UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of: STRATA ENERGY, INC. (Ross In Situ Uranium Recovery Facility)	Docket No.: 40-9091-MLA Date: August 25, 2014

STRATA ENERGY, INC'S INITIAL STATEMENT OF POSITION

Strata Energy, Inc. (hereinafter "Strata") hereby submits its Initial Statement of Position, expert written testimony, and pre-filed exhibits to the Atomic Safety and Licensing Board (Licensing Board) regarding the grant of United States Nuclear Regulatory Commission (NRC) License No. SUA-1601 permitting the construction and operation of the Ross *in situ* leach uranium recovery (ISR) project in the State of Wyoming (hereinafter the "Ross ISR Project"). The issued NRC license permits Strata to construct ISR facilities at the Ross ISR Project site, including, but not limited to, a central processing plant (CPP), ion-exchange (IX) columns, wellfields with production, injection, and monitor wells, and other associated and ancillary structures in accordance with NRC regulations at 10 CFR Part 40 and Appendix A Criteria and other applicable regulations, guidance, and policy for NRC-licensed ISR operations.

As will be discussed in greater detail below, two (2) groups, the Powder River Basin Resource Council and the Natural Resource Defense Council (hereinafter the "Intervenors") requested and were granted an NRC administrative hearing pursuant to 10 CFR Part 2, Subpart L of the Commission's administrative hearing procedures. Over the course of the past three (3)

years, the Licensing Board admitted, amended, and/or migrated three (3) environmental contentions.[1]

As set forth in Strata's Initial Statement of Position, Strata's NRC License No. SUA-1601 record of decision (ROD) and accompanying decision documents, including but not limited to its Safety Evaluation Report (Final SER), its Final Supplemental Environmental Impact Statement (NUREG-1910, Supplement 5 or "FSEIS"), and associated requirements and mitigation measures, and final license conditions (NRC License No. SUA-1601) addressing both safety and environmental-related resource areas, the final decision by NRC Staff to issue SUA-1601 satisfies the Commission's statutory mandate delineated by Congress in the Atomic Energy Act of 1954, as amended by the Uranium Mill Tailings Radiation Control Act of 1978 (collectively the "AEA"), to adequately protect public health and safety and to not be inimical to the common defense and security. Further, as will be shown below, NRC Staff's issuance of SUA-1601 adequately satisfies the requirements of the National Environmental Policy Act of 1969 (NEPA) as interpreted by the Commission and implemented in its 10 CFR Part 51 environmental regulations. Thus, the environmental-related allegations levied by Intervenors in Contentions 1, 2, and 3 are without merit.

I. BACKGROUND AND PROCEDURAL HISTORY

On December 31, 2010 and January 4, 2011 respectively, Strata submitted the necessary components of a license application to NRC Staff seeking the issuance of a combined source and 11e.(2) byproduct material license to construct and operate the Ross ISR Project in

[1] It should be noted that by Order dated July 25, 2014, the Licensing Board granted Strata's and NRC Staff's Motion for Summary Disposition of Contention 4/5 regarding potential cumulative impacts discussed in Strata's license application associated with the Ross ISR Project. Details regarding this Order will be discussed below.

Crook County, Wyoming. At the time that Strata's license application was submitted, NRC Staff held a Category 1 public meeting to discuss the submission and the procedures that would follow during the NRC licensing process, including its initial "acceptance review" which typically takes up to ninety (90) days to complete. However, on January 19, 2011, NRC Staff informed Strata that its "acceptance review" would not commence until May 2, 2011 due to agency resource constraints. But, while NRC Staff's "acceptance review" of the license application and, thus, its formal docketing would be delayed, on January 26, 2011, NRC Staff made Strata's license application publicly available on its ADAMS database.

NRC Staff commenced its "acceptance review" on May 2, 2011 and, on June 28, 2011, announced that the "acceptance review" had resulted in formal docketing of Strata's license application. NRC issued a Federal Register notice dated July 13, 2011, which announced the formal docketing of Strata's license application and the opportunity to request an administrative hearing within a sixty (60) day time period.[2]

On October 27, 2011, the Intervenors filed its request for a hearing in response to which both Strata and NRC Staff filed responses dated December 5, 2011. On December 20, 2011, the Licensing Board held oral argument at which the Intervenors' request for hearing, including arguments on standing and potentially admissible contentions was heard. By Order dated February 10, 2012 (LBP-12-3),[3] the Licensing Board granted standing to the Intervenors and admitted four (4) contentions on Strata's license application. Each admitted contention was classified as an "environmental" contention.

During the course of this proceeding, Strata's license application and its associated ROD have been supplemented with additional documentation and analysis pursuant to NRC

[2] *See* 76 Fed. Reg. 41308 (July 13, 2011).
[3] *See Strata Energy, Inc.* (Ross ISR Project), *Ruling on Standing and Contention Admissibility* (February 10, 2012).

Staff requests for additional information (RAI). These RAIs were divided into two classes of questions: (1) safety and (2) environmental. On March 30, 2012 (ML121030406 & ML121030465) and April 6, 2012 (ML121020357 & ML121020361), Strata provided NRC Staff with responses to each set of RAIs and on April 13, 2012 (TR RAIs) and April 20, 2012 (ER RAIs), these responses were made publicly available in NRC's ADAMS database. At no time during this proceeding have Intervenors proffered any new or amended contentions or attempted to migrate previously admitted contentions to encompass Strata's RAI responses.

In February, 2013, NRC Staff issued its Final SER in which it detailed its extensive safety/technical evaluation of Strata's license application, including but not limited to: (1) the adequacy of Strata's proposed groundwater data gathering and analysis for 10 CFR Part 40, Criterion 7 "baseline" groundwater quality; (2) the adequacy of the *procedures* for establishment of 10 CFR Part 40, Appendix A, Criterion 5(B)(5) "Commission-approved background" groundwater standards post-license issuance but prior to operations, (3) the adequacy of Strata's proposed process and analysis for groundwater restoration of recovery (ore) zone groundwater to Criterion 5(B)(5) standards, and (4) protection of public health and safety with respect to potential recovery solution migration from the recovery (ore) zone to adjacent, non-exempt underground sources of drinking water (USDW).[4] On Page 6-7 of this Final SER, NRC Staff concluded that:

> "The NRC staff finds that the application for the Ross Project material license complies with the standards and requirements of the [Atomic Energy] Act and the Commission's regulations, and based on its review as documented in this SER, staff concludes that the proposed facility meets applicable requirements for a license issuance in 10 CFR Parts 20 and 40. More specifically,

[4] Under the Safe Drinking Water Act of 1974 (SDWA), all ISR operators are required to obtain an aquifer exemption pursuant to 40 CFR § 146.4 which, in part, requires that such operators obtain an amendment to a "primacy" State's SDWA program through, in the instant case, the Wyoming Department of Environmental Quality (WDEQ) and, ultimately, the United States Environmental Protection Agency (EPA) showing that the recovery (ore) zone aquifer cannot now nor ever in the future serve as a USDW.

> the staff finds that Strata is qualified by reasons of training and experience to use source material for its requested purpose, and that Strata's proposed equipment and procedures at its Ross Project facility are adequate to protect public health and minimize danger to life or property in accordance with 10 CFR [Part] 40.32(b)-(c). Therefore, pursuant to 10 CFR [Part] 40.32(d), the staff finds that issuance of a license to Strata for the Ross Project will not be inimical to the common defense and security or to the health and safety of the public."

United States Nuclear Regulatory Commission, *Safety Evaluation Report for the Strata Energy, Inc. Ross ISR Project, Crook County, Wyoming, Materials License No. SUA-1601*, Docket No. 040-09091 at 6-7 (February, 2013).

At no point in this proceeding have the Intervenors proffered any new or amended contentions or attempted to migrate previously admitted contentions to challenge NRC Staff's Final SER.

On March 21, 2013, NRC Staff issued its Draft Supplemental Environmental Impact Statement (DSEIS), which was intended to provide Ross ISR Project site-specific 10 CFR Part 51 environmental analyses tiered off the programmatic analyses and conclusions documented in NUREG-1910 entitled *Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities* (Final Report) (2009) (hereinafter "ISR GEIS"). The DSEIS was issued for a public comment period of forty-five (45) days. Multiple interested stakeholders and members of the public offered public comments on the DSEIS, including Strata and the Intervenors.

On May 6, 2013, Intervenors submitted new and/or amended contentions, as well as requests to migrate existing admitted contentions from Strata's license application to the DSEIS. Strata and NRC Staff both filed responses to Intervenors' submission on June 3, 2013. In an Order dated July 26, 2013, the Licensing Board allowed Contentions 1, 2 and 3 to migrate from Strata's license application to the DSEIS.[5] The Licensing Board's Order also declined to allow Contention 4/5 to migrate from Strata's license application to the DSEIS and to allow admission

[5] *See Strata Energy, Inc.* (Ross ISR Project), *Ruling on Motion to Resubmit Contentions and to Admit a New Contention* (July 26, 2013).

of an additional environmental contention. Thus, after issuance of this Order, four (4) admitted contentions still remained (i.e., Contentions 1, 2, 3, and 4/5).

After receipt of public comments on the DSEIS, NRC Staff finalized the 10 CFR Part 51 environmental review process and issued the FSEIS in February 28, 2014.[6] NRC Staff's final 10 CFR Part 51 environmental review conclusion is found in the FSEIS' abstract which states:

> "Based upon its environmental review, the final NRC staff recommendation is that, unless emerging safety issues mandate otherwise, a Source and Byproduct Materials License be issued to the Applicant as requested."

Ross FSEIS at Abstract, page iii.

Given that its Final SER determined that no safety issues should preclude issuance of Strata's requested license as well, NRC Staff determined that Strata's requested license should be issued.

On March 31, 2014, Intervenors submitted a request to admit new/amended contentions, as well as requests to migrate existing admitted contentions to the FSEIS. On April 23, 2014, Strata and NRC Staff both submitted responses to Intervenors' request. In an Order dated May 23, 2014, the Licensing Board granted Intervenors' request to migrate Contentions 1, 2, and 3 and declined to allow Contention 4/5 to migrate from Strata's license application to the FSEIS.[7] As a result, only Contentions 1, 2, and 3 were challenges to Strata's license application, the DSEIS, and the FSEIS, while Contention 4/5 remained a challenge to Strata's license application only.

Then, on April 24, 2014, NRC Staff finalized its license application review process and issued NRC License No. SUA-1601 to Strata, along with a ROD demonstrating that Strata's license application, RAI responses, Final SER, and FSEIS meet the Commission's statutory

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[6] *See* 79 Fed. Reg. 13683 (March 11, 2014) for notice of FSEIS availability.

[7] *See Strata Energy, Inc.* (Ross ISR Project), *Ruling on Motion to Migrate/Amend Existing Contentions and Admit New Contentions Regarding Final Supplement to Generic Environmental Impact Statement* (May 23, 2014).

mandate of adequate protection of public health and safety and its responsibilities under NEPA and the Commission's implementing regulations at 10 CFR Part 51. At that time, Intervenors did not submit any requests to migrate Contentions 1, 2, 3 or 4/5A to Strata's final license conditions or any other part of the ROD not previously challenged.

On June 13, 2014, the Licensing Board's general schedule required that all motions for summary disposition on the remaining admitted contentions, regardless of their status, be submitted. On that day, Strata and NRC Staff filed motions for summary disposition of Contention 4/5A alleging that no genuine issues of material fact existed due to the fact that the Contention was only a challenge to Strata's license application and not any elements of the ROD. Intervenors also filed a motion for summary disposition of Contention 1 claiming there were no genuine issues of material fact associated with the gathering of Ross site-specific groundwater quality data. On July 3, 2014, all parties submitted their responses to these motions for summary disposition per the Licensing Board's general schedule. Strata and NRC Staff opposed Intervenors' motion for summary disposition of Contention 1, and Intervenors' opposed Strata's and NRC Staff's motion for summary disposition of Contention 4/5A.

On July 25, 2014, the Licensing Board issued an Order granting Strata's and NRC Staff's motion for summary disposition and removed Contention 4/5 from the list of admitted contentions.[8] Then, on August 12, 2014, the Licensing Board denied Intervenors' motion for summary disposition of Contention 1 finding that several genuine disputes of material fact remain within the scope of this Contention.[9] Thus, Strata's legal and factual arguments and written testimony address only Environmental Contentions 1, 2, and 3.

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[8] *See Strata Energy, Inc.* (Ross ISR Project), *Ruling on Summary Disposition Motion Regarding Environmental Contention 4/5A* (July 25, 2014).
[9] *See Strata Energy, Inc.* (Ross ISR Project), *Ruling on Summary Disposition Motion Regarding Environmental Contention 1* (August 12, 2014).

II. APPLICABLE LEGAL STANDARDS

As a general matter, uranium recovery facilities such as the Ross ISR Project are subject to the Commission's regulations at 10 CFR Part 40 and its Appendix A Criteria specifically promulgated for uranium recovery as relevant and appropriate. As part of the licensing process, the Commission also implements NEPA through its 10 CFR Part 51 environmental review regulations when NRC Staff accepts and reviews an ISR license application.

Strata's license application was submitted as a request for a combined source and 11e.(2) byproduct material license, which typically is considered to be a uranium recovery license.[10] While there are no safety-related contentions currently admitted to this proceeding, 10 CFR Part 40 regulations and Appendix A Criteria and the Final SER are directly relevant to many aspects of the Ross ISR Project that are evaluated in NRC's environmental review which, in this case, resulted in an FSEIS tiered from the ISR GEIS.

A. ENVIRONMENTAL CONTENTIONS

Contentions 1, 2, and 3 have been classified by the Licensing Board as "environmental" contentions and, as such, no safety-related challenges have been proffered by Intervenors. Regulatory standards applicable to environmental contentions can be found at 10 CFR Part 51. Part 51 was promulgated by the Commission to implement its responsibilities pursuant to NEPA. As a general matter, NEPA is a procedural statute and is not designed to confer any additional substantive jurisdiction beyond that in its empowering statute to a specific agency such as NRC. As an independent regulatory agency, the Commission promulgated Part 51 as its interpretation

[10] As a general matter, this class of NRC Materials License applies to all forms of uranium recovery, including ISR.

of the Council on Environmental Quality's (CEQ) regulations under its AEA statutory mandate to protect public health and safety and the environment.[11]

In addition, it is important to note that, in the context of 10 CFR Part 40 regulations, new ISR operating license applicants must adhere to the provisions of 10 CFR § 40.32(e) with respect to pre-licensing site construction activities. Independent of its license application, a new ISR operating license applicant is permitted to engage in specific site development activities (known as "preconstruction") prior to the receipt of a requested NRC license. Recently, NRC Staff revised Part 40.32(e) to provide industry and interested stakeholders with clarification regarding the Commission's position on which site development activities at Part 40 facilities, such as the Ross ISR Project, are considered to be preconstruction and which are considered to be "construction."[12]

1. 10 CFR Part 51 Environmental Review Regulations

Intervenors allege potential deficiencies in NRC Staff's 10 CFR Part 51 NEPA process for preparation and finalization of the Ross ISR Project's FSEIS. The standard NRC Staff is required to apply to environmental reviews under 10 CFR Part 51 is to take a "hard look" at the environmental impacts of a proposed action, in this case the Ross ISR Project. This "hard look" is tempered by a "rule of reason" that requires agencies to address only impacts that are reasonably foreseeable –not remote or speculative.[13] If an admitted contention alleges that an environmental review document (such as an FSEIS) is inadequate, "the 'rule of reason' by which NEPA is to be interpreted provides that agencies need not consider 'remote and speculative'

[11] 49 Fed. Reg. 9381 (March 12, 1984).
[12] *See* 76 Fed. Reg. 56951 (September 15, 2011).
[13] *See Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-156, 6 AEC 831, 836 (1973); *see also Arizona Public Service Co.* (Palo Verde Nuclear Generating Station, Units 1, 2, & 3), LBP-82-117A, 16 NRC 1964, 1992 (1982) (finding that environmental uncertainties raised by intervenors in NRC proceedings do not result in a *per se* denial of the license, but rather are subject to a rule of reason).

risks or 'events whose probabilities they believe to be inconsequentially small.'"[14] Further, "NEPA gives agencies broad discretion to keep their inquiries within appropriate and manageable boundaries."[15] As stated by the Commission, although "there 'will always be more data that could be gathered,'" agencies 'must have some discretion to draw the line and move forward with decisionmaking.'"[16]

When challenging NRC Staff's environmental review, an intervening party must identify, with some specificity, the alleged deficiencies in the NEPA analysis.[17] An EIS-level document such as the Ross ISR Project FSEIS may have mistakes or errors but, so long as they are not significant or material, it does not represent an inadequacy in NRC Staff's environmental review.[18] NRC Staff's environmental review is deemed to be adequate unless NRC Staff "has failed to take a 'hard look' at significant environmental questions—i.e., the Staff has unduly ignored or minimized pertinent environmental effects."[19] NEPA provides no guarantee that federally approved projects will not have adverse environmental impacts, nor does NEPA require agencies to select the most environmentally advantageous or benign option available. *See Hydro Resources, Inc.* (Crownpoint Uranium Project), CLI-06-29, 64 NRC 417, 429 (2006).

NEPA analyses often must rely upon imprecise and uncertain data, particularly when forecasting future technological developments, which should be judged on their

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[14] *Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Nuclear Power Station, ALAB-919, 30 NRC 29, 44 (1989) (citation omitted).
[15] *Louisiana Energy Servs, L.P.*, CLI-98-3, 47 NRC at 103 (internal citation omitted).
[16] *Entergy Nuclear Generation Co.* (Pilgrim Nuclear Power Station), CLI-10-11, 71 NRC 287, 315 (2010) (footnote omitted).
[17] *See Hydro Resources, Inc.* (Crownpoint Uranium Project), CLI-99-22, 50 NRC 3, 13 (1999).
[18] *See Exelon Generation Co.* (Early Site Permit (ESP) for Clinton Site), CLI-05-29, 62 NRC 801, 811 (2005) ("[I]n an NRC adjudication, it is Intervenors' burden to show the 'significance and materiality' of mistakes in the EIS).
[19] *See Duke Energy Corp.* (McGuire Nuclear Station, Units 1 & 2; Catawba Nuclear Station, Units 1 & 2), CLI-03-17, 58 NRC 419, 431 (2003) (discussing what an intervenor must allege, with adequate support, to litigate a NEPA claim).

reasonableness.[20] "NEPA gives agencies broad discretion to keep their inquiries within appropriate and manageable boundaries."[21] When faced with uncertainty, NEPA only requires "reasonable forecasting."[22] In short, NEPA allows agencies "to select their own methodology as long as that methodology is reasonable."[23]

For source material milling facilities such as the Ross ISR Project, 10 CFR Part 51 regulations require that a new operating license application's potential environmental impacts be reviewed using an environmental impact statement (EIS) level document.[24] However, for purposes of new ISR operating license applications, NRC Staff developed a programmatic or generic environmental impact statement (ISR GEIS) due to the largely standardized aspects of ISR projects across the nation. It is NRC's intent that all new ISR license applications utilize the programmatic analyses and conclusions in the ISR GEIS to the maximum extent practicable, so that the development of a site-specific FSEIS for each requested license is performed efficiently. In the instant case, NRC Staff developed the FSEIS for the Ross ISR Project which analyzed all resource areas for the Project per 10 CFR Part 51 regulations.

As a general matter, the Commission is an independent regulatory agency and,[25] while the Commission agrees that CEQ's regulations are entitled to deference where appropriate, in developing Part 51 of its regulations, the Commission has stated that it is not bound by those

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[20] *Louisiana Energy Servs.* (Claiborne Enrichment Center), LBP-96-25, 44 NRC 331, 355 (1996).

[21] *Louisiana Energy Services L.P.* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 103 (1998) (internal citation omitted).

[22] *Scientists' Inst. for Pub. Info., Inc. v. AEC*, 481 F.2d 1079, 1092 (D.C. Cir. 1973). "[I]nherent in any forecast . . . is a substantial margin of uncertainty," and therefore the forecast should be accepted if it is "reasonable." *Niagara Mohawk Power Corp.* (Nine Mile Point Nuclear Station, Unit 2), ALAB-264, 1 NRC 347, 365-67 (1975).

[23] *Id*. at 13; *see also The Lands Council v. McNair*, 537 F.3d 981, 1003 (9th Cir. 2008) (finding that an EIS need not be based on the "best scientific methodology available").

[24] *See* 10 CFR § 51.20(b)(8) (2014).

[25] *See Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Nuclear Power Station), ALAB-876, 26 NRC 277, 284 n.5 (1987).

portions of the CEQ's NEPA regulations that have some substantive impact on the way in which the Commission performs its primary regulatory responsibilities.[26]

The SEIS for the Ross ISR Project was prepared in accordance with applicable NRC regulations and was issued in draft form for public comment on March 21, 2013 for a period of forty-five (45) days. NRC Staff responded to relevant public comments, including those submitted by Strata and Intervenors, and published such responses in the FSEIS on February 28, 2014.

2. NUREG-1748 Environmental Report Guidance

Pursuant to 10 CFR § 51.90 *et seq.*, NRC Staff developed NUREG-1748 entitled *Environmental Review Guidance for Licensing Actions Associated with NMSS Programs* (hereinafter "NUREG-1748")[27] to provide license applicants with its interpretation of 10 CFR Part 51 requirements for environmental reports (ER) for a range of operating licensing actions, including new ISR license applications. NUREG-1748 provides license applicants with an acceptable format for these ERs and directs such applicants to provide information regarding site-specific conditions at an ISR project site. To the extent relevant and appropriate, ISR license applicants are encouraged to utilize the analyses and conclusions in the GEIS to support their site-specific ER. Strata's license application included an ER modeled on the guidance in NUREG-1748.

3. NUREG-1569: Standard Review Plan For ISR License Applications

NRC Staff evaluates new ISR license applications in accordance with the aforementioned requirements in 10 CFR Part 40 and Appendix A Criteria, as well as NRC Staff guidance

[26] *See Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), CLI-91-02, 33 NRC 61 (1991).
[27] NUREG-1569 is currently listed as Strata Exhibit SEI-007. However, for ease of reference, citations to this exhibit is listed throughout this document as "NUREG-1569."

contained in NUREG-1569 entitled *Standard Review Plan for In Situ Leach Uranium Extraction Facilities* (hereinafter "NUREG-1569").[28] NUREG-1569 was issued for public comment in October of 1997 and later in February of 2002 and was finalized in June of 2003, thereby rendering the document formal Commission guidance created specifically to address ISR licensing decisions.

With respect to Footnote 6 in the Licensing Board's recent August 12, 2014 Order denying Intervenors' motion for summary disposition of Contention 1, as noted above, Strata recognizes that NUREG-1569 is not binding like a regulation on a Licensing Board. However, while it is not binding on the Licensing Board, the Commission has stated in its decisions in *Seabrook* and *Private Fuel Storage* that it is nonetheless entitled to special weight. *See Nextera Energy Seabrook, LLC* (Seabrook Station, Unit 1), CLI-12-05, 75 NRC 301, 314, n.78 (2012); *see also In the Matter of Private Fuel Storage* (Independent Spent Fuel Storage Installation), CLI-01-22, 54 NRC 255, 264 (2001). In its 2005 *Yankee* decision, the Commission further elaborated on the role of NRC Staff guidance with respect to regulatory compliance:

> "We recognize, of course, that guidance documents do not have the force and effect of law. Nonetheless, guidance is at least implicitly endorsed by the Commission and therefore is entitled to correspondingly special weight."

Yankee Atomic Electric Co. (Yankee Nuclear Power Station), CLI-05-15, 61 NRC 365, 375, n.26 (2005); *see also Consumers Power Co.* (Big Rock Point Nuclear Plant), ALAB-725, 17 NRC 562, 568 & n.10 (1983) (finding that NUREGs are entitled to considerable prima facie or special weight). Indeed, the Commission itself has indicated that conformance with regulatory guides is likely to result in compliance with specific regulatory requirements, though nonconformance with such guides does not mean noncompliance with the regulations. *See Petition for Emergency & Remedial Action*, CLI-78-6, 7 NRC 400, 406-407 (1978). Thus, in the absence of

[28] *See* Strata Exhibit SEI-007.

other evidence, adherence to guidance may be sufficient to demonstrate compliance with the regulatory requirements. *Metropolitan Edison Co.* (Three Mile Island Nuclear Station, Unit 1), ALAB-698, 16 NRC 1290, 1299 (1982), *rev'd in part on other grounds*, CLI-83-22, 18 NRC 299 (1983).

NUREG-1569's Response to Comments provides evidence of these facts. In the introduction to the Response to Comments, NRC states:

> "The review plan provides general guidance on acceptable methods for compliance with the existing regulatory framework.[29] As described in an NRC white paper on risk-informed, performance-based regulation (SECY-98-144), however, the applicant has flexibility to propose other methods as long as it demonstrates how it will meet regulatory requirements."[30]

NUREG-1569, *Notice of Availability of a Standard Review Plan (NUREG-1569) for Staff Reviews for In Situ Leach Uranium Extraction License Application* at 1.

Further, this portion of NUREG-1569 states that it prescribes "standard practices that have been found acceptable in demonstrating compliance at *in situ* leach uranium extraction facilities have been placed in the standard review plan as one approach that the staff may use in determining compliance." *Id.* at 4. Based on these statements, NUREG-1569 provides license applicants with a framework for compliance with NRC uranium recovery regulations and, by implication, demonstrates that satisfaction of its requirements will render a license application acceptable. Thus, based on the aforementioned case law, it appears that NUREG-1569 should be accorded special weight when addressing Strata's and NRC Staff's compliance with NRC regulations for ISR facilities in this proceeding

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[29] *See Gulf States Utilities Co.* (River Bend Station, Units 1 and 2), ALAB-444, 6 NRC 760 (1977).
[30] To this point, NUREG-1569 also states "the Commission directed the staff to update its regulatory guidance related to *in situ* leach uranium extraction facilities, and in doing so, to provide guidance on use of risk-informed, performance-based regulatory philosophies. NUREG-1569 incorporates this direction from the Commission." NUREG-1569, *Notice of Availability of a Standard Review Plan (NUREG-1569) for Staff Reviews for In Situ Leach Uranium Extraction License Applications* at 4.

Strata also notes that the Commission has formally delegated authority to implement/interpret the Commission's regulations in 10 CFR Part 40 and its Appendix A Criteria to NRC Staff.[31] NUREG-1569 also is an official NRC document created after multiple ISR Licensing Board/Commission decisions in the *Hydro Resources, Inc.* Subpart L proceeding (*e.g.*, LBP-99-30, CLI-00-12)[32] regarding license conditions that "will allow particular determinations to be made post-licensing" prior to operations in a wellfield) to provide clarity to the ISR licensing process in light of the *Hydro Resources, Inc.* proceeding.[33] This guidance has been used by all recent ISR license applicants (now licensees) to provide NRC Staff with the information it states will lead to approval of an ISR license application.

NUREG-1569 serves as NRC Staff's interpretation of its 10 CFR Part 40 regulations and Appendix A Criteria as applied to ISR license applications, specifically with respect to safety/technical issues and technical reports (TR). In its Table of Contents, NUREG-1569 delineates the resource areas that will be addressed by NRC Staff in reviewing license applicants' TRs, with the caveat that deviations from the guidance therein are permissible assuming that they are properly justified and are adequate to protect public health and safety and the environment consistent with the AEA's statutory mission. Further, with respect to NUREG-1569's relevance to license applicants' environmental reports (ER), Table 1 of NUREG-1569

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[31] *See* 10 CFR § 1.41(b)(18&19); *see also* United States Nuclear Regulatory Commission, *NRC Manual, Chapter 0124: Organization and Functions Office of Nuclear Material Safety and Safeguards* (October 27, 1989). This is directly applicable to uranium recovery as the Uranium Recovery Branch was part of NMSS prior to being separated into the Office of Federal and State Materials and Environmental Management Programs (FSME).

[32] *See In the Matter of Hydro Resources, Inc.* (Crownpoint Uranium Project), CLI -00-12, 52 NRC 1 (2000); *In the Matter of Hydro Resources, Inc.* (Crownpoint Uranium Project), LBP-99-30, 50 NRC 77 (1999).

[33] It is also worth noting that Phase II of the *Hydro Resources, Inc.* Subpart L proceeding was briefed and decided after finalization of NUREG-1569 in 2003 and affirmed by the Commission. Thus, many of the resource areas discussed in NUREG-1569 are representative of this line of cases and should be considered binding as Commission precedent.

contains a comparison chart listing all sections of the guidance and identifying which such sections apply directly to the 10 CFR Part 51 environmental review or jointly to the safety/technical review. *See* NUREG-1569 at Introduction, xviii-xix.

NUREG-1569 also was developed with a specific eye towards the aforementioned Part 40.32(e) construction rule. As stated in the NUREG-1569 Response to Comments regarding a comment on construction of ISR facilities prior to license issuance lest the applicant run the risk of having its requested license denied, "NRC considers this statement to be consistent with the requirements of 10 CFR 40.32(e) and believes it to be appropriate for the agency's responsibilities to protect public health and safety and the environment." NUREG-1569, *Notice of Availability of a Standard Review Plan (NUREG-1569) for Staff Reviews for In Situ Leach Uranium Extraction License Application* at 5. NUREG-1569, Chapter 2 entitled *Site Characterization* provides license applicants with guidance on submitting data, information, and analyses to satisfy regulatory requirements supporting any initial licensing decision on an NRC ISR license application. More specifically, Chapter 2 addresses the sections of *license applications* related to site-specific groundwater conditions, including the development of pre-license issuance, "baseline" groundwater quality as mandated by 10 CFR Part 40, Appendix A, Criterion 7. Criterion 7 of Appendix A is specifically tailored towards pre-license issuance, baseline site characterization at a proposed uranium recovery project site across a wide range of resource areas, including but not limited to pre-license issuance groundwater quality conditions.[34]

Chapter 5 of NUREG-1569 entitled *Operations* addresses ISR operations, including the development of Criterion 5 "Commission-approved background," which is the foundation for development of all other operational and restoration standards for groundwater at a *licensed* ISR

[34] *See* Page 33 *infra.*

site. It is critical to note that Criterion 5 "Commission-approved background" cannot be developed without the ability to fully delineate hydrological conditions in an ISR-amenable ore body through construction and testing of a complete monitor well network(s). Per the Part 40.32(e) construction rule, an ISR license applicant is not permitted to install a complete wellfield and associated monitor well networks until after a license is issued.[35] Thus, Criterion 5 "Commission-approved background" cannot be known until after a license is issued.

To the extent that the provisions of NUREG-1569, Chapters 2 and 5 are representative of the Phases I and II *Hydro Resources, Inc.* line of cases, the Licensing Board should be bound by the Commission precedent articulated in those cases. Thus, the Licensing Board must be mindful of this distinction between Criterion 7 (embodied in NUREG-1569, Chapter 2) "baseline" and Criterion 5 (embodied in NUREG-1569, Chapter 5) "Commission-approved background" when evaluating groundwater–specific contentions in this proceeding. *Compare In the Matter of Hydro Resources, Inc.* (Crownpoint Uranium Project), CLI-06-01, 63 NRC 1, (2006).

4. Burden of Proof

An applicant generally has the burden of proof in a licensing proceeding.[36] However, in cases involving NEPA contentions, the burden belongs to the NRC Staff because it has the ultimate responsibility for complying with NEPA.[37] Nevertheless, because "the Staff, as a practical matter, relies heavily upon the Applicant's Environmental Report in preparing the

[35] *See* 10 CFR § 40.4 definition of 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)" and, thus, is not permitted under 10 CFR § 40.32(e).
[36] 10 C.F.R. § 2.325.
[37] *See, e.g.*, *Duke Power Co.* (Catawba Nuclear Station, Units 1 & 2), CLI-83-19, 17 NRC 1041, 1049 (1983).

[SEIS], 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."[38]

The showing necessary to meet the burden of proof is the "preponderance of the evidence" standard.[39] The Licensing Board therefore must consider the evidence and testimony and determine whether the NRC Staff and Strata have shown by the preponderance of the evidence that the NRC Staff complied with NEPA.

Adjudicatory findings on NEPA issues become part of the environmental "record of decision" and can supplement the FEIS.[40] In an adjudicatory hearing, to the extent that any environmental findings by the Presiding Officer (or the Commission) differ from those in a final Part 51 document, the document is deemed modified by the decision. *See Hydro Resources, Inc.* (Crownpoint Uranium Project), CLI-01-4, 53 NRC 31, 53 (2001). Accordingly, to the extent that the SEIS does not address an issue or does not adequately address a topic, the information presented in the hearing can be relied upon to satisfy the NRC's NEPA obligation.[41]

In NRC licensing proceedings, "the ultimate NEPA judgments regarding a facility can be made on the basis of the entire record before a presiding officer, such that the [SEIS] can be deemed to be amended pro tanto."[42] Therefore, the Board may consider the full record before it, including the testimony and exhibits at the hearing, to conclude that "the aggregate is sufficient

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[38] *Louisiana Energy Servs., L.P.* (Claiborne Enrichment Center), LBP-96-25, 44 NRC 331, 338-39 (1996) (citing *Pub. Serv. Co. of N.H.* (Seabrook Station, Units 1 & 2), ALAB-471, 7 NRC 477, 489 n.8 (1978)), *rev'd on other grounds*, CLI-97-15, 46 NRC 294 (1997).

[39] The definition of "preponderance of the evidence" in Black's Law Dictionary, 6th ed. (p. 1182), is "[e]vidence which is of greater weight or more convincing than the evidence offered in opposition to it; that is, evidence which as a whole shows that the fact sought to be proved is more probable than not."

[40] *Louisiana Energy Servs., L.P.* (Nat'l Enrichment Facility), CLI-06-15, 63 NRC 687, 707 n. 91 (2006).

[41] *Louisiana Energy Servs., L.P.* (Nat'l Enrichment Facility), LBP-06-08, 63 NRC 241, 285-286 (2006); *see also Hydro Resources, Inc.* (P.O. Box 15910, Rio Rancho, NM 87174), CLI-01-04, 53 NRC 31, 53 (2001) ("[I]n an adjudicatory hearing, to the extent that any environmental findings by the Presiding Officer (or the Commission) differ from those in the FEIS, the FEIS is deemed modified by the decision.").

[42] *Louisiana Energy Servs., L.P.* (Nat'l Enrichment Facility), LBP-05-13, 61 NRC 385, 404 (2005).

to satisfy the agency's obligation under NEPA" to take a "hard look" at the environmental consequences of issuing a license.[43]

III. STRATA'S EXPERT WITNESSES

While it has submitted Strata Exhibits SEI-001, SEI-005, SEI-026, SEI-039, and SEI-042 as exhibits to this Initial Statement of Position, Strata believes it is important to provide the Licensing Board with a brief description of its expert witnesses and their credentials here:

A. RALPH KNODE

- As Chief Executive Officer, Mr. Knode is responsible for the direction and oversight of all exploration, permitting, construction and operations activities for Strata. A geologist by training, Mr. Knode has over thirty (30) years of domestic and international experience in in-situ mine construction, mine operations and property evaluation, demonstrating proven general management and executive leadership skills in building and overseeing multi-professional, multi-national technical teams. His mine construction experience includes large contract administration, project design and engineering, contractor management, and safety and environmental oversight. In the field of mine operations, Mr. Knode has directed teams for leading uranium producers worldwide, providing strategic and operational planning, regulatory compliance review and oversight, budget and financial accountability, and property evaluations.

- Mr. Knode's testimony is set forth in Strata Exhibit SEI-001.

B. MIKE GRIFFIN

- Mr. Griffin has over 35 years' experience in uranium field operations, facility licensing, health and environmental protection, reclamation, and decommissioning. Mr. Griffin joined Strata after four (4) years with Uranium One Inc, one of the world's largest publicly traded uranium producers, where he served as Vice President of Safety, Health and Environment/Corporate Social Responsibility. During that time, Mr. Griffin was responsible for the development and oversight of safety, health, environmental and corporate social responsibility programs at conventional and ISR operations in the United States, Australia, Tanzania and Kazakhstan. Prior to joining Uranium One, Mr. Griffin directed Griffin Consulting, where he managed the preparation of an NRC license amendment application for an ISR client and coordinated the efforts of multiple subject matter experts. Mr. Griffin also served as Manager of Health, Safety and Environmental Affairs with Crow Butte Resources Inc from 1998-2006, where he was the primary

[43] *Louisiana Energy Servs., L.P.*, LBP-06-08, 63 NRC at 286.

corporate contact with regulatory agencies and directed the activities of the EHS Department. In this capacity, Mr. Griffin was responsible for all environmental, health and safety compliance programs and regulatory affairs for an ISR operation, as well as preparation of all regulatory submittals.

- Mr. Griffin's testimony is set forth at Strata Exhibit SEI-039.

C. BEN SCHIFFER

- Mr. Schiffer has been working as a geologist for nearly nineteen (19) years and as a professional geologist for nearly thirteen (13) years, during which he has focused on both surface and groundwater hydrology, primarily in the Powder River Basin. Before joining WWC, he served as a field geologist for Cogema's Christensen Ranch ISR mine. Mr. Schiffer has extensive experience in evaluating wellfield performance, aquifer characteristics and suitability for in-situ mining techniques as well as establishing baseline monitor well programs for mine permitting. In addition, Mr. Schiffer assisted in the groundwater restoration planning and operations at Cogema's Texas facilities, particularly at Holiday-El Mesquite Mine in Jim Hogg County, TX.

- Mr. Schiffer's testimony is set forth in Strata Exhibit SEI-005.

D. RAY MOORES

- Ray Moores is a senior Engineer with WWC Engineering. Mr. Moores holds both a Bachelors and Masters degrees in Civil Engineering from the University of Wyoming. Since joining WWC Engineering in 2002, one of his specialties has been in groundwater and surface water modeling in a variety of contexts, including conventional oil and gas produced water disposal, coal bed natural gas development, surface mining, and *in-situ* mining. Mr. Moores has assisted with and provided oversight for aquifer pumping tests at ISR mines and for aquifer characterization at non-ISR operations. He has also conducted local and regional groundwater impact analyses and *in-situ* uranium wellfield analyses. Mr. Moores is a licensed professional engineer in the State of Wyoming and Colorado.

- Mr. Moores' testimony is set forth in Strata Exhibit SEI-042.

E. HAL DEMUTH

- Mr. Demuth is a senior engineer/hydrologist and principal of Petrotek Engineering Corporation. He holds an M.S. in Hydrogeology from the University of Idaho a B.S. in Petroleum Engineering from the University of Tulsa. Mr. Demuth is a member of the Association of Ground-Water Scientists and Engineers (NGWA), the Society of Petroleum Engineers (SPE) and the Society of Mining Engineers (SME). He has served as a manger of groundwater projects for ISR operations (permitting, characterization, design, optimization and regulatory compliance). He currently serves as Team Leader at Petrotek for aquifer testing operations throughout the United States. Mr. Demuth also

has served as project manager for groundwater modeling studies related to TDS and radionuclides/metals plume remediation and restoration operations and regulatory compliance for uranium ISR operations.

- Mr. Demuth's testimony is set forth in Strata Exhibit SEI-026.

F. ERROL LAWRENCE

- Mr. Errol Lawrence currently serves as a senior hydrologist employed by Petrotek Engineering Corporation. Mr. Lawrence currently holds a Masters degree in Engineering Geology from the Colorado School of Mines and a Bachelors degree from Northern Arizona University. Mr. Lawrence is a registered professional geologist in the States of Wyoming and Texas and a member of the National Ground Water Association, the American Institute of Professional Geologists, and the National Water Well Association. Mr. Lawrence has worked on more than twelve (12) ISR projects in the United States, Paraguay, Turkey, and Kazakhstan. With specific regard to United States-based ISR projects, Mr. Lawrence has worked on nine (9) Wyoming and two (2) Texas ISR projects. Mr. Lawrence also served as a lead groundwater consultant for the Dewey-Burdock Project.

- Mr. Lawrence's testimony is set forth in Strata Exhibit SEI-026.

IV. STRATA INITIAL STATEMENT OF POSITION

A. THE ISR PROCESS

Prior to addressing the three (3) specific admitted contentions, it is important that the Licensing Board understand the basics of the ISR process so that the aforementioned ISR regulatory programs can be better understood.[44] As a general proposition, the existence of natural geologic, hydrologic, and geochemical conditions in aquifers amenable to the ISR process, the ISR process itself, and regulatory requirements for ISR operations and restoration taken together provide a significant package of mitigation measures to prevent potential short and long-term impacts to adjacent, non-exempt USDWs. There are several naturally occurring geologic, hydrologic, and geochemical conditions that, in and of themselves, contribute

[44] *See* Strata Exhibit SEI-031 which is the National Mining Association's Generic Environmental Report (GER) on ISR facilities submitted in support of NRC's development of the ISR GEIS.

significantly to the isolation of uranium and its associated heavy metals in a redistributed ore body from other portions of an aquifer that can potentially serve as a USDW and that can serve to complement and enhance the benefits of existing NRC regulatory control requirements for operations and groundwater restoration.

ISR operations first were tried on an experimental basis in the early 1960s with the first commercial facility commencing operations in 1974. ISR processes continuously re-circulate native groundwater from the aquifer where the ore body resides after fortifying it with oxygen and/or carbon dioxide. Uranium deposits amenable to ISR processes occur in permeable sand or sandstones that typically are confined above and below by less permeable strata. Confinement is a natural environmental condition that acts to assist in the creation of isolated deposits of minerals (e.g., uranium) as a natural result of groundwater flow forced by less permeable layers above and below through coarser sands into reducing/oxygen deficient environments. These deposits can either be tabular or C-shaped deposits formed as "roll-fronts."

These uranium-bearing formations were formed by the lateral movement downgradient of groundwater bearing minute amounts of oxidized uranium in solution through the aquifer until precipitation of the uranium occurs along the boundary where the oxygenated waters encounter a zone of sufficient reductant. Currently, the uranium roll front deposition that has taken place over millions of years is *ongoing on a regional basis every day*. Regional roll fronts require broad areas of upgradient oxidation to keep uranium mobile until the oxygenated water moves downgradient and encounters a zone with sufficient reductant. It is at this regional *redox interface* where the oxygenated water is reduced and uranium is deposited in a reduced mineral phase in what is known as a rollfront ore body that ISR operations are conducted.

Uranium mineralization leaves a distinct radiochemical footprint or signature in the host rock and surrounding groundwater—that is, uranium occurs not only upon the rock matrices, but also in the groundwater within the ore body. In other words, given natural dissolution processes, uranium and uranium progeny that accumulate on the host sands also occur naturally in surrounding groundwater media. For a uranium ore body to be amenable to ISR processes using industry standard recovery chemistry, the ore zone must be saturated with relatively fresh water and the rock must have enough transmissivity for water to flow from injection to extraction wells. In other words, for the ISR process to work, the ore must be situated in a saturated, water-bearing interval referred to as an aquifer. *There are no ISR operations in ore bodies that are not in aquifers.*

Techniques for ISR operations, many of which are included in license conditions, including well construction techniques, regular well testing techniques (i.e., mechanical integrity testing (MIT)), development of NRC-approved upper control limits (UCL) for highly mobile constituents to provide "early warning" of potential excursions, and development of NRC-approved target restoration values (TRV).[45] Extensive monitor well systems, and well field balance and "bleed," have evolved to the point where these techniques complement and enhance the above-noted naturally occurring conditions to provide ongoing, iterative mitigation measures with the flexibility to adjust to site-specific conditions in order to protect adjacent USDWs.

After an ore body that is amenable to ISR processes is identified, the licensee develops wellfield designs to progressively remove uranium from the identified ore body. Wellfield design is based on grids with alternating extraction and injection wells, monitor wells above and

[45] NRC defines "excursions" as "when two or more excursion indicators in a monitoring well exceed their upper control limits." *See* United States Nuclear Regulatory Commission, NUREG-1910: Supplement 1, *Environmental Impact Statement for the Moore Ranch ISR project in Campbell County, Wyoming* (Final Report) (August 2010).

below the recovery zone, and a ring of monitoring wells surrounding the entire recovery zone to detect any potential *excursions* of solubilized uranium and other minerals from the uranium recovery production zone. Each wellfield is operated at the maximum continuous flow-rate achievable for that particular wellfield pattern area. Injection and extraction/production flow-rates are monitored and adjusted as necessary, so that injection can be balanced with extraction/production across the entire wellfield, with the injection flow smaller than the extraction flow by the amount of the "bleed" rate. The process "bleed" rate varies according to ore body geometry, well pattern and magnitude, and direction of the natural groundwater flow. Proper wellfield balance, including the process "bleed," maximizes recovery while protecting against recovery solution excursions.

The *sequential* development of ISR wellfields is an example of the iterative, "phased" nature of ISR projects. The development of these wellfields and the accumulation of a complete sampling database cannot take place until a project operator installs baseline and monitor wells. Engineers and geologists continually assess data as it is obtained, applying this new information to the next phase or activity, thus ensuring that subsequent exploration and delineation is based on the most up-to-date information possible to ensure proper well placement. Prior to installing monitor wells, additional exploration and delineation has to be conducted to assure the wells are properly placed. As wellfields are developed, all wells, including monitor wells, are subject to a variety of testing procedures, including air-lifting, to assure that they function appropriately prior to being sampled. Water quality sampling establishes water quality within and outside the recovery (ore) zone (i.e., at the monitor wells) and the aforementioned UCLs enable the licensee to readily determine if an excursion has occurred. A "lessons learned" approach is implemented, as the results in one wellfield may cause the site engineer or geologist to change design in the

next. This process is both progressive and iterative, as each wellfield is developed and tested with the mineral being progressively depleted from different parts of the ore body.

During active operations, native groundwater from the recovery zone in the aquifer is pumped to the surface for fortification with oxygen and carbon dioxide and/or sodium bicarbonate (hereinafter defined as "lixiviant"). This fortified water, which is similar to soda water (i.e., not water fortified with toxic chemicals), is then returned to the recovery zone through a series of *injection* wells in varying patterns in the well-fields. The volume of water withdrawn from *extraction wells* in these patterns exceeds the water injected into the patterns creating a "cone of depression" that assures a net inflow of water into the recovery zone of the aquifer. This is to ensure no lateral water movement from the exempted portion of the aquifer where uranium recovery operations will occur, so that any adjacent, non-exempt USDWs will not be impacted by excursions of recovery solutions.

The extraction pumping causes the injected lixiviant to move through the uranium ore body oxidizing and solubilizing the uranium present in the host sandstone. The water from the extraction wells is then run through IX columns containing synthetic resins, which remove the uranium in a process very similar to that used to remove minerals from "hard" drinking water in a conventional home water softener. The uranium is then stripped from the IX resins using a brine solution (again similar to the backwash that takes place in a home water softener). The uranium in this rich eluate is then precipitated chemically, dewatered, and dried to produce saleable *yellowcake*. Strata Exhibit SEI-032 includes two figures that illustrate generic ISR wellfield and CPP operations.

After uranium removal in the IX column, the water in the circuit is re-fortified and re-injected as part of a continuous process until the uranium in the ore zone is exhausted. As noted

above, to help keep the continuously operating system in balance, the extra water that is extracted is removed from the circuit as a "bleed." Ultimately, the "bleed" fluid (as treated or untreated water, depending on relevant NRC or EPA underground injection control (UIC) requirements) is discharged to holding ponds or tanks and from there it is disposed of using deep well injection, solar evaporation, land application or some combination of these methods.

After active ISR operations cease, the groundwater in the recovery zone is restored *consistent with* Criterion 5(B)(5) "Commission-approved background," that is established post-license issuance. The natural reductive and confining conditions noted above and NRC's requirement that an ISR operator engage in active groundwater restoration in the recovery zone together serve as the primary bases for minimizing or eliminating of any potential long-term impacts to adjacent, non-exempt USDWs. Restoration efforts are designed to flush recovery solutions from the recovery (ore) zone to enhance its natural pre-operational reductant properties. Logic dictates and studies support[46] that these reducing properties which created the redistributed ore body in the first place will be more than adequate to retard movement of mobilized constituents (particularly heavy metals such as uranium) over the long-term.

Upon completion of groundwater restoration, wells are sealed or capped below the soil surface using approved plugging and abandonment methods contained in license conditions and the soil surface is restored. Surface process facilities are decontaminated, if necessary, and removed, and any necessary reclamation and re-vegetation of surface soils is completed. As a result, after site closure is completed and approved, there may be no visual evidence of an ISR site, and the surface of the decommissioned site will be available for unrestricted (i.e., any future) use. It is at this point that NRC will terminate an ISR operator's license. However,

[46] An example of supporting studies is United States Nuclear Regulatory Commission, NUREG/CR-3136, *Aquifer Restoration at ISL Uranium Mines: Evidence for Natural Restoration Processes* (April, 1983).

unlike the surface of the decommissioned site, the recovery (ore) zone aquifer remains exempted from serving as a USDW in perpetuity, as EPA UIC regulations do not contain a mechanism to revoke an aquifer exemption.[47]

Liquid waste also is generated during groundwater restoration when uranium recovery operations have ceased. Groundwater sweep uses existing production wellfield patterns to flush the recovery zone with natural groundwater from outside of the recovery zone and to extract the flushed water from the ore zone for treatment on the surface. Removed groundwater can be treated using reverse osmosis (RO) to create a de-ionized water source which can be re-injected to accelerate groundwater restoration. In fact, more recent groundwater restoration efforts have often used a combination of these two techniques and, possibly, the injection of a reductant and pH modifier to optimize restoration results. Groundwater restoration returns water within the depleted recovery zone to approved levels determined by NRC to be adequate to minimize or eliminate post-restoration migration of contaminants and any potentially significant, adverse impacts to adjacent, non-exempt USDWs.

In over three decades of operations, there have been *no significant, adverse impacts to adjacent, non-exempt USDWs* outside the recovery zone and into the related area of review (AOR)[48] from ISR operations in the United States.[49] Wellfield balancing, use of the "bleed,"

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[47] It should be noted that since EPA's UIC regulations are implementing the SDWA, once an aquifer or portion thereof is exempted and can never be a USDW, UIC regulations do not require aquifer restoration of that exempted aquifer or portion thereof.

[48] The "area of review" is essentially a "buffer zone" prescribed by the United States Environmental Protection Agency's (EPA) underground injection control (UIC) program to provide additional protection for USDWs during ISR uranium recovery. The regulation also states:

> "In determining the fixed radius, the following factors shall be taken into consideration: Chemistry of injected and formation fluids; hydrogeology; population and ground-water use and dependence; and historical practices in the area."

40 CFR § 146.6.

[49] *See* United States Nuclear Regulatory Commission, *Staff Assessment of Groundwater Impacts from Previously Licensed In-Situ Uranium Recovery Facilities*, (July 10, 2009) (hereinafter "Strata Exhibit SEI-004A); *see also* United States Nuclear Regulatory Commission, *12/11/08 Commission Meeting:*

and extensive ongoing monitoring and frequent MITs at ISR sites have been highly successful in assuring that leach solution is contained within the recovery (ore) zone and to mitigate the impacts of any excursions. Before monitoring ceases, restoration and stabilization are determined by NRC to be complete to minimize or eliminate the potential risk of excursion that could result in the migration of contaminants from the exempted recovery zone portion of the aquifer to adjacent, non-exempt portions of the aquifer.

ISR projects can be operated in one of two facility types. First, an ISR project can be operated using a CPP and wellfields that are directly adjacent to the processing facility. This allows the operator to license a defined site footprint and to construct adjacent well-fields from which pregnant lixiviant may be directly pumped to the central processing facility. This approach also allows an ISR operator to receive uranium-loaded IX resins from satellite wellfield owned and/or operated by that licensee or another operator.

In instances where uranium ore bodies do not contain enough uranium or are located a significant distance from a CPP to justify the licensing, construction and operation of central processing facilities, ISR operators may use satellite or so-called satellite technology to develop wellfields that can be at considerable distances from a central processing facility. The use of satellite wellfields has been utilized to recover uranium in South Texas as early as 1980 and is currently used by various ISR companies in Wyoming and Texas. Each satellite wellfield can serve as a stand-alone location that recovers uranium using IX columns and resins. When the IX resins are fully loaded with uranium, they are pumped into transport conveyances, typically tanker trucks. After the uranium-loaded IX resins are pumped into the transportation

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Briefing on Uranium Recovery, (Stephen Heare, Director of EPA's Division of Water at EPA Headquarters testifying to the Commission in 2008 about potential problems in the UIC program: "there is a fair amount of history and experience with the process; the idea of dissolving in a formation and then bringing the material back up and separating it. Again, I'm not aware that we're aware anyway in our program of major problems that have been caused by these facilities").

conveyance, the resins are transported to a central processing facility where the resins will undergo the same processes described above.

B. ADMITTED CONTENTIONS

As stated in Section I, above, there are currently three (3) admitted contentions under consideration. In the Sections below, Strata will address each contention with the support of its expert testimony, relevant portions of the ROD for NRC License No. SUA-1601, and identified pre-filed exhibits. Each specific Contention argument will address the major legal and/or factual argument proffered by Intervenors in their pleadings to date; but, Strata notes that each of its arguments rely in total on its expert witness testimony and attached exhibits, even if not specifically mentioned in the text of this Initial Statement of Position. As will be shown below, Strata's initial position is that none of Intervenors' admitted contentions should result in modifications to the ROD and NRC License No. SUA-1601 should be upheld as issued.

1. CONTENTION 1: Alleged Failure of NRC's FSEIS to Adequately Characterize Baseline Groundwater Quality

Contention 1 involves a series of allegations regarding baseline groundwater quality data and information presented by Strata in its license application and used by NRC Staff to issue NRC License No. SUA-1601. The allegations levied by Intervenors include the following: (1) an overall deficiency in the Commission's regulatory program for groundwater data gathering and analysis under 10 CFR Part 40, Appendix A Criteria for uranium recovery facilities; (2) allegations that Strata did not comply with NRC requirements for 10 CFR Part 40, Appendix A, Criterion 7 "baseline" groundwater quality data and Resource Conservation and Recovery Act of 1976(RCRA)/Comprehensive Environment Recovery and Compensation Liability Act of 1980[50] (CERCLA) requirements for proper statistical methods; (3) a challenge to NRC Staff's

[50] *See* 42 U.S.C. § 9601 *et seq* (1980).

conclusions in the FSEIS that Strata's proposed procedures for acquiring and analyzing post-license issuance groundwater quality data pursuant to 10 CFR Part 40, Appendix A, Criterion 5(B)(5) are adequate; (4) allegations that sampling and testing procedures performed for determining Criterion 7 "baseline" groundwater quality were conducted inappropriately; (5) allegations that pre-Strata and private water supply well water quality data were not provided in the license application or the FSEIS; and (6) allegations that site exploratory drilling and regional monitor well installation has significantly altered baseline conditions.

Contention 1 is an environmental contention in this proceeding and does not include any specific safety-related component, due to Intervenors' not proffering a new or amended contention challenging NRC Staff's Final SER or Strata's final license conditions. For the purposes of Contention 1, Strata plans to rely upon the testimony of Mr. Knode, Mr. Schiffer, Mr. Demuth, and Mr. Lawrence. For the reasons discussed below and based on the legal and factual argument presented in this Initial Statement of Position and the entirety of Strata's proffered expert witness testimony and exhibits, Strata's position is that Intervenors' allegations in Contention 1 should not result in any modification to the FSEIS, Strata's NRC License No. SUA-1601 or any other elements of the ROD.

Initially, Contention 1's allegations regarding the adequacy of "baseline" water quality appropriate for an initial NRC licensing decision must be put in the proper context, so that an evaluation of compliance with applicable NRC regulations for "baseline" groundwater quality can be understood. For ISR operations, the gathering and analysis of groundwater quality data for a license application at a project site is contingent on specific NRC regulatory requirements. As stated above, the proper context for understanding how "baseline" groundwater quality is determined at an ISR site is to evaluate NRC's Part 40, Appendix A Criteria in light of the 10

CFR § 40.32(e) construction rule. The construction rule imposes requirements on all uranium recovery license applicants regarding the type and extent of site preparation and development activities that can be performed without the need for an NRC 10 CFR Part 40 license. Part 40.32(e)'s provisions specifically state that:

> "In the case of an application for a license for a uranium enrichment facility, or for a license to possess and use source and byproduct material for uranium milling, production of uranium hexafluoride, or for the conduct of any other activity which the NRC determines will significantly affect the quality of the environment, the Director, Office of Federal and State Materials and Environmental Management Programs or his/her designee, before commencement of construction, on the basis of information filed and evaluations made pursuant to subpart A of part 51 of this chapter, has concluded, after weighing the environmental, economic, technical and other benefits against environmental costs and considering available alternatives, that the action called for is the issuance of the proposed license, with any appropriate conditions to protect environmental values. ***Commencement of construction prior to this conclusion is grounds for denial of a license to possess and use source and byproduct material in the plant or facility***."

10 CFR § 40.32(e) (emphasis added).

Based on the language of this Rule, NRC Staff has made plain that engaging in 10 CFR § 40.4 "construction" activities[51] at a proposed uranium recovery site without first obtaining a license can result in the denial of a submitted license application.

Prior to the finalization of the current Rule, the uranium recovery industry grappled with the interpretation of its predecessor rule with respect to site development activities that could be conducted prior to the issuance of a requested ISR license. In one case, an ISR license applicant proceeded to install a monitor well network for its initial wellfield at its proposed ISR site prior to the issuance of a license. At that time, there were no specific provisions in the prior Rule prohibiting such action; but rather, industry was forced to attempt to interpret the Rule to determine whether such activities could indeed be conducted. The ISR license applicant

[51] As noted previously, 10 CFR § 40.4's definition of "construction" includes installation of a wellfield package, including monitor well network(s). *See* 10 CFR § 40.4.

submitted a request to NRC Staff for a determination of whether such an activity (i.e., development of a monitor well network) could be conducted and, NRC Staff responded that the prior Rule did not allow such an activity to be conducted without running the risk of denial of its requested license.[52]

Partially as a result of the level of uncertainty associated with the prior Rule, the new construction rule now contains provisions specifically identifying site development activities that are not permitted to be conducted without a license lest the applicant risk denial of the requested license. More specifically, the current Rule does not permit an ISR license applicant to develop a wellfield package, including monitor well network(s), without NRC Staff at least completing the environmental review process.[53] 10 CFR § 40.4's definition of construction "means the installation of wells associated with radiological operations (e.g., production, injection, or monitoring well networks associated with in-situ recovery or other facilities)…." 10 CFR § 40.4. Thus, based on this specific language, ISR license applicants cannot install entire wellfields and associated monitor well networks without running the risk of having their requested license denied.[54] This factor is critical for the Licensing Board to consider when evaluating Intervenors' allegations in this Contention regarding adequacy of groundwater data

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[52] *See* Strata Exhibit SEI-033.

[53] *See* 76 Fed. Reg. 56951, 56954 (September 15, 2011); *see also In the Matter of Nuclear Fuel Services* (Erwin, Tennessee), CLI-03-03, 57 NRC 239 (2003) (finding that NRC regulations contemplate that "construction" should not begin until NRC's 10 CFR Part 51 environmental review is complete).

[54] NRC Staff has previously considered an industry request to translate 10 CFR Part 52 limited work authorization (LWA) site development activities to ISR project sites as preconstruction activities. In Regulatory Issue Summary (RIS) 2009-12, NRC Staff stated that they could not translate such requirements to 10 CFR Part 40 ISR project sites and that 10 CFR Part 40.14 specific exemptions were the proper route. However, this RIS also noted that NRC Staff *would not* consider issuance of a specific exemption for "wellfield monitoring network installation." *See* United States Nuclear Regulatory Commission, RIS-2009-12, *Uranium Recovery Policy Regarding Site Preparation Activities at Proposed, Unlicensed Uranium Recovery Facilities* (September 23, 2009).

depicting Criterion 7 "baseline" groundwater quality data and analyses submitted by Strata pursuant to NUREG-1569, Chapter 2 as reviewed and approved by NRC Staff.

With specific respect to adequacy of groundwater quality data submitted by Strata and reviewed by NRC Staff under NRC regulations and Commission guidance, 10 CFR Part 40, Appendix A, Criterion 7 requires that a license applicant conduct a minimum of twelve months of pre-operational monitoring to provide "complete baseline" data for a number of resource areas including site groundwater quality. However, as noted in NUREG-1569, Chapter 2, a license applicant is required to gather "baseline" site groundwater quality data *generally characterizing* site groundwater quality to support an ISR operating license application. As stated in Chapter 2, Page 2-2 of NUREG-1569, NRC's guidance states:

> "Reviewers should keep in mind that the development and initial licensing of an in situ leach facility is not based on comprehensive information. This is because in situ leach facilities obtain enough information *to generally locate the ore body and understand the natural systems involved.* More detailed information is developed as each area is brought into production….[R]eviewers should ensure that sufficient information is presented to reach only the conclusion necessary for initial licensing."

See also NUREG-1569, Chapter 2, *Site Characterization* at 2-2.

As stated previously, this is NRC Staff's interpretation of Commission regulations and is supported by the Part 40.32(e) construction rule which prohibits the installation of a wellfield package, including monitor well networks. This effectively limits the scope of data that can be gathered and analyzed pre-license issuance.

In addition, this regulatory approach set forth in Chapter 5 of NUREG-1569 is further supported by 10 CFR Part 40, Appendix A, Criterion 5(B)(5) which establishes groundwater quality standards for operating uranium recovery facilities. Unlike the required "baseline" groundwater quality data under Criterion 7 for *license applications*, Criterion 5(B)(5)'s operations groundwater quality standard is termed "Commission-approved background" and is

the primary groundwater protection standard for operational uranium recovery facilities. In the context of ISR facilities and in accordance with Chapter 5 of NUREG-1569, the final determination of "Commission-approved background" requires the installation of a wellfield package, including monitor well network(s) above, below, within, and around the wellfield, and an analysis of all groundwater quality data within that wellfield to determine a number of groundwater protection limits such as UCLs. This is the control system used to operate ISR facilities efficiently at these sites to monitor for, detect, and remediate potential excursions and be prepared to perform restoration after exhaustion of the ore body. Aquifer pumping tests are utilized to demonstrate adequate confinement for this control system to limit excursions from wellfields to assure that adjacent, non-exempt USDWs will be protected. As will be shown below, the control system based on well-accepted industry experience that is embodied in license conditions and standard operating procedures assures effective groundwater data gathering, monitoring, and protection.[55]

Strata's expert witnesses, Mr. Demuth and Mr. Lawrence, support Strata's interpretation of 10 CFR Part 40, Appendix A, Criteria 7 and 5 and NRC's Commission guidance at NUREG-1569, Chapters 2 and 5. Mr. Demuth's and Mr. Lawrence's testimony on this issue also disputes Intervenors' allegation that Strata needs additional data to establish a "credible baseline:"

> "These allegations demonstrate a clear lack of understanding of the different phases of baseline groundwater quality data collection for an ISR facility. In order to permit an ISR facility, the applicant must demonstrate the adequacy of site characterization baseline groundwater quality in conformance with NUREG-1569 Section 2. Such data are collected on a site-wide basis."

[55] Intervenors offer an allegation regarding the need for compliance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) in order for the FSEIS to be valid. This allegation is without merit, because the express language of CERCLA exempts releases from AEA-licensed facilities such as ISR sites. *See* 42 U.S.C. § 2210. Additionally, source and 11e.(2) byproduct material are expressly exempt from RCRA, thus Strata is not subject to RCRA protocols. *See* 40 CFR § 261.4(a)(4).

Strata Exhibit SEI-021 at ¶ A.14.

Mr. Demuth and Mr. Lawrence also support Strata's argument that Criterion 7 "baseline" water quality determinations are limited in scope and that the data necessary for determination of Criterion 5 "Commission-approved background" cannot be required until post-license issuance:

> At the same time the applicant must demonstrate appropriate procedures for establishing pre-operational groundwater quality data and target restoration values (TRVs) for each wellfield in conformance with NUREG- 1569 Section 5. It is not until after license issuance that the licensee is permitted to install the wellfield monitoring networks that allow the collection of pre-operational groundwater quality data for each wellfield that are necessary to establish CAB, UCLs and TRVs."

Id.

Mr. Demuth and Mr. Lawrence also cite to NRC's Commission guidance at NUREG-1569 which supports their conclusions:

> "NUREG-1569 clearly defines three phases of groundwater monitoring at (Exhibit SEI-007 at 133): 'There are three distinct phases of ground-water and surface-water monitoring: pre- operational, operational, and restoration. Pre-operational monitoring is conducted as a part of site characterization, and review procedures are in Section 2 of this standard review plan.'"

Id. at ¶ A.15 *quoting* NUREG-1569 at 5-36.

The definition of these phases of groundwater collection data, both pre and post-license issuance, also fully supports Strata's position that the 10 CFR § 40.32(e) construction rule is a primary regulatory reason for limiting the scope and amount of groundwater data that can be collected to define Criterion 7 "baseline" water quality for site characterization although, as noted above, only general site characterization is necessary pre-license issuance.[56] Once again, Mr. Demuth and Mr. Lawrence quote NUREG-1569, Mr. Demuth and Mr. Lawrence state:

[56] *See* Page 31-33 *supra*.

> "Beginning construction of process facilities, well fields, or other substantial actions that would adversely affect the environment of the site, before the staff has concluded that the appropriate action is to issue the proposed license, is grounds for denial of the application [10 CFR 40.32(e)]."

Id. at ¶ A.13 *quoting* NUREG-1569 at xviii.

This entire approach to compliance with NRC regulations for Criterion 7 "baseline" groundwater quality data in the initial license application phase is, as stated by Mr. Demuth and Mr. Lawrence:

> "the same approach that has been used in the industry for decades and that has been recently approved by NRC in source and byproduct material licensees issued for the Moore Ranch Project…Nichols Ranch Project…Lost Creek Project…and Dewey-Burdock Project…."

Id. at ¶ A.21.

The NUREG-1569 guidance for Criterion 7 "baseline" groundwater quality are set forth in Section 2-7.3 for use by license applicants. More specifically, Section 2.7-3 informs ISR license applicants that a satisfactory determination of such "baseline" groundwater quality includes:

> "Reasonably comprehensive chemical and radiochemical analyses of water samples, obtained within and at locations away from the mineralized zone(s), have been made to determine pre-operational baseline conditions. Baseline water quality should be determined for the mineralized and surrounding aquifers. These data should include water quality parameters that are expected to increase in concentration as a result of *in situ* leach activities and that are of concern to the water use of the aquifer (i.e., drinking water, etc.). The applicant should show that water samples were collected by acceptable sampling procedures…."

NUREG-1569 at 2-24, Section 2.7-3(4).

Mr. Demuth's and Mr. Lawrence's expert testimony also addresses Intervenors' allegation that baseline water quality needs to be analyzed to determine whether recovery (ore) zone groundwater quality exceeds MCLs and sufficient statistical analysis needs to be performed to determine the role of MCLs in water quality analyses. Initially, the recovery

(ore) zone aquifer must be exempted by EPA and satisfy the 40 CFR § 146.4 requirement that it cannot now nor ever in the future serve as a source of public drinking water. *See* 40 CFR § 146.4. Then, NRC regulations at 10 CFR Part 40, Appendix A, Criterion 5(B)(5) requires that Strata establish Commission-approved background water quality levels for a suite of constituents of concern (COC) to establish UCLs for excursion monitoring. Calculation of UCLs at an ISR does not consider MCL values. *See* Strata Exhibit SEI-026 at ¶ A.27. Pursuant to Criterion 5(B)(5), Commission-approved background is also one of the primary standards for restoration, which is background or an MCL, *whichever is higher*. Thus, it is possible that a constituent(s) would have a lower Commission-approved background level than an MCL.[57] Therefore, Intervenors' allegations on this issue are without merit.

Mr. Schiffer's testimony also addresses the presence of NRC Staff's evaluation of the Criterion 7 baseline water quality collected by Strata and the procedures for establishing Commission-approved background per Criterion 5. Mr. Schiffer cites to FSEIS Section 6.3.2.1 that specifically addresses the adequacy of Strata's procedures for establishing Commission-approved background for the recovery (ore) zone and overlying and underlying aquifers that will be monitored during operations and restoration. *See* Strata Exhibit SEI-005 at ¶ A.8 *quoting* FSEIS at 6-10-11. Further, Mr. Schiffer notes that the FSEIS (and the Final SER) evaluates the approach to assessing site characterization-level "baseline" groundwater quality, the results of NRC Staff's review of the data and analyses associated with this issue, and how these data and analyses comply with NUREG-1569 acceptance criteria. *See id.* at ¶¶ A.12-A.33. NRC Staff's review of this vast amount of data and analyses included an FSEIS review

[57] Frequently, recovery (ore) zone constituents, both radiological and non-radiological, do exceed MCLs; particularly constituents such as uranium, radium, and radon. Although no final MCL has been promulgated and finalized for radon, the EPA-proposed MCL was 300 pCi/L. By way of example, radon concentrations at the Ross ISR Project in the recovery (ore) zone range from 4,580 to 35,100 pCi/L.

of groundwater quality sampling and analytical results (FSEIS Section 3.5.3.3), potential operational impacts to groundwater quality (FSEIS Section 4.5.1.2), location of groundwater sampling points (FSEIS Section 3.5.3.3), and compliance with Criterion 7 requirements (FSEIS Section 3.5.3.3).[58]

Mr. Schiffer's testimony also offers additional discussion regarding compliance with Criterion 7 "baseline" groundwater quality requirements. For example, Mr. Schiffer opines that Intervenors' allegations that complete baseline data and laboratory water quality data for historic and recent data sets are not provided is incorrect. Mr. Schiffer states:

> "Baseline field and laboratory water quality data for the historic and recent data sets have been summarized in Section 3.4 of the ER (Strata Exhibit SEI-005A at 275-288 and 331-358. Tables 3.6 and 3.7 of the FSEIS also summarize water quality data from Strata's regional baseline monitoring network as well as the historical Nubeth wells. In addition, the FSEIS includes the groundwater quality sample results for the regional baseline monitoring network and existing water supply wells in Appendix C (Strata Exhibit SEI-009B 3 through 45). It is my testimony that the information in the ER and FSEIS clearly demonstrates that, 'The average water quality for each aquifer zone and the range of each indicator in the zone have been tabulated and evaluated' according to the guidance in NUREG-1569 acceptance criterion 2.7.3(4) (Strata Exhibit SEI-007 at 64)."

Id. at ¶ A.35.

Mr. Schiffer's testimony also refutes Intervenors' claims that pre-Strata and private supply well water quality data were not provided in the license application and evaluated in the FSEIS. In ¶¶ A.41-44 of his testimony, Mr. Schiffer states that Nubeth data from previous five-spot patterns and associated monitor well data taken pursuant to NRC requirements at NUREG-1569 and Regulatory Guide 4.14 were presented in the license application and were evaluated in the FSEIS (Section 3.5.3 for pre-Strata data and tabulated in Strata Exhibit SEI-009A at

[58] This listing from Mr. Schiffer's expert testimony is not intended to be exhaustive; but rather to provide the Licensing Board with representative examples of how the FSEIS addressed "baseline" water quality.

Table 3.7).[59] Paragraphs A.41-44 of Mr. Schiffer's testimony addresses the Intervenors' allegation that Strata's license application failed to provide detailed water quality data for private supply wells. This testimony discusses the various guidance provided by NRC and other entities, as well as the manner in which Strata's license application demonstrates conformance with agency guidance. These arguments and testimony demonstrate that Intervenors' allegations regarding the need for more data to determine "baseline" water quality at the Ross ISR Project site or that Strata's license application or NRC's FSEIS does not include adequate assessments of such data are without merit.

Intervenors allege that past Ross ISR Project site exploratory drilling and monitor well construction has significantly altered baseline conditions. Initially, Mr. Knode's expert testimony provides the Licensing Board with a detailed overview of the two different types of borehole drilling typically conducted at ISR sites and that were conducted at the Ross ISR Project site. *See* Strata Exhibit SEI-001 at ¶ A.6. Then, this testimony directly addresses the potential impacts to site groundwater quality from these types of drilling and demonstrates that Intervenors' allegation is technically incorrect. Mr. Knode states that typical industry exploratory drilling will not contaminate the targeted aquifer based on the presence of a "very tough and impermeable filtercake that prevents drilling fluids from leaving the borehole and entering the surrounding materials."[60] *Id.* at ¶ A.9. Mr. Knode concludes that, "In my opinion,

[59] Additional guidelines and/or requirements followed by Strata when obtaining this data are listed in Mr. Schiffer's expert testimony at Strata Exhibit SEI-007 at ¶¶ A.41-A.42.

[60] Mr. Knode also disputes Intervenors' allegation that fluids and gases that could be introduced into the aquifer during the drilling of boreholes would result in geochemical changes to the water there and change groundwater quality. Mr. Knode states that, "During mud rotary drilling only drilling fluid is introduced into the borehole. It is possible that there could be some small amount of air entrained within the drilling fluid, however the filter cake would effectively limit how much air would enter the aquifer. Additionally, the pressure of the aquifer, that is the level the water rises in the well above the top of the aquifer, would also serve to limit the introduction of air. Otherwise no air is injected during exploration borehole drilling with a mud rotary system." Strata Exhibit SEI-001 at ¶ A.8.

it is unrealistic to think that an entire aquifer could be contaminated by exploration drilling." *Id.*

With respect to well construction during drilling, Mr. Knode also notes that well construction is typically done in a manner similar to exploratory drilling, but it also has additional safeguards:

> "Standard practice in the ISR industry and a license condition at all U.S. ISR facilities, is to conduct mechanical integrity testing on the wells once they are completed. This is to ensure that there are no places were mining fluids can escape the well casing and enter upper aquifers."

Id. at ¶ A.10.

This well construction is typical at ISR sites based on Mr. Knode's experience and does not result in impacts to a targeted aquifer:

> "every effort is made to minimize impacts to all aquifers encountered during the drilling, well construction and development process. This includes the use of drilling fluids designed to coat the bore hole wall with filter cake which effectively eliminate the movement of drilling fluids into the aquifer. It also includes use of well casing materials that have no effect on the ground water and water quality."

Strata Exhibit SEI-001 at ¶ A.14.

In summary, Mr. Knode's ISR expert industry experience demonstrates that drilling exploratory boreholes or well construction at ISR sites has not previously and will not at the Ross ISR Project site cause introduction of contaminants or oxygen into a targeted aquifer, thereby altering baseline water quality conditions. Intervenors' suggestions to the contrary are merely generalized speculation that is not based on any "hands-on" experience.

Mr. Schiffer's testimony also addresses whether the Nubeth R&D site has altered baseline groundwater quality conditions. As discussed in his testimony, the Nubeth R&D site engaged in successful groundwater restoration resulting in termination of its NRC Source

Material license. Strata's ER offered measurements of restoration water quality data demonstrating that "concentrations of critical parameters…were at or below the levels measured prior to the initiation of the 5-spot test activities…." Strata Exhibit SEI-005 at ¶ A.37. Correspondence related to the approval of groundwater restoration and the termination of the license is directly quoted in ¶ A.37 of Mr. Schiffer's testimony and included in the license application. *See id.* Further, Mr. Schiffer notes that the cluster wells for the regional baseline monitoring network are upgradient of the Nubeth R&D site and, therefore, could not have measured any residual contamination in the area, thus adversely affecting baseline water quality as Intervenors claim. *See id.* at ¶¶ A.38-A.40. Indeed, Mr. Schiffer's testimony states, "it is impossible that any of the restored groundwater could have affected the site-wide, pre-license water quality as assessed by Strata, WDEQ, and NRC." *See id.* at ¶ A.40. Thus, Intervenors' allegation that the Nubeth R&D site has altered baseline water quality at the Ross ISR Project site is without merit.

Based on the argument offered above and the entirety of Strata's expert witness testimony and exhibits, Strata's initial position is that Intervenors' allegations in Contention 1 should not result in any modification to the FSEIS, Strata's NRC License No. SUA-1601 or any other elements of the ROD.

2. <u>CONTENTION 2:</u> Alleged Failure of NRC's FSEIS to Analyze Environmental Impacts of Failure to Restore Groundwater to Primary or Secondary Limits

Contention 2 alleges that Strata and NRC Staff did not adequately evaluate the potential environmental impacts associated with the possibility that Strata will not be able to restore recovery (ore) zone groundwater to applicable groundwater quality standards (10 CFR Part 40, Appendix A, Criterion 5(B)(5)) after cessation of active ISR operations. Intervenors offer a

series of allegations implicating both legal and factual arguments that will be addressed here. These allegations include: (1) a general allegation stating that ISR operators are unable to restore site groundwater to "baseline" groundwater quality conditions; (2) allegations that Strata and NRC Staff should have assessed ACLs for specific wellfields, including a virtual certainty that they will be required; (3) allegations that groundwater restoration has not been successful and that ISR operators struggle with controls of aquifer contamination; and (4) allegations that the FSEIS does not adequately discuss Strata-proposed restoration techniques and potential impacts. Strata also will address the legal aspects of the Licensing Board's intimation that an ISR license applicant might be required to assess potential environmental impacts of ACLs prior to knowing whether one will actually be needed. *See In the Matter of Strata Energy, Inc.* (Ross ISR Project), LBP-12-3, slip op. at 34-35 (February 10, 2012).

Contention 2 is an environmental contention in this proceeding and does not include any specific safety-related component, due to Intervenors' not initially admitting such a safety component in its initial hearing request and not proffering a new or amended contention on NRC Staff's SER or Strata final license conditions. For purposes of Contention 2, Strata plans to rely on the testimony of Mr. Knode, Messrs. Demuth/Lawrence, and Mr. Schiffer. For the reasons discussed below and based on the legal and factual argument presented in this Initial Statement of Position and the entirety of Strata's proffered expert witness testimony and exhibits, Strata's position is that Intervenors' allegations in Contention 2 should not result in any modification to the FSEIS, Strata's NRC License No. SUA-1601 or any other elements of the ROD.

As a legal matter, Intervenors' allegations within the scope of Contention 2 center upon an allegation that ISR operations consistently result in a failure to restore all recovery (ore) zone groundwater constituents to "baseline" levels. This alleged failure results in Intervenors' claims

that Strata and NRC Staff should have addressed the potential environmental impacts associated with the need to restore such groundwater to standards other than primary or secondary standards (i.e., ACLs). However, this allegation is entirely inconsistent with the manner in which the Commission's ISR regulatory program operates and, in essence, is a challenge to such regulations, which is not permitted in Subpart L proceedings. *See* 10 CFR § 2.335.[61]

Initially, the Commission's ISR regulatory program for the operational and restoration phases of groundwater protection and final restoration can be found in 10 CFR Part 40, Appendix A, Criterion 5. As discussed in the legal argument above for Contention 1, Criterion 5 is the critical component to NRC Staff's evaluation of applicable site-specific groundwater quality standards (e.g., post-license issuance development of "Commission-approved background") such as UCLs and TRVs. By developing "Commission-approved background," which Intervenors appear to refer to as "baseline," Strata can implement its groundwater protection program during operations to prevent migration of recovery solutions from the exempted recovery (ore) zone to adjacent, non-exempt aquifers.

Moreover, with respect to post-operational groundwater restoration, Criterion 5(B)(5) groundwater quality standards serve as the main basis for a final determination of whether groundwater restoration in a specific wellfield is complete. Criterion 5(B)(5) groundwater quality standards, which have been determined to specifically apply to ISR wellfields, articulate the groundwater quality standards that must be complied with both during operations and upon completion of restoration. Criterion 5(B)(5) mandates that during groundwater restoration efforts an ISR licensee such as Strata must restore recovery (ore) zone constituents to either Commission-approved background *or* a maximum contaminant level (MCL), *whichever is*

[61] A challenge to "the basic structure of the Commission's regulatory process or is an attack on the regulations" is not permitted in this proceeding. *See Philadelphia Electric Co.* (Peach Bottom Atomic Power Station, Units 2 and 3), ALAB-216), 8 AEC 13, 20-21 (1974).

higher, or an ACL. An ACL is a site-specific, constituent-specific, risk-based human health standard that requires a detailed technical and environmental justification through NRC license amendment to demonstrate that restoration to that level is adequately protective of human health and the environment. Criterion 5(B)(6) lays out a series of nineteen (19) factors that are considered by the Commission when evaluating a licensee's application for an ACL[62]. Initially, ACL standards and guidance were applied to conventional uranium mills but, since 2009,[63] have been directly applied to ISR wellfields as a matter of law.

With respect to the need to evaluate potential ACLs for specific wellfields in an ISR license application, Intervenors' allegations are misguided for several reasons. First, their allegation that it is a virtual certainty that an ISR wellfield will not be restored to Commission-approved background confuses the issue. Typically, ISR wellfields are restored with a majority of all constituents returned to at or below Commission-approved background levels. In some instances the levels are higher than Commission-approved background but are *consistent* with such levels and show no *steadily increasing trends*. In many cases, constituents not restored to at or below Commission-approved background levels are not even hazardous constituents and/or do not have maximum concentration limits (MCL) under the SDWA for public drinking water sources (e.g., chlorides and sulfates). Hence, Criterion 5(B)(6)'s requirements address

[62] Another factor that NRC can consider when evaluating an ACL license application for an ISR wellfield is whether the groundwater is restored to "prior class of use." A showing of restoration to "prior class of use" typically was the standard for approval of restoration in States such as Wyoming and Nebraska because the water in the recovery (ore) zone could still be used for whatever use it was used for prior to ISR operations. It is worth noting that most, if not all, wellfields in the United States have been restored to at least "prior class of use," which implies that there have been no irrevocable impacts to such groundwater resources.

[63] *See* United States Nuclear Regulatory Commission, Regulatory Issue Summary 2009-05, *Uranium Recovery Policy Regarding: (1)The Process for Scheduling Licensing Reviews of Applications for New Uranium Recovery Facilities and (2) The Restoration of Groundwater at Licensed Uranium In Situ Recovery Facilities* (April 29, 2009) ("Accordingly, the requirements in Criterion 5B of Appendix A apply to restoration of groundwater at uranium ISR facilities").

"hazardous" constituents. Given that the ultimate goal of groundwater restoration is to minimize or eliminate post-license termination migration of recovery solutions to adjacent, non-exempt aquifers, the concept and actuality of ACLs in Criterion 5(B)(6) are a fully assessed alternative to background or an MCL, as determined by two (2) federal agencies in three (3) full-fledged rulemakings.[64] Thus, an NRC-approved ACL is an extensively evaluated and formally approved alternative to background *or* an MCL.

However, given the fact that NRC has determined that Criterion 5(B)(5) applies as a matter of law to ISR wellfields, *it is possible* that ISR licensees will be required to obtain ACL approvals from NRC at the conclusion of groundwater restoration. As discussed in the testimony of Mr. Lawrence, ACL license amendment applications must contain "sufficient site-specific information to demonstrate that an elevated concentration of a given constituent will not pose a substantial present or future hazard to human health *or the environment*, as long as…the ACL is as low as reasonably achievable (ALARA),[65] considering practicable corrective actions." Strata Exhibit SEI-026 at ¶ A.31 (emphasis added). An ACL license application for any uranium recovery facility qualifies under 10 CFR Part 51 and NUREG-1748 as requiring a full environmental review and, at a minimum, an environmental assessment (EA), which at the very

[64] The three rulemakings alluded to here begin with the finalization of EPA's Resource Conservation and Recovery Act of 1976 (RCRA) regulations at 40 CFR Part 264, Subpart F which prescribes groundwater protection standards for RCRA facilities, including Part 264.94(a)(3) which discusses ACLs. The second rulemaking is EPA's 40 CFR Part 192 rulemaking pursuant to UMTRCA setting generally applicable standards for uranium mill tailings facilities. Part 192.32 specifically incorporates the aforementioned RCRA groundwater standards. The final rulemaking is NRC's conforming 10 CFR Part 40 rulemaking to comply with UMTRCA's requirement that NRC conform its regulations to EPA's generally applicable standards for groundwater corrective action in 40 CFR § 192.32 (e.g., 10 CFR Part 40, Appendix A, Criterion 5(B)(5)).

[65] It is important to note that no ACL can be authorized by NRC unless the licensee demonstrates that the ALARA principle for groundwater restoration has been satisfied. This ALARA requirement is an AEA concept that adds an additional component to development of an ACL application before an application for an ACL can be submitted. This means that an ISR licensee must demonstrate in its ACL license amendment application that it has attempted all practicable efforts to restore site groundwater to Commission-approved background levels (or an MCL whichever is higher). This justification also must be evaluated under the aforementioned EA pursuant to 10 CFR Part 51.

least mandates a complete assessment of the potential human health and environmental hazards associated with such an ACL. *See* 10 CFR § 51.22 (ACLs do not fall under the Part 51 activities resulting in a categorical exclusion); *see also* NUREG-1748 at Chapter 2, *Preparation and Use of Categorical Exclusions* at 2-1 *et seq*. These ACL license amendment applications also are subject to an opportunity for a public hearing at which any interested party demonstrating the requisite standing and offering an admissible contention may challenge NRC's environmental review of the application. Thus, to require an assessment of potential environmental impacts for an ACL at the initial license application stage is unnecessary, because such potential impacts will be evaluated in a separate licensing action *if and when an ACL is determined to be necessary*.

Further, an evaluation of potential proposed ACLs at the initial license application phase practically speaking is impossible not only because it is unknown as to whether an ACL will be required without knowledge of wellfield data generated by active operational/restoration actions, because an ISR license applicant is not permitted to install a complete wellfield under 10 CFR § 40.32(e) and, thus, cannot determine "Commission-approved background" per Criterion 5(B)(5). As stated above, in order to determine what the appropriate restoration goals are for a specific wellfield, "Commission-approved background" must be determined so that each constituent can be monitored for final levels that potentially exceed the standard. Without an installed wellfield package and monitor well network, and subsequent license-imposed sampling, testing, and analysis, no ISR licensee can make an accurate determination of "Commission-approved background" levels, which is the primary goal of restoration. In addition, no ISR operator can fully understand the hydrological and geochemical conditions in a specific wellfield without performing these tests and analyses and without operating the wellfield to determine how it will respond to restoration. As noted, a licensee cannot even apply for an ACL without active

groundwater restoration reaching the "asymptotic curve" to demonstrate compliance with the ALARA requirement. Thus, the ability of an ISR license applicant to even offer a preliminary assessment of ACLs for any constituent, prior to knowing Commission-approved background levels and operating the wellfield itself is to ask for virtually meaningless and unavailable information.

Additionally, since a license amendment application necessary for any specific ACL is not currently before NRC at this time, there is no need for a NEPA evaluation in the FSEIS. *See Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2); Catawba Nuclear Station, Units 1 and 2), CLI-02-14, 55 NRC 278, 293 (2002) (denying a NEPA "segmentation" contention because it involved inchoate plans of the licensee and explaining that, to bring NEPA into play, a possible future action must constitute a "proposal" pending before the agency). Contentions based on projected changes to a license, not currently before the NRC in any proceeding or application, are not sufficient to support admission of a contention, let alone support a contention. *See Duke Energy Corp.*, 55 NRC at 294.

Based on the above discussion, the potential requirement of a "bounding estimate" of potential ACLs in an initial license application would be adding an additional requirement to the already nineteen (19) criteria that must be addressed in 10 CFR Part 40, Appendix A, Criterion 5(B)(6). Strata believes that this amounts to a modification of NRC regulations in a licensing proceeding without a rulemaking. Aside from the fact that any such "bounding estimate" would produce essentially meaningless information since the license applicant is not permitted to develop "Commission-approved background," UCLs, and TRVs, NRC regulations do not permit a *licensee* to apply for an ACL until active groundwater restoration efforts have been exhausted and the ALARA principle has been satisfied. The Licensing Board's previous suggestion that

ACLs would require an analysis of irrevocable impacts and irretrievable resources also is not applicable here. As stated in Footnote 65 above, the Commission's ACL concept was developed through three (3) separate rulemakings involving EPA and NRC, including draft and final environmental impact statement analyses and public comment.[66] The conclusions of these rulemakings cannot be modified without a subsequent rulemaking, which Intervenors or any other interested stakeholder is free to petition the Commission to conduct pursuant to 10 CFR § 2.802. Moreover, it is not a foregone conclusion that an ACL will be required for any site-specific constituent at the Ross ISR Project, and it is impossible at the license application stage to predict which, if any constituent might actually qualify for an ACL or whether such constituent would be subject to an ACL as a *hazardous* constituent. Thus, an ACL "bounding estimate" in an ISR license application is meaningless and, accordingly, inappropriate.

With respect to the specific allegations levied by Intervenors in Contention 2, Strata's expert witnesses address such allegations as follows. First, Intervenors levy a general allegation that groundwater restoration has not been successful at past ISR wellfields and that the industry has been historically struggled with controls of aquifer contamination. Strata expert witnesses Mr. Knode, Mr. Demuth, and Mr. Lawrence address this allegation.

Mr. Knode's extensive experience with groundwater restoration during the development of the ISR industry demonstrates that advances in technology have drastically improved restoration successes. Mr. Knode testifies that, since the pilot projects of the 1980s, "[t]he industry has significantly reduced the consumption of groundwater in restoration through the use of reverse-osmosis (RO) water treatment. Today RO units are more efficient than ever at removing contaminants. Recycling of affected groundwater through modern RO units has proven to be an effective way to accelerate restoration at ISR sites." Strata Exhibit SEI-001 at ¶

[66] *See* Footnote 64 *supra.*

A.18. Additionally, Mr. Knode identified several examples of new progressive techniques for improving restoration such as the use of bioremediation and natural attenuation, which he states "may be an effective and efficient groundwater restoration technique." *Id.* Finally, Mr. Knode states that ISR industry's understanding of geochemistry has improved such that adjustments to technical processes such as timing, vertical extent of recovery, and chemistry of leach solutions also assist in restoration efficiency. *Id.* The combination of these improvements leads Mr. Knode to conclude that "Strata plans to take advantage of the large body of research and development that has occurred since the early 1980's as well as technological advancements to operate the Ross ISR Project to significantly improve restoration efficiency over the historic pilot project." *Id.* at ¶ A.19. His final conclusion, based on his extensive experience with ISR restoration is "I have no doubt restoration will be successful at the Ross ISR Project." Strata Exhibit SEI-001 at ¶ A.20. Based on Mr. Knode's testimony and Mr. Demuth's and Mr. Lawrence's historical understanding of past ISR restoration, Strata concludes that NRC Staff's evaluation of proposed groundwater restoration at the Ross ISR Project satisfies NEPA's "hard look" procedural requirements.

Intervenors' allegations regarding restoration are also shown to be without merit based on evaluation of the past Nubeth R&D site restoration data. Mr. Schiffer discusses the prior Nubeth restoration data in his expert testimony beginning with the fact that Nubeth groundwater was successfully restored despite the presence of less robust and advanced restoration techniques. Strata Exhibit SEI-005 at ¶ A.56. As discussed by Mr. Knode, Mr. Schiffer identifies several new or advanced restoration techniques that indicate Ross ISR Project restoration will be more successful than Nubeth's. *Id.* Techniques such as effluent control during restoration through the

use of deep disposal wells were evaluated by NRC Staff in the FSEIS and the SER and were found to be acceptable. *Id.*

The previous testimony regarding ISR restoration is supported by the FSEIS' and SER's discussion of Ross ISR Project restoration and discussed by Mr. Schiffer in his expert testimony. Mr. Schiffer offers a detailed discussion of the FSEIS' evaluation of operational controls during restoration, including its evaluation of the Nubeth restoration data and the typical industry techniques for addressing horizontal and vertical excursions. *Id.* at ¶ A.51. Horizontal and vertical excursions were addressed in the FSEIS for the industry in general and it was determined that current techniques for addressing such excursions have proven effective and will be effective at the Ross ISR Project. Strata Exhibit SEI-007 at ¶ A.51. Mr. Schiffer also addresses Intervenors' allegation that the monitoring parameters and chemical constituent list for restoration are too limited by noting that Strata's parameter list was developed in accordance with NUREG-1569 guidance (as well as supported by State of Wyoming guidelines) and was evaluated by NRC in its SER. The parameters listed in NUREG-1569 have been historically demonstrated to be those most likely to be impacted by ISR operations.

The FSEIS also provides a detailed discussion of restoration techniques and potential impacts associated with groundwater restoration at the Ross ISR Project. As discussed by Mr. Schiffer in his testimony, FSEIS Pages 2-35-37 specifically address the restoration techniques/approach proposed by Strata. As discussed in the FSEIS, Strata is required by 10 CFR Part 40, Appendix A, Criterion 5(B)(5) to restore groundwater to the quality standards established after license issuance. The FSEIS shows that NRC Staff adequately evaluated these techniques and approach and finds it reasonable to conclude that Ross ISR Project restoration would be successful. *Id.* Appropriate license conditions, which are imposed in part based on

NRC Staff's evaluation of restoration in the FSEIS, have been imposed requiring compliance with all proposed restoration procedures and any additional requirements imposed by NRC Staff. *Id.* This evaluation contradicts Intervenors' allegation that Strata and NRC Staff have failed to demonstrate that impacts from groundwater restoration are small, which is further supported by industry's historic record of returning exempted aquifers to prior class of use. Given that Strata's evaluation of restoration and its associated monitoring components were thoroughly evaluated in the FSEIS and the SER by NRC Staff, Intervenors' allegations that the FSEIS does not satisfy 10 CFR Part 51's NEPA procedural requirements are without merit.

Based on the argument offered above and the entirety of Strata's expert witness testimony and exhibits, Strata's initial position is that Intervenors' allegations in Contention 2 should not result in any modification to the FSEIS, Strata's NRC License No. SUA-1601 or any other elements of the ROD.

3. <u>CONTENTION 3:</u> Alleged Failure of NRC's FSEIS to Include Adequate Hydrological Information Demonstrating Control of Fluid Migration

Contention 3 alleges that Strata and NRC Staff failed to include adequate hydrological information demonstrating that Strata's licensed ISR operations will prevent migration of recovery solutions from the recovery (ore) zone to adjacent, non-exempt aquifers. These allegations include: (1) allegations that Strata did not provide and NRC Staff did not review adequate "baseline" groundwater quality data in the FSEIS; (2) allegations that Strata will not be able to monitor for and correct excursions based on alleged historical industry difficulties with excursion control; (3) allegations that Strata and NRC Staff have not adequately analyzed potential recovery solution migration due to historic unplugged boreholes; (4) allegations regarding lack of confinement due to historic unplugged boreholes; (5) allegations regarding insufficient controls to contain recovery solution migration; (6) alleged failure to properly

characterize the subsurface and hydrologic environment at the Ross ISR Project; (7) allegations that site-specific pumping tests were too short; and (8) allegations that Strata's numerical groundwater model is inadequate.

Contention 3 is an environmental contention in this proceeding and does not include any specific safety-related component, due to Intervenors' not initially challenging such a safety component in its initial hearing request and not proffering a new or amended contention on NRC Staff's SER or Strata final license conditions. For purposes of Contention 3, Strata intends to rely upon the expert testimony of Mr. Schiffer, Mr. Demuth, Mr. Lawrence, Mr. Griffin, Mr. Moores, and Mr. Knode. For the reasons discussed below and based on the legal and factual argument presented in this Initial Statement of Position and the entirety of Strata's proffered expert witness testimony and exhibits, Strata's initial position is that Intervenors' allegations in Contention 3 that the FSEIS does not satisfy 10 CFR Part 51's "hard look" requirements are baseless and should not result in any modification to the FSEIS, Strata's NRC License No. SUA-1601 or any other elements of the ROD.

To the extent that Intervenors' allege that Strata did not include and NRC Staff not review sufficient "baseline" groundwater quality data in Strata's license application and the ROD, Strata respectfully incorporates by reference its above argument regarding the difference between 10 CFR Part 40, Criterion 7 "baseline" groundwater quality data and Criterion 5(B)(5) "Commission-approved background" groundwater standards. This argument is consistent with the Commission's determination in *Louisiana Energy Servs.*, which found that "NEPA also does not call for certainty or precision, but an *estimate* of anticipated (not unduly speculative) impacts."[67]

[67] CLI-05-20, 62 NRC 523, 536 (2005).

Further to this argument, Strata emphasizes that a critical component of the Commission's ISR regulatory program is the "early" detection of the potential for migration of recovery solutions from the recovery (ore) zone to adjacent, non-exempt aquifers. As part of this regulatory program, NRC has implemented a requirement for monitoring for "excursions" during both operations and groundwater restoration requiring that appropriate, highly mobile site constituents and associated values be identified and established post-license issuance and pre-operations values be established, and monitoring commence upon start of operations to detect migration of recovery solutions at wellfield monitor wells. In order to properly determine what UCLs are so that values for excursion indicators can be established, an ISR operator is required to determine Commission-approved background pursuant to Criterion 5(B)(5) so that such groundwater quality levels can be established. Thus, since an ISR license applicant cannot determine Commission-approved background groundwater quality indicators until a wellfield package, including monitor well network, is installed and wells are sampled and that such activity cannot be engaged in under 10 CFR § 40.32(e) until a license is issued, Intervenors' allegations that Strata and NRC Staff should have gathered and analyzed their definition of *complete* wellfield groundwater quality data also is against the Commission's regulations and should be rejected pursuant to 10 CFR § 2.335.[68]

With respect to the specific allegations levied by Intervenors, Strata will address the major allegations and associated issues below. As a broad discussion of aquifer contamination and recovery solution migration, Mr. Demuth and Mr. Lawrence offer in their opinion on groundwater excursions and the allegation that the industry has a historic and ongoing inability to control aquifer contamination. Mr. Demuth and Mr. Lawrence state that:

[68] *See* Footnote 62 *supra*.

> "It is common for intervenors in these proceedings to point to excursions at operating ISR facilities as evidence that uranium ISR is unsafe or causes significant environmental impacts. However, excursions are merely the detection of nonhazardous indicator parameters (typically alkalinity, chloride and electrical conductivity) at a monitor well that provide early warning that corrective actions are needed to prevent groundwater contamination outside of the exempted aquifer. The important point here is that an excursion is not a violation of regulations; rather it is an indication that mining fluids may be migrating away from the hydraulic control of the wellfield unless corrective action is undertaken."

Strata Exhibit SEI-026 at ¶ A.28.

This approach to criticizing excursions at ISR sites is indicative of a complete misunderstanding of the ISR regulatory program and the fact that, as described in NUREG-1910, Supplement 1 and quoted by Mr. Demuth and Mr. Lawrence:

> "***NRC does not define an excursion as contamination that moves into a USDW***. An excursion is defined as an event where a monitoring well in overlying, underlying, or perimeter well ring detects an increase in specific water quality indicators, usually chloride, alkalinity and conductivity, which may signal that fluids are moving out from the wellfield. These specific water quality parameters are used because they are present in high concentrations in the ISR production fluids and are "conservative" in the sense that they move at roughly the same rate as the groundwater flow and are not significantly attenuated by adsorption or reduced by other factors. Therefore, they serve as early indicators of imbalance in the wellfield flow system to notify operators to take appropriate actions."

Id. quoting United States Nuclear Regulatory Commission, NUREG-1910, Supplement 1 at B-75 (Exhibit SEI-036 at B-479) (emphasis added).

This information and other aspects of excursion controls were discussed at a 2008 Commission briefing and resulted in a 2009 NRC Staff Report that concluded "[t]o date, no excursions from an NRC-licensed ISR facility has contaminated a USDW."[69] *Id.* Based on this information and testimony, Intervenors allegations regarding aquifer contamination have no merit.[70]

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[69] Mr. Demuth and Mr. Lawrence also cite NUREG-6733 entitled *A Baseline Risk-Informed, Performance-Based Approach for In Situ Leach Uranium Extraction Licensees* (Strata Exhibit SEI-037) which states that "there were no reports of extraction fluid excursions being detected in off-site water supplies in any of the documentation for U.S. uranium ISL sites reviewed for this report."

[70] The Licensing Board should note that claims of aquifer contamination in the recovery (ore) zone should be ignored as an ISR operator is required to obtain a SDWA aquifer exemption from EPA by

Focusing on Intervenors' allegation of a lack of confinement due to unplugged exploratory boreholes, Strata's expert witnesses directly address this allegation. Strata's expert witness, Mr. Schiffer, specifically discusses the data and analyses contained in the FSEIS regarding this allegation. The site-specific subsurface aspects of the Ross ISR Project and the testing conducted by Strata demonstrate that, regardless of the alleged presence of unplugged exploratory boreholes, there is no communication between the identified recovery (ore) zone and the overlying and underlying zones and, as stated by Mr. Schiffer:

> "At each monitor well cluster, separate wells were completed in the SA, SM, OZ, and DM aquifers. Static water levels measured at each well clearly show several to tens of feet of difference between the aquifers. The difference in the levels demonstrates that they are hydrologically isolated."

Strata Exhibit SEI-005 at ¶ A.58.

Strata's subsurface data demonstrates that "the targeted aquifer (the OZ aquifer) is geologically confined throughout the entire license boundary." *Id.* Added to this, the OZ aquifer is overlain and underlain by thick confining units of varying thickness with identified monitoring zones above and below where Strata is required by license condition to install monitor wells. *Id.* Differing water quality measurements in the identified recovery and monitor zones also demonstrate that there is no communication between the aquifers. *Id.* at ¶ A.59.

Strata's expert witnesses also address the allegation that there are insufficient controls in place pursuant to NRC License No. SUA-1601 to contain fluid migration despite historic unplugged exploratory boreholes. As a general matter, the Commission's ISR regulatory program is specifically designed to address recovery solution migration, even in the presence of

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demonstrating that the recovery (ore) zone aquifer cannot now nor ever in the future serve as a source of public drinking water. Thus, typically, the recovery (ore) zone aquifer is already contaminated beyond public drinking water standards.

unplugged exploratory boreholes which is typical at previously explored ISR sites. Indeed, this statement is supported by Strata's expert witness, Mr. Knode, when he states that:

> "[e]very uranium ISR project I have been involved [with] has had a large number of exploration drill holes on it. We have been able to successfully operate at all of the facilities because the boreholes within the well fields were successfully plugged or they sealed up naturally."

Strata Exhibit SEI-001 at ¶ A.21.

Strata's expert witness, Mr. Demuth and Mr. Lawrence, provides additional support for Mr. Knode's statement:

> "In our direct experience in working with over a dozen operating ISR wellfields in Wyoming, Nebraska and Texas, most or all of these facilities contain hundreds or thousands of historical exploration drill holes yet have been successful at maintaining control of ISR solutions and preventing impacts to groundwater outside of the exempted aquifers. The primary reasons for this are that most historical drill holes were plugged and abandoned using techniques sufficient to prevent vertical migration of wellfield solutions; natural processes seal open drill holes; and adequate procedures were put in place to locate unplugged or improperly plugged holes during wellfield delineation and testing and prevent potential impacts."

Strata Exhibit SEI-026 at ¶ A.33.

Then, using Mr. Knode's, Mr. Demuth's, and Mr. Lawrence's experience as a guide, Strata's experts go on to explain the Commission's ISR regulatory program and how the licensee implements controls to prevent fluid migration. As stated by Mr. Schiffer, the Commission's program requires significant wellfield testing prior to the initiation of licensed operations per license condition: "Prior to operating each wellfield, Strata will be required to demonstrate that the production zone is hydraulically isolated from underlying and overlying aquifers." Strata Exhibit SEI-005 at ¶ A.60. In order to do this, Strata was required to await license issuance to begin detailed delineation drilling and mapping of the ore body(ies) and the lithology of overlying and underlying aquifers and confining layers in order to install a wellfield and associated monitor well network. *Id*. After efforts are completed to install the entire monitoring

well network, Strata is then required to adequately plug and abandon all drillholes completed by Strata not to be used as wells and then proceed to conduct pump tests in accordance with license conditions to demonstrate proper hydrological confinement. *Id.* These procedures to demonstrate adequate confinement for licensed ISR operations is typical industry practice and has been proven effective at multiple ISR project sites.

With respect to unplugged boreholes drilled prior to Strata' development of the Ross ISR Project, the licensee already has committed to detailed procedures for adequate plugging and abandoning of such boreholes, including the location and plugging/abandoning of all boreholes within the perimeter monitor well ring in each wellfield. Previous Nubeth boreholes were plugged at the surface with a cement plug and metal cap which has allowed Strata to identify and locate approximately ninety-two (92) percent of past boreholes within estimated wellfield boundaries. *See* Strata Exhibit SEI-001 at ¶ A.25. Strata's license commitments also include a specific procedure for plugging and abandoning these historic boreholes, which was reviewed and approved by NRC Staff. *See* NRC License No. SUA-1601 at License Condition 10.12; *see also* Strata Exhibit SEI-015 at 9. NRC Staff's evaluation of these procedures and the current approach to address hydrological confinement and control of recovery solution migration in the FSEIS demonstrates that Intervenors' allegation regarding an FSEIS deficiency regarding unplugged historic boreholes is without merit.

Controls for recovery solution migration, regardless of the presence of historic unplugged boreholes, are described in Mr. Demuth's, Mr. Lawrence's, and Mr. Griffin's testimony regarding the presence and remediation of vertical and horizontal excursions. For example, with respect to horizontal excursions, Mr. Demuth and Mr. Lawrence discuss the standard NRC operating program for excursion monitoring and how these controls have been and are effective.

Mr. Demuth and Mr. Lawrence state: "[h]orizontal fluid migration typically is limited by operational controls (especially maintaining hydraulic wellfield control through bleed and wellfield balancing) and verified through monitoring." Strata Exhibit SEI-026 at ¶ A.34. Mr. Demuth and Mr. Lawrence also note the presence of adequate FSEIS analysis of this issue through the monitoring of appropriately selected excursion indicators, comprehensive sampling, and then procedures to recover the excursion. *See id.*: *see also* FSEIS at 2-32. Mr. Griffin discusses how, in his past experience, vertical excursions have been addressed at sites he is familiar with and the procedures used by the ISR operator to do so. *See* Strata Exhibit SEI-039 at ¶ A.7-A.9. Mr. Griffin's past experience also results in his opinion that there are no unique conditions at the Ross ISR Project that would result in the failure to detect and remediate a vertical excursion during operations or restoration. *Id.* at ¶ A.10.

Intervenors' also allege that Strata and NRC Staff did not adequately characterize the subsurface and hydrologic environment at the Ross ISR Project. As a general matter, Strata's license application and the acceptance of the data and analyses presented by Strata by NRC Staff demonstrates that it complies with NUREG-1569 acceptance criteria for items such as geology, hydrology, and hydrogeology. NRC Staff's SER, which is not subject to challenge in this proceeding, determined that Strata complied with NUREG-1569 acceptance criteria for geology (Section 2.3.3.3) and hydrology and regional hydrogeology (Section 2.4.33, 2.4.3.4, and 2.4.4.). *See* Strata Exhibit SEI-005 at ¶¶ A.65-A.69.

Strata's experts also address the claims by Intervenors' that pre-license issuance pumping tests to generally characterize subsurface conditions at the Ross ISR Project pursuant to NUREG-1569, Chapter 2 are too short. Mr. Demuth and Mr. Lawrence addresses this allegation

on a generic basis comparing the seven (7) pump tests of duration between 24 to nearly 73 hours with previous pump tests performed by Petrotek previously:

> "These durations are consistent with those of more than 40 pumping tests that Petrotek Engineering Corporation has designed and conducted at uranium ISR facilities in Texas, Wyoming and Nebraska. As described in Strata's license application, the primary purpose of the baseline aquifer tests described in TR Addendum 2.7-F were to calculate hydraulic parameters of the aquifer zone to further understand the system as well as provide measured parameters for modeling purposes. Based on review of the aquifer test procedures and results, it is our opinion that these aquifer tests provided sufficient information in conformance with guidance in NUREG-1569. The NRC will require additional aquifer tests at a well field scale to ensure hydrologic isolation of the production aquifer."

Strata Exhibit SEI-026 at ¶ A.35.

Mr. Moores supports Mr. Lawrence's generic assessment by describing the specific parameters associated with Strata's site-specific aquifer tests. In response to Intervenors' allegations that the aquifer tests were too short, Mr. Moore's states that "the data collected during the aquifer tests was sufficient to develop trendlines and curves to be able to successfully analyze the aquifer tests using appropriate empirical methods." Strata Exhibit SEI-036 at ¶ A.7. These aquifer tests were also supported by the use of historic aquifer test data from 1977 and 1978, which were summarized in the aquifer test reports and included in the license application. As stated by Mr. Moores, "[t]he results of the historic aquifer tests were similar to the results of the more recent aquifer tests." *Id.* Mr. Moore's also notes NRC Staff's evaluation of the aquifer test results in the SER used to support issuance of NRC License No. SUA-1601: "NRC staff reviewed Strata's aquifer test results and Strata's evaluation of previous aquifer tests in Sec. 2.4.4 of the SER." Mr. Moore's testimony at ¶ A.9 discusses the direct statements of NRC Staff.

Lastly, Mr. Moores, Mr. Demuth, and Mr. Lawrence discuss Intervenors' allegation that Strata's numerical groundwater model does not provide a reasonable representation of site

hydrologic conditions.[71] Mr. Moores, who was the primary manager for development of the model, provides a detailed explanation of the development of the model using appropriate, standard industry procedures using both historic pre-1980 and current 2010 potentiometric surfaces, as well as pumping rates from 1980 to 2010 industrial wells in the project area. *See id.* at ¶ A.11. This comprehensive groundwater model utilized this data and a number of other site-specific factors to appropriately calibrate the model to reflect site-specific conditions and to provide an adequate framework to predict groundwater movement during typical operational scenarios. Mr. Moores' also responds that Intervenors' expert, Dr. Abitz's opinion that the model should address movement for a 30 year period from the Nubeth R&D site to the Strata well clusters by clarifying that the potentiometric data provided by Strata demonstrates that groundwater is actually moving towards the Nubeth R&D site. *See id.* at ¶ A.13. Mr. Moores does not dispute that numerical groundwater models will have some level of error; but however, he states "our confidence in the model predictions of impacts from operations is 'high,' because we have incorporated a significant amount of geologic and hydrologic data into the model and our calibration is robust." *Id.* at ¶ A.13.

Mr. Demuth and Mr. Lawrence provided peer review of Strata's numerical groundwater model and found its calibration and usage to be typical of ISR industry practices and has been used to apply for and receive NRC ISR licenses, even as recently as the 2014 Powertech (USA), Inc. Dewey-Burdock ISR Project license. *See* Strata Exhibit SEI-026 at ¶ A.38-A.43. More specifically, Mr. Demuth and Mr. Lawrence states, for example, that:

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[71] It is worth noting that 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. *See Entergy Nuclear Generating Co.* (Pilgrim Nuclear Power Station), CLI-10-11, 71 NRC 287, slip op. at 37 (March 26, 2010) (citations omitted). Indeed, NEPA analyses often must rely upon imprecise and uncertain information, which should be judged on its reasonableness. *See Louisiana Energy Servs*. (Claiborne Enrichment Center), LBP-96-25, 44 NRC 331, 355 (1996).

> "Strata used MODFLOW, which was developed by the USGS [United States Geological Survey] and has become the standard in the industry. The pre/post processing software (Groundwater Vista) is commonly used as well. The modeling approach followed standard modeling protocol."

Id. at ¶ A.38.

Based on his considerable experience with the development of ISR numerical groundwater models,[72] Mr. Demuth and Mr. Lawrence concludes that Strata's model is typical of industry practice.

Given the totality of the data and analyses presented to NRC developed in accordance with NRC regulations at 10 CFR Part 40 and Appendix A Criteria and as embodied in NUREG-1569 guidance and evaluated by NRC Staff in the SER and FSEIS, Strata asserts that NRC Staff has satisfied 10 CFR Part 51's "hard look" NEPA requirements. Thus, based on the argument offered above and the entirety of Strata's expert witness testimony and exhibits, Strata's initial position is that Intervenors' allegations in Contention 3 should not result in any modification to the FSEIS, Strata's NRC License No. SUA-1601 or any other elements of the ROD.

[72] *See* Strata Exhibit SEI-021 at ¶ A.39.

V. CONCLUSION

Based on the argument and the entirety of the expert testimony and exhibits discussed above and submitted in concurrence with the arguments and expert testimony offered by NRC Staff, Strata's initial position is that each of the Contentions offered by Intervenors should be should not result in a modification to Strata's NRC License No. SUA-1601 or any elements of the ROD supporting issuance of this License.

Respectfully Submitted,

/Executed (electronically) by and in accord with 10 C.F.R. § 2.304(d)/ Christopher S. Pugsley, Esq.

_____

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Dated: August 25, 2014

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	Docket No.: 40-9091-MLA
STRATA ENERGY, INC.	)	Date: August 25, 2014
(Ross In Situ Uranium Recovery Facility)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing "**STRATA ENERGY INC.'S INITIAL STATEMENT OF POSITION**" in the above-captioned proceeding have been served via the Electronic Information Exchange (EIE) this 25th day of August, 2014, which to the best of my knowledge resulted in transmittal of the foregoing to those on the EIE Service List for the above-captioned proceeding.

Respectfully Submitted,

/Executed (electronically) by and in accord with 10 C.F.R. § 2.304(d)/
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