Ranch-Highland facility.¹⁷⁹ They also claim that the FSEIS's discussion of the Irigaray facility is deficient because the NRC approved of restoration at that facility based upon a methodology that used a composite average baseline for all wellfields, rather than an initial average baseline for each individual wellfield.¹⁸⁰ These concerns, however, are essentially directed at the Commission's previous decisions to approve restoration of these facilities, rather than to the Staff's discussion of these decisions in the FSEIS. We see no basis under NEPA to require the Staff to reevaluate the Commission's prior licensing actions, particularly where any new values that may be derived from such an exercise would not provide any more information on what a *Commission-approved* alternate concentration limit for the Ross Project could be. To do so would go beyond the reasonable bounding analysis we called for in admitting this contention.¹⁸¹

6.35. Furthermore, the Staff explains that the three facilities used to provide this analysis are the best sources of information available to the Staff on the potential levels of hazardous constituent concentrations that may be approved by the Commission in the future as ACLs.¹⁸² This is because the Crow Butte Wellfield 1, Smith Ranch-Highland A Wellfield, and Irigaray Mine Units 1-9 projects discussed in the FSEIS are the only

¹⁷⁹ May 23, 2014 Order at 9.

¹⁸⁰ *Id.* at 9-10.

¹⁸¹ See *Strata Energy, Inc.*, LBP-13-10, 75 NRC at 138.

¹⁸² Ex. NRC001 at A.2.7.

commercial wellfields for which the Commission has approved aquifer restoration since the 1980s.¹⁸³ The Intervenors have not challenged this claim.

6.36. While the Intervenors claim that the Staff should have considered more information in their discussion of historical Commission-approved aquifer restorations, and find fault with the examples of aquifer restoration approvals discussed in the FSEIS, the Intervenors have not established that the FSEIS is, as a result, legally inadequate. As the Commission has stated, “NEPA does not call for certainty or precision, but an *estimate* of anticipated (not unduly speculative) impacts.”¹⁸⁴ “While there will always be more data that could be gathered, agencies must have some discretion to draw the line and move forward with decisionmaking.”¹⁸⁵

6.37. In this case, we find that the Staff used the best information available on the concentration levels of hazardous constituents that the Commission has historically found to be protective of human health and the environment to provide a bounding analysis that, if these past approvals are indicative of how the Commission would act in the future, may provide some evidence of what a future ACL for the Ross Project could look like.¹⁸⁶ Even if the Commission’s prior decisions to approve aquifer restoration activities at these three sites were based upon flawed or incomplete information, the fact remains that these sites provide the only relevant examples of how the Commission might act with respect to the Ross Project in the future. To attempt to satisfy the Intervenors’ demands for even more analysis, much of which amount to challenges of

¹⁸³ *Id.*

¹⁸⁴ *Louisiana Energy Services*, CLI-05-20, 62 NRC at 536 (emphasis in original).

¹⁸⁵ *Pilgrim*, CLI-10-11, 71 NRC at 315.

¹⁸⁶ See Ex. NRC001 at A.2.6.

the Commission's prior technical assessments supporting the agency's approval of restoration for these sites, would go far beyond what NEPA requires.

6.38. Next we turn to the Intervenor's claim that, contrary to the Staff's findings in the FSEIS, the impacts from the Ross Project should be categorized in the FSEIS as LARGE.¹⁸⁷ Central to this argument is the Intervenor's contention that no ISR project has ever successfully restored an aquifer to post-licensing, pre-operational baseline values.¹⁸⁸ To support their argument, the Intervenor presents information from an ISR facility that is currently engaged in restoration activities, Christensen Ranch Mine Units 2-6, and a website developed by the Intervenor's Dr. Larson containing visually plotted post-restoration groundwater information sourced from the NRC, referred to as "storymaps."¹⁸⁹ This data purports to show that "restoration failure" is the inevitable result of ISR operations at the Ross Project site, and that a conclusion in the FSEIS that impacts will be SMALL cannot be supported.¹⁹⁰ We do not find this argument persuasive.

6.39. First, related to our findings above, the Intervenor does not explain how the impacts from the use of an ACL will be both "clearly noticeable" and "sufficient to destabilize important attributes" of the groundwater, in light of the fact that ore zone aquifer is exempted as a USDW.¹⁹¹

6.40. Second, the data supplied in the Intervenor's storymap exhibits are not useful as examples of values that the Commission may approve as an ACL for the Ross

¹⁸⁷ Intervenor's Initial Statement at 49-50.

¹⁸⁸ *Id.* at 50, 51; Ex. JT1003-R at A.11.

¹⁸⁹ *See generally* JT1003-R.

¹⁹⁰ *See* Intervenor's Initial Statement at 50, 51.

¹⁹¹ *See supra* at 6.24.

Project in the future, because these values have not been assessed by the Commission as to whether they would be sufficiently protective. Pursuant to Criterion 5B(6) of Appendix A, should an ACL be required, the licensee must request the ACL through the license amendment process.¹⁹² The Commission must then make an affirmative determination that the proposed alternate hazardous constituent concentration values will not pose a substantial present or potential hazard to human health or the environment.¹⁹³ Indeed, with respect to the Christensen Ranch facility, the Staff accurately notes that the Commission has actually declined to approve restoration based upon the values cited by the Intervenor.¹⁹⁴

6.41. Third, the Intervenor's claim that restoration to values other than pre-operational baseline values amounts to "restoration failure" fails to acknowledge the Commission's approval of alternate restoration standards. Appendix A to 10 C.F.R. Part 40 contains three criteria, any one of which is sufficient to meet the regulatory requirements for successful restoration: (1) restoration to the Commission-approved background values; (2) restoration to a value given in the table in paragraph 5C of Appendix A; and (3) restoration to an ACL approved by the Commission.¹⁹⁵

6.42. Finally, 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. The Staff explains in the FSEIS that a licensee would be required by its WDEQ Permit to Mine and by its source and byproduct materials license to conduct aquifer-restoration activities to restore

¹⁹² Tr. at 393.

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

¹⁹⁴ See Exs. SEI009A at 4-46, NRC044 at A.2.6.

¹⁹⁵ 10 C.F.R. Part 40, Appendix A, Criterion 5B(6); see also Ex. NRC001 at A.1.5; Tr. at 535-36.

the ore zone aquifer to post-licensing, pre-operational conditions, if possible.¹⁹⁶ If the aquifer could not be returned to that condition, the NRC would require that the aquifer meet EPA MCLs as provided in 10 C.F.R. Part 40, Appendix A, or ACLs as approved by the NRC.¹⁹⁷ The FSEIS concludes that, for these reasons, the potential impacts to water quality of the exempted aquifer as a result of ISR operations is expected to be SMALL and temporary.¹⁹⁸

6.43. In other words, for the purposes of determining the potential effects of the Ross Project, the Staff considered a scenario wherein Strata would be unable to restore groundwater to primary or secondary limits, and concluded that such impacts would nevertheless be SMALL.¹⁹⁹ Therefore, because the FSEIS accounts for this possibility and in addition describes, based upon historical experience, what the range of hazardous constituent values for a Ross Project ACL may look like, we are satisfied that the FSEIS provides all of the information required under NEPA.

C. Contention 3

6.44. In Contention 3, Joint Intervenors argue that the FSEIS fails to assess adequately the likelihood and impacts of fluid migration to the adjacent groundwater, as required by 10 C.F.R. §§ 51.90-94, NEPA, and NUREG-1569 § 2.7. First, Joint Intervenors argue that the FSEIS fails to analyze sufficiently the potential for and impacts associated with fluid migration associated with unplugged exploratory boreholes, including the adequacy of Strata's plans to mitigate possible borehole-related migration impacts by monitoring wellfields surrounding the boreholes and/or plugging the

¹⁹⁶ Ex. SEI009A at 4-37.

¹⁹⁷ *Id.* (citing 10 C.F.R. Part 40, Appendix A); *see also* Tr. at 440-41.

¹⁹⁸ Ex. SEI009A at 4-37; *see also* Tr. at 440-41.

¹⁹⁹ Ex. SEI009A at 4-37.

boreholes. Second, Joint Intervenors argue that there was insufficient information for the NRC Staff to make an informed fluid migration impact assessment given that Strata's six monitor-well clusters and the 24-hour pump tests at four of these clusters provided insufficient hydrological information to demonstrate satisfactory groundwater control during planned high-yield industrial well operations.²⁰⁰

6.45. The FSEIS specifically discusses fluid migration in Sections 3.5.3.2, Local Ground-Water Resources, and 4.5.1.2, Ross Project Operation. Section 3.5.3.2 discusses the results of the on-site pumping test data report prepared by Strata and analyzed by the Staff. Section 4.5.1.2 identifies relevant discussions in the GEIS regarding the potential for vertical excursions at an ISR site based on such factors as vertical hydraulic head gradients, vertical hydraulic conductivities and thicknesses of the confining units, and whether the confining units are contiguous. In addition, Section 4.5.1.2 discusses a set of license conditions imposed on Strata to identify and properly abandon old exploratory boreholes prior to conducting operations, monitor corrective actions, and carry out mitigation should Strata identify a vertical excursion.²⁰¹

6.46. A three-pronged defense to the possibility of impacts from unplugged historical boreholes is proposed. Each prong is embodied by a commitment made by Strata and incorporated as a license condition.²⁰²

6.47. The first prong involves significantly reducing the number of unplugged historical boreholes. License Condition 10.12 requires Strata to attempt to locate and abandon all historic boreholes within the wellfield perimeter prior to conducting tests for

²⁰⁰ May 23, 2014 Order at Appendix A.

²⁰¹ Ex. SEI009A at 3-30 to 3-37, 4-34 to 4-44; see *also* Ex. NRC001 at A.3.1.1.

²⁰² Ex. NRC001 at A.3.1.5.

a wellfield data package (and therefore well before commencing operations).²⁰³ License Condition 10.13 requires Strata to submit the wellfield package to the NRC for review and verification prior to commencing operations in a new wellfield.²⁰⁴

6.48. The second prong involves the detection of vertical excursions. License Conditions 11.3 and 11.4 establish criteria for how excursions will be determined. These conditions set out procedures for establishing baseline water quality, the frequency of water quality sampling in the perimeter monitoring wells, and the criteria by which an excursion will be determined.²⁰⁵

6.49. The third prong is to implement immediate and long-term corrective actions. If a vertical excursion is detected, License Condition 11.5 requires cessation of lixiviant injection into production areas until Strata demonstrates to the NRC that an unplugged borehole is not the source of the excursion or that the responsible borehole has been plugged and abandoned.²⁰⁶ Additional corrective actions may include numerical ground water modeling to better understand the potential extent of excursions, and extraction and treatment of contaminated ground water.²⁰⁷

6.50. As documented in Section 3.5.3.2 of the FSEIS, the Staff determined that Strata has demonstrated its ability to locate and abandon boreholes, and that sufficient safeguards are in place to protect against excursions should Strata be unable to locate and abandon all historic boreholes within the well-ring perimeter.²⁰⁸

²⁰³ Ex. SEI015 at 9.

²⁰⁴ *Id.* at 9-10.

²⁰⁵ *Id.* at 12-13; *see also* Ex. NRC001 at A.3.1.5.

²⁰⁶ Ex. SEI015 at 13.

²⁰⁷ Ex. NRC001 at A.3.1.5.

²⁰⁸ Ex. SEI009A at 3-30 to 3-37.

6.51. Intervenors contest the Staff's conclusions because only a small number of boreholes have yet been filled.²⁰⁹ However, the FSEIS analyzes potential excursions and associated impacts during operations, not before. Under License Conditions 10.12 and 10.13, Strata is required to attempt to locate and abandon all boreholes within the well-ring perimeter and submit a wellfield package to the NRC prior to commencing operations.

6.52. Intervenors also argue that the FSEIS fails by simply assuming the feasibility of locating and plugging the large number of boreholes and that confidence in Strata to correctly carry out that project is misplaced. First, however, it is well-established that the NRC does not assume that a licensee will violate its obligations, including the obligations of its license.²¹⁰ Furthermore, Strata has thus far located 92% of the boreholes and represents that more rigorous techniques will be employed to locate the remaining boreholes.²¹¹ This would support the Staff's determination, documented in Section 3.5.3.2 of the FSEIS, that Strata has demonstrated its ability to locate and abandon boreholes within the wellfield perimeter.²¹² At any rate, the Staff has analyzed in Section 4.5.1.2 of the FSEIS the potential for vertical migration in the scenario where Strata is unsuccessful in locating and abandoning boreholes, determining that sufficient safeguards are in place to protect against excursions in such a scenario.

²⁰⁹ Intervenors' Initial Statement at 58.

²¹⁰ See *Private Fuel Storage* (Independent Spent Fuel Storage Installation), CLI-01-9, 53 NRC 232, 235 (2001) ("[T]he NRC does not presume that a licensee will violate agency regulations wherever the opportunity arises"); *GPU Nuclear, Inc.* (Oyster Creek Nuclear Generating Station), CLI-00-6, 51 NRC 193, 207 (2000) ("NIRS also fails to offer documentary support for its argument that AmerGen is likely to violate our safety regulations. Absent such support, this agency has declined to assume that licensees will contravene our regulations.").

²¹¹ Tr. at 692-93.

²¹² See Ex. NRC001 at A.3.1.8, A.3.1.12.

6.53. Next, Intervenor point out an alleged discrepancy between the current number of boreholes (1,682) and the number identified in the Environmental Report (5,000). This apparent discrepancy results, however, from comparing the number of historic boreholes in the larger Lance District (approximately 5,000) with the number within the project area plus a one-half mile radius (1,682). The numbers reported in Strata's Technical Report are consistent with the information provided in the Environmental Report and used in the FSEIS.²¹³

6.54. Finally, Intervenor argue that the FSEIS lacks a "full accounting of all improperly abandoned boreholes," and that the FSEIS must provide a timetable for locating and plugging all the holes.²¹⁴ The Staff has explained that the presence of unplugged historical boreholes has not materially affected the pre-license water quality data or the interpretation of pumping test data to determine aquifer properties. Therefore, the detail provided by Strata and the ongoing investigations were sufficient for the analysis required in the FSEIS. Further documentation of historical borehole identification and abandonment will be documented in the wellfield data package required by License Condition 10.13, and must be submitted prior to commencing operations. With respect to Intervenor's argument that the FSEIS must provide a timetable, the Staff points out that a timetable for Strata's efforts to locate and plug all the boreholes was not necessary to conduct the analysis in the FSEIS. The analysis was based on that fact that License Condition 10.12 would require Strata to attempt to locate and abandon all historic boreholes prior to conducting tests for a wellfield data package. A specific date or timetable is not necessary for the analysis in the FSEIS.²¹⁵

²¹³ *Id.* at A.3.1.13.

²¹⁴ Ex. JTI001-R at 47-48.

²¹⁵ Ex. NRC001 at A.3.1.15.

6.55. Intervenors' second argument in Contention 3 is that the Staff did not have sufficient information to conduct an informed fluid migration impact assessment. Intervenors cite several alleged shortcomings that would preclude the Staff from conducting an informed analysis.

6.56. First, Intervenors argue that Strata's pumping tests could not establish adequate hydrological information, as the tests were too short and the pumping rates were too low. The modified single well pumping test, as used by Strata, is specifically listed in acceptance criterion 3 in Section 2.7.3 of NUREG-1569. The data from the pumping tests was used to inform the numerical model of the Ross Project Area, and that model was calibrated to observed piezometric heads.²¹⁶ The pumping test and results were therefore tailored to provide adequate and accurate hydrological information about the site. Going forward, as individual wellfields are proposed for operation, Strata will undertake more detailed hydrogeologic investigations and confirm its ability to control ground water within the ore zone.²¹⁷ This data will be submitted to the NRC for review and verification prior to injecting lixiviant in the wellfield, per License Condition 10.13.²¹⁸

6.57. Second, Intervenors argue that the Staff's assessment should have included an analysis of significant data gaps in the conceptual and numerical hydrological model. Sections 2.7.3 and 7.2.3 of NUREG-1569 set forth the Acceptance Criteria for the hydrologic characterization and environmental impacts analysis,

²¹⁶ See *id.* at A.3.2.4.

²¹⁷ Ex. SEI015 at 9-10 ("Prior to conducting principal activities in a new wellfield, the licensee shall submit a hydrologic test data package (wellfield package) to the NRC. The initial wellfield package will be submitted for NRC staff review and verification. Each wellfield package shall be submitted at least 60 days prior to the planned start date of lixiviant injection . . . The wellfield package will adequately define heterogeneities that may affect the chemical signature and ground-water flow paths within the ore zone . . .").

²¹⁸ *Id.*

respectively.²¹⁹ In its evaluation of Strata's license application and in its development of the FSEIS, the Staff concluded that the available data met the acceptance criteria.²²⁰

6.58. Third, Intervenor's argue that, based partly on the Staff's conclusion in the FSEIS that impacts from horizontal and vertical excursions could be MODERATE to LARGE, Strata will have limited options to correct vertical excursions at the time they occur. However, referring to the GEIS, Section 4.5.1.2 of the FSEIS states that, for these impacts to be MODERATE to LARGE, a large volume of contaminated water must leave the ore zone and impact an area being used for consumption.²²¹ These conditions are not expected to occur at the site, and therefore the Staff's conclusions are supported.

6.59. Fourth, Intervenor's argue that communication between the SM and OZ horizons is evident in the 24-hour pump test data from well 12-18OZ. First, however, this test was a 72-hour pumping test, not a 24-hour test. Second, as seen in the graphs from Strata's Technical Report, Addenda 2.7-F and 2.7-G, fluctuations in water levels in well 12-18SM are not related to the pumping of well 12-18OZ, and the fluctuations are typical of those seen in the longer-period hydrograph.²²² Therefore, the Staff's conclusion that there is no evidence of direct communication between the overlying and OZ aquifers is supported.

6.60. Fifth, Intervenor's argue that the water quality results from wells 12-18OZ and 22X-19 indicate groundwater mixing from the SM and OZ horizons. However, this argument is unpersuasive for two reasons. First, the Intervenor witness incorrectly

²¹⁹ Ex. SEI007 at 2-22 to 2-26 (acceptance criteria for characterization of site hydrology), 7-5 (acceptance criteria for environmental impacts from operations).

²²⁰ Ex. NRC001 at A.3.2.5.

²²¹ See *also id.* at A.3.2.6.

²²² Exs. SEI014G at 143-187, SEI014H; see *also* Ex. NRC001 at A.3.2.7.

describes well 22x-19 as screened through the OZ and SM, whereas well 22x-19 is actually screened through the OZ and DM aquifers. Second, the difference in water quality in 14-18SM and 14-18OZ is not due to a lower density of exploration boreholes, as the Intervenor witness suggests. A comparison of the density of historical boreholes around wells 14-18 and 12-187 shows that the density of exploration boreholes is not lower around cluster 14-18, indicating that it is more likely that the spread of the OZ data represents natural heterogeneity in the water chemistry.²²³

6.61. Finally, Intervenor argues that the Staff incorrectly excluded uranium as an excursion indicator. However, because other constituents move through the aquifer faster than uranium and would indicate excursions before radionuclides and other elements move outside the production zone, uranium is a poor choice for an excursion indicator. A good excursion indicator is one that will allow a licensee to identify the excursion most quickly.²²⁴ This is further supported by NUREG/CR-3709, which states that uranium is a poor excursion indicator because it does not travel as rapidly as water,²²⁵ and NUREG-1569, which states that uranium is not a good indicator because its mobility may be affected by conditions in the aquifer.²²⁶ We find Intervenor's argument that the Staff incorrectly excluded uranium as an excursion indicator unpersuasive.

6.62. For the reasons stated above, we are satisfied that the FSEIS adequately analyzed the impacts associated with fluid migration from unplugged boreholes. We are

²²³ Exs. NRC001 at A.3.2.8, NRC 044-R2 at A.3.13.

²²⁴ Ex. NRC 044-R2 at A.3.3.

²²⁵ Ex. NRC050 at 60 ("Many potential indicators (such as uranium and pH) are not conservative, and their values will change rapidly as the lixiviant interacts with the sediment. In general, dissolved species that interact with the sediment do not travel as rapidly as water and thus would not be useful as an early indicator of an excursion.").

²²⁶ Ex. SEI007 at 5-41 ("Uranium is not considered a good excursion indicator because, although it is mobilized by *in situ* leaching, it may be retarded by reducing conditions in the aquifer.").

further satisfied that the Staff's assessment was based on sufficient information to support an informed analysis.

VII. CONCLUSIONS OF LAW

7.1. The Board has considered all of the evidence presented by the parties on Contentions 1, 2 and 3. Based upon a review of the entire record in this proceeding, and based upon the findings of fact set forth above, which are supported by reliable, probative and substantial evidence in the record, the Board has decided all matters in controversy concerning Contentions 1, 2 and 3, and reaches the following conclusions.

7.2. This Board finds that the Staff's FSEIS complies with the requirements of NEPA. Taken together, the Staff and Strata presented evidence that demonstrates that the Staff, as required under NEPA, examined sufficient information on groundwater conditions at the Ross Project site to support its assessment of the potential impacts of the proposed project and its assessment of alternatives. We hold that the Joint Intervenors have failed to establish that the Staff is required as a matter of law to consider additional groundwater quality information to support its environmental review of the Ross Project.

7.3. We also find that the Staff has provided sufficient information on the potential impacts that may result from the potential eventual need for an ACL for the Ross Project, by providing a reasonable bounding analysis based upon the historical experience of previously restored ISR facilities.

7.4. Finally, we find that the FSEIS adequately analyzed the impacts associated with fluid migration from unplugged boreholes. We also find that the Staff's assessment was based on sufficient information to support an informed analysis.

7.5. We therefore affirm that the FSEIS complies with the requirements of NEPA, and we hereby resolve Contentions 1, 2 and 3 in favor of the Staff and Strata.

Respectfully submitted,

/Signed (electronically) by EM/
Emily Monteith
David M. Cylkowski
Counsel for NRC Staff

Dated at Rockville, Maryland
this 3rd day of November, 2014.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)	
)	
STRATA ENERGY, INC.)	Docket No. 40-9091-MLA
)	
(Ross In Situ Recovery Uranium Project))	ASLBP No. 12-915-01-MLA-BD01
)	

CERTIFICATE OF SERVICE

Pursuant to 10 C.F.R § 2.305, I hereby certify that copies of the foregoing "NRC STAFF'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW" in the above-captioned proceeding have been served via the Electronic Information Exchange (EIE) this 3rd day of November, 2014.

/Signed (electronically) by/

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Date of Signature: November 3, 2014