

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD PANEL

Before the Licensing Board:

G. Paul Bollwerk, III, Chairman  
Dr. Craig M. White

In the Matter of

STRATA ENERGY, INC.

(Ross In Situ Recovery Uranium Project)

Docket No. 40-9091-MLA

ASLBP No. 12-915-01-MLA-BD01

January 27, 2015

MEMORANDUM AND ORDER

(Providing Parties' Proposed Questions for the Official Record)

The attached documents are the proposed questions submitted to the Licensing Board by the NRC staff, Strata Energy, Inc., and the Joint Intervenors\* prior to or during the evidentiary hearing in this proceeding held on September 30-October 1, 2014, in Gillette, Wyoming. With the issuance of the Board's initial decision in this proceeding on January 23, 2015, see LBP-15-3, 81 NRC \_\_ (Jan. 23, 2015), in accord with 10 C.F.R. § 2.1207(a)(3)(iii) these

---

\* Joint Intervenors are the Natural Resources Defense Council and the Powder River Basin Resource Council.

questions are being provided to the Office of the Secretary and are to be included in the official record of this proceeding.

It is so ORDERED.

FOR THE ATOMIC SAFETY  
AND LICENSING BOARD

*/RA/*

---

G. Paul Bollwerk, III, Chairman  
ADMINISTRATIVE JUDGE

Rockville, Maryland

January 27, 2015

ATTACHMENT 1

NRC Staff Proposed Questions

September 5, 2014

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

**NRC STAFF'S DIRECT TESTIMONY PROPOSED CROSS-EXAMINATION QUESTIONS**

Pursuant to 10 C.F.R. § 2.1207(a)(3) and the Board's scheduling orders in this proceeding, the NRC Staff submits, *in camera*, its proposed questions for the Board's consideration. The Staff's proposed questions are directed to the prefiled direct testimony of the witnesses appearing on behalf of the Natural Resources Defense Council and the Powder River Basin Resource Council (collectively Joint Intervenors). The answers to these questions should help the Board better understand how the Staff complied with the National Environmental Policy Act (NEPA) and other laws when preparing the Final Supplemental Environmental Impact Statement (FSEIS) for Strata Energy, Inc.'s (Strata's) Ross Project.<sup>1</sup>

**I. Proposed Questions for Contention 1**

- A. Issues Needing Further Examination:** Dr. Richard Abitz, the Joint Intervenors' witness, alleges that Strata and the Staff failed to adequately define baseline groundwater conditions at the Ross Project site. Dr. Abitz argues that, as a result, the Staff lacked sufficient information to define baseline conditions and assess impacts to groundwater as required under NEPA.
- B. Objective of the Examination:** To establish that Strata submitted information on baseline groundwater conditions consistent with NRC guidance and that, as a result, the Staff had sufficient information to perform the analysis required by NEPA. Also to establish that the Staff's assessment of baseline groundwater information was consistent with NEPA.

---

<sup>1</sup> The Staff is including citations after certain questions to clarify the evidentiary basis for the question.

**C. Proposed Questions for Dr. Abitz:**

1. Do you acknowledge that, in its review of Strata's application for compliance with the Atomic Energy Act and NRC safety regulations (Ex. SEI010), the Staff found that the empirical data on groundwater quality collected by Strata was consistent with guidance in Section 2.7 of NUREG-1569, "Standard Review Plan for In-Situ Leach Uranium Extraction License Applications" (Ex. SEI007)?
2. Is it your position that, even though the Staff found in its safety evaluation report that Strata submitted information on existing baseline groundwater conditions consistent with NUREG-1569, the NRC Staff still lacked sufficient information to conduct the review required by NEPA?
3. Do you agree that, under the guidance in NUREG-1569, an applicant need not collect and analyze data on baseline groundwater quality as it existed *before* past uranium mining activities?
4. Do you acknowledge that, in Section 3.5.3.3 of the Ross Project FSEIS, the Staff discusses existing groundwater conditions in production zone aquifers and surrounding aquifers at the Ross Project site?
5. Do you acknowledge that the baseline groundwater quality data reported in Section 3.5.3.3 of the FSEIS reflects the existing impacts of any groundwater contamination that may have occurred from past uranium mining activities, including the Nubeth project?
6. Do you acknowledge that in Chapter 5 of the FSEIS the Staff assesses the cumulative impacts on groundwater from past, present, and reasonably foreseeable future actions, including past mining activities?
7. Do you agree that in Chapter 5 of the FSEIS the Staff takes into account cumulative impacts related to the Nubeth project?
8. Do you acknowledge that the Staff determined in its safety evaluation of Strata's application that the groundwater quality information provided by Strata met the requirements of 10 C.F.R. Part 40, Appendix A, Criterion 7?
9. Do you acknowledge that Strata's NRC license contains conditions, including Conditions 10.6, 11.3, and 11.4, requiring Strata to provide additional data relevant to determining groundwater quality and groundwater restoration standards?
10. Do you acknowledge that in Section 2.1.1.1 of the FSEIS the NRC Staff describes the procedures for establishing Commission-approved post-licensing, pre-operational background groundwater quality in wellfields at the Ross Project site?

## II. Proposed Questions for Contention 2

**A. Issues Needing Further Examination:** Dr. Lance Larson, the Joint Intervenors' witness, alleges the Staff, in the FSEIS, fails to provide and evaluate information regarding the reasonable range of hazardous constituent concentration values that are likely to be applicable if Strata is required to implement an Alternative Concentration Limit (ACL). Dr. Larson argues that, as a result, the FSEIS fails to evaluate the virtual certainty that Strata will be unable to restore groundwater to primary or secondary limits.

**A. Objective of the Examination:** To establish that the Staff had sufficient information to perform an analysis of potential environmental impacts from the Ross Project that comports with NEPA. Also to establish that the Staff's assessment of potential environmental impacts was consistent with NEPA.

### B. Proposed Questions for Dr. Larson:

1. Do you acknowledge that the FSEIS's assessment of the potential impacts from the operation and restoration of the Ross Project describes information from all three modern commercial ISR operations – Crow Butte Wellfield 1, Smith Ranch-Highland A-Wellfield, and Irigaray Mine Units 1-9 – that have received Commission approval for restoration?
2. Do you acknowledge that the decision to approve restoration for these three sites was previously made by the Commission after it evaluated the groundwater data for each site, and not by the Staff in conjunction with the Ross Project FSEIS?
3. Do you agree that the Commission determined that for each of the three sites, the groundwater quality information provided by the licensee was sufficient for the Commission to approve groundwater restoration?
4. Do you acknowledge that Cogema Mining Company's Christensen Ranch Mine Units 2–6, has not received approval of restoration from the Commission?
5. Because Cogema has not received approval of restoration for Christensen Ranch Mine Units 2–6, do you acknowledge that the concentrations of hazardous constituents in the groundwater recorded at that site are not approved by the Commission as acceptable alternate concentration limits?
6. If the above two statements are true, then do you acknowledge that the information from Christensen Ranch Mine Units 2–6 does not aid the Staff in its assessment of the restoration values historically approved by the Commission?
7. Do you acknowledge that from the Staff's review of the available data from the Crow Butte Wellfield 1, Smith Ranch-Highland A-Wellfield, and Irigaray Mine Units 1-9 restoration approvals, the FSEIS concludes that the concentrations of these constituents in the groundwater did not change the class of use and did not represent a potential impact to the groundwater outside the aquifer-exemption boundary for any of the three sites?

### III. Proposed Questions for Contention 3

**A. Issues Needing Further Examination:** In their direct testimony, Drs. Abitz and Larson challenge the adequacy of the Staff's analysis on the potential of excursions by making a number of claims regarding Strata's ability to locate and abandon the "thousands of drillholes." See Abitz Direct Testimony at A41; Larson Direct Testimony at A73. Specifically Dr. Abitz states that the FSEIS makes an improper assumption that Strata will be able to locate and plug all the drillholes throughout the Ross Project Area, and that the FSEIS requires a "full accounting of all improperly abandoned boreholes." Abitz Direct Testimony at A73. Dr. Larson similarly states that the Staff's assumption of confined aquifers improperly relies on the assumption that all abandoned Nubeth drillholes will be abandoned. Larson Direct Testimony at A73.

**B. Objective of the Examination:** To clarify the need to properly fill and abandon only those drillholes within the well ring perimeter, rather than all drillholes throughout the Ross Project Area, and to establish Strata's capability to accomplish that task.

#### **C. Proposed Questions for Dr. Abitz and Dr. Larson:**

1. Dr. Abitz, is it correct that in your direct testimony, you state that the FSEIS improperly assumes the feasibility of locating and plugging the thousands of drillholes throughout the Ross Project Area? (See Abitz Direct Testimony at A41)
2. Is it correct that in your direct testimony, you also state that there should be a full accounting of all improperly abandoned boreholes in the FSEIS? (See Abitz Direct Testimony at A41)
3. Dr. Larson, is it correct that in your direct testimony, you fault the staff's conclusion of a confined OZ aquifer because the Staff improperly relies on Strata abandoning all the Nubeth drillholes in the project area? (See Larson Direct Testimony at A73)
4. Drs. Abitz and Larson, isn't it true that the text you base your conclusion on is on p. 3-37 of the FSEIS, which states, in part, that License Condition 10.12 requires Strata to attempt to locate and properly abandon all historic drillholes within the ring of perimeter-monitoring wells in each wellfield prior to operations?
5. Isn't it true that for flow to occur between aquifers during mining operations, the groundwater pressure in the source aquifer must be greater than the pressure in the receiving aquifer?
6. And isn't it true that if lixiviant detected in the production aquifer at or beyond the perimeter well ring, License Condition 11.5 requires Strata to pursue corrected actions?
7. So therefore, isn't it true that the highest potential for excursions from the production aquifer to an overlying or underlying aquifer is if an unplugged drillhole were located within the production area?

8. Isn't it true that by locating and properly abandoning the drillholes within the ring of the perimeter-monitoring wells, as required by License Condition 12.18, and by maintaining a net inward gradient, the chances of vertical excursions are severely limited?
9. Isn't it true then, that the focus of the FSEIS on drillholes within the ring of the perimeter-monitoring wells was appropriate, rather than on all historic drillholes within the Ross Project Area?
10. Isn't it true that if all drillholes were plugged within 522-radius feet of well 12-18OZ and if no response was observed during testing in either the SM or DM monitoring aquifers, Strata was successful in locating and plugging historical drillholes within the test area of the well?
11. If Strata was successful in locating and plugging historical drillholes within the test area of well 12-18OZ, doesn't this success demonstrate that Strata is able to locate and abandon drillholes within the area as required by License Condition 12.10?

Respectfully submitted,

**/Signed (electronically) by EM/**

Emily Monteith

Richard S. Harper

Counsel for NRC Staff

Dated at Rockville, Maryland  
this 5th day of September, 2014.

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

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

CERTIFICATE OF SERVICE

Pursuant to 10 C.F.R. § 2.305, I certify that counsel for the NRC Staff served the Staff's Direct Testimony Proposed Cross-Examination Questions *in camera* with the Board via the NRC's Electronic Information Exchange (EIE) on September 5, 2014.

**/Signed (electronically) by/**

Emily Monteith  
Counsel for the NRC Staff  
U.S. Nuclear Regulatory Commission  
Mail Stop O-15 D21  
Washington, DC 20555-0001  
(301) 415-2718  
Emily.Monteith@nrc.gov

Date of Signature: September 5, 2014

September 18, 2014

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

**NRC STAFF'S REBUTTAL TESTIMONY PROPOSED CROSS-EXAMINATION QUESTIONS**

Pursuant to 10 C.F.R. § 2.1207(a)(3) and the Board's scheduling orders in this proceeding, the NRC Staff submits, *in camera*, its proposed questions for the Board's consideration. The Staff's proposed questions are directed to the prefiled rebuttal testimony of the witnesses appearing on behalf of the Natural Resources Defense Council and the Powder River Basin Resource Council (collectively Joint Intervenors). The Staff also incorporates its previously-filed direct testimony proposed cross-examination questions in this pleading to preserve intact certain lines of questioning. The previously submitted questions are denominated with an asterisk (\*). The Staff believes the answers to these questions should help the Board better understand how the Staff complied with the National Environmental Policy Act (NEPA) and other laws when preparing the Final Supplemental Environmental Impact Statement (FSEIS) for Strata Energy, Inc.'s (Strata's) Ross Project.<sup>1</sup>

**I. Proposed Questions for Contention 1**

**A. Issues Needing Further Examination:** Dr. Richard Abitz, the Joint Intervenors' witness, alleges that Strata and the Staff failed to adequately define baseline groundwater conditions at the Ross Project site. Dr. Abitz argues that, as a result, the Staff lacked sufficient information to define baseline conditions and assess impacts to groundwater as required under NEPA.

---

<sup>1</sup> The Staff is including citations after certain questions to clarify the evidentiary basis for the question.

**B. Objective of the Examination:** To establish that Strata submitted information on baseline groundwater conditions consistent with NRC guidance and that, as a result, the Staff had sufficient information to perform the analysis required by NEPA. Also to establish that the Staff's assessment of baseline groundwater information was consistent with NEPA.

**C. Proposed Questions for Dr. Abitz:**

1. Do you acknowledge that, in its review of Strata's application for compliance with the Atomic Energy Act and NRC safety regulations (Ex. SEI010), the Staff found that the empirical data on groundwater quality collected by Strata was consistent with guidance in Section 2.7 of NUREG-1569, "Standard Review Plan for In-Situ Leach Uranium Extraction License Applications" (Ex. SEI007)?\*
2. Is it your position that, even though the Staff found in its safety evaluation report that Strata submitted information on existing baseline groundwater conditions consistent with NUREG-1569, the NRC Staff still lacked sufficient information to conduct the review required by NEPA?\*
3. Do you agree that, under the guidance in NUREG-1569, an applicant need not collect and analyze data on baseline groundwater quality as it existed *before* past uranium mining activities?\*
4. Do you acknowledge that, in Section 3.5.3.3 of the Ross Project FSEIS, the Staff discusses existing groundwater conditions in production zone aquifers and surrounding aquifers at the Ross Project site?\*
5. Do you acknowledge that the baseline groundwater quality data reported in Section 3.5.3.3 of the FSEIS reflects the existing impacts of any groundwater contamination that may have occurred from past uranium mining activities, including the Nubeth project?\*
6. Do you acknowledge that in Chapter 5 of the FSEIS the Staff assesses the cumulative impacts on groundwater from past, present, and reasonably foreseeable future actions, including past mining activities?\*
7. Do you agree that in Chapter 5 of the FSEIS the Staff takes into account cumulative impacts related to the Nubeth project?\*
8. Do you acknowledge that the Staff determined in its safety evaluation of Strata's application that the groundwater quality information provided by Strata met the requirements of Criterion 7?\*
9. Do you acknowledge that Strata's NRC license contains conditions, including Conditions 10.6, 11.3, and 11.4, requiring Strata to provide additional data relevant to determining groundwater quality and groundwater restoration standards?\*
10. Do you acknowledge that in Section 2.1.1.1 of the FSEIS the NRC Staff describes the procedures for establishing Commission-approved post-licensing, pre-operational background groundwater quality in wellfields at the Ross Project site?\*

11. Do you acknowledge that the FSEIS defines a LARGE impact as one that is clearly noticeable and is sufficient to destabilize important attributes of the resource considered?
12. Do you acknowledge that this definition derived from, and is identical to, the definition of a LARGE impact in the Generic Environmental Impact Statement (GEIS) for ISR projects (Ex. NRC006B)?
13. Do you acknowledge that, under this definition, in order for an impact to be considered LARGE, it would have to be sufficient to destabilize an important attribute of the groundwater at the Ross Project site?
14. Do you dispute the Staff's statement in its rebuttal testimony (Ex. NRC044-R at A.1.4) that the important attributes of groundwater quality at the Ross Project site are those that are related to the current and future uses of the groundwater?
15. Do you agree, then, that in order to show that long-term impacts to groundwater quality would be LARGE, the FSEIS would have to document impacts that would destabilize the current and future uses of the groundwater?
16. Do you acknowledge that the Ross Project ore zone aquifer has been exempted as a source of underground drinking water by the U.S. Environmental Protection Agency (EPA) and the Wyoming Department of Environmental Quality (WDEQ)?
17. Do you agree that this means that both agencies have determined the Ross Project ore zone aquifer does not currently and will not in the future serve as a source of drinking water?
18. Do you acknowledge that the groundwater within the Ross Project ore zone is currently classified by WDEQ as Class V Mineral Commercial?
19. Do you acknowledge that Strata is required by its WDEQ permit to restore the exempted aquifer to the pre-operational class-of-use?
20. Do you acknowledge that the current and future uses of the aquifer do not include uses as a source of drinking water, or for domestic, agricultural or livestock use?
21. Do you acknowledge, therefore, that baseline groundwater data gathered and analyzed quantitatively according to your preferred approach is unlikely to indicate that the operation of the Ross Project ISR facility would destabilize the current and future uses of the ore zone groundwater?

## **II. Proposed Questions for Contention 2**

- A. Issues Needing Further Examination:** Dr. Lance Larson, the Joint Intervenors' witness, alleges the Staff, in the FSEIS, fails to provide and evaluate information regarding the reasonable range of hazardous constituent concentration values that are likely to be applicable if Strata is required to implement an Alternative Concentration Limit (ACL). Dr. Larson argues that, as a result, the FSEIS fails to

evaluate the virtual certainty that Strata will be unable to restore groundwater to primary or secondary limits.

**A. Objective of the Examination:** To establish that the Staff had sufficient information to perform an analysis of potential environmental impacts from the Ross Project that comports with NEPA. Also to establish that the Staff's assessment of potential environmental impacts was consistent with NEPA.

**B. Proposed Questions for Dr. Larson:**

1. Do you agree that both the GEIS and the FSEIS state that the potential impacts to the water quality of the uranium-bearing production zone aquifer as a result of ISL operations would be expected to be SMALL and temporary?
2. Do you acknowledge that the GEIS and FSEIS base this conclusion in part on the requirement that the production aquifer be returned to either preoperational conditions, the maximum contaminant levels listed in Appendix A, Table C, or to a Commission-approved ACL?
3. Do you acknowledge that the FSEIS defines a LARGE impact as one that is clearly noticeable and is sufficient to destabilize important attributes of the resource considered?
4. Do you acknowledge that this definition derived from, and is identical to, the definition of a LARGE impact in the Generic Environmental Impact Statement (GEIS) for ISR projects (Ex. NRC006B)?
5. Do you acknowledge that, under this definition, in order for an impact to be considered LARGE, it would have to be sufficient to destabilize an important attribute of the groundwater at the Ross Project site?
6. Do you dispute the Staff's statement in its rebuttal testimony (Ex. NRC044-R at A.1.4) that the important attributes of groundwater quality at the Ross Project site are those that are related to the current and future uses of the groundwater?
7. Do you agree, then, that in order to show that long-term impacts to groundwater quality would be LARGE, the FSEIS would have to document impacts that would destabilize the current and future uses of the groundwater?
8. Do you acknowledge that the FSEIS's assessment of the potential impacts from the operation and restoration of the Ross Project describes information from all three modern commercial ISR operations – Crow Butte Wellfield 1, Smith Ranch-Highland A-Wellfield, and Irigaray Mine Units 1-9 – that have received Commission approval for restoration?\*
9. Do you acknowledge that the decision to approve restoration for these three sites was previously made by the Commission after it evaluated the groundwater data for each site, and not by the Staff in conjunction with the Ross Project FSEIS?\*

10. Do you agree that the Commission determined that for each of the three sites, the groundwater quality information provided by the licensee was sufficient for the Commission to approve groundwater restoration?\*
11. Do you acknowledge that according to Ex. JTI053, the NRC's decision to seek additional information from the licensee regarding Crow Butte Wellfield 1 was due to a concern that constituent levels may not remain below levels protective of human health and the environment?
12. Do you acknowledge that the NRC directed Crow Butte to resume stability monitoring and to provide the results of the monitoring to the NRC?
13. Do you acknowledge that after receiving the results of the additional stability monitoring, the NRC found that restoration of Wellfield 1 was acceptable and resulted in constituent levels that would remain below levels protective of human health and the environment?
14. Do you agree, therefore, that the NRC found "similar concentrations protective in one instance and not in another," as you claim in A.4 of your revised rebuttal testimony, because in the first instance, those concentrations appeared to be increasing, while in the latter instance, they were shown to be stable?
15. Do you acknowledge that Cogema Mining Company's Christensen Ranch Mine Units 2-6, has not received approval of restoration from the Commission?\*
16. Because Cogema has not received approval of restoration for Christensen Ranch Mine Units 2-6, do you acknowledge that the concentrations of hazardous constituents in the groundwater recorded at that site are not approved by the Commission as acceptable alternate concentration limits?\*
17. If the above two statements are true, then do you acknowledge that the information from Christensen Ranch Mine Units 2-6 does not aid the Staff in its assessment of the restoration values historically approved by the Commission?\*
18. Do you acknowledge that from the Staff's review of the available data from the Crow Butte Wellfield 1, Smith Ranch-Highland A-Wellfield, and Irigaray Mine Units 1-9 restoration approvals, the FSEIS concludes that the concentrations of these constituents in the groundwater did not change the class of use and did not represent a potential impact to the groundwater outside the aquifer-exemption boundary for any of the three sites?\*
19. Do you agree with the author's explanation that the abrupt decrease in uranium concentrations between 120 and 140 meters on Figure 9 (from JTI042, as replicated by you and shown on page 20 of your revised rebuttal testimony) is due to an increase in acidity due to the model's elevated CO<sub>2</sub> levels in the restored aquifer which dissolved all of the calcite immediately downgradient model cell?
20. Do you further agree that Figure 10 represents adding an infinite amount of calcium, which is possible for a model but not likely in the field?

### III. Proposed Questions for Contention 3

**A. Issues Needing Further Examination:** In their direct testimony, Drs. Abitz and Larson challenge the adequacy of the Staff's analysis on the potential of excursions by making a number of claims regarding Strata's ability to locate and abandon the "thousands of drillholes." See Abitz Direct Testimony at A41; Larson Direct Testimony at A73. Specifically Dr. Abitz states that the FSEIS makes an improper assumption that Strata will be able to locate and plug all the drillholes throughout the Ross Project Area, and that the FSEIS requires a "full accounting of all improperly abandoned boreholes." Abitz Direct Testimony at A73. Dr. Larson similarly states that the Staff's assumption of confined aquifers improperly relies on the assumption that all abandoned Nubeth drillholes will be abandoned. Larson Direct Testimony at A73.

**B. Objective of the Examination:** To clarify the need to properly fill and abandon only those drillholes within the well ring perimeter, rather than all drillholes throughout the Ross Project Area, and to establish Strata's capability to accomplish that task.

#### **C. Proposed Questions for Dr. Abitz and Dr. Larson:**

1. Dr. Abitz, is it correct that in your direct testimony, you state that the FSEIS improperly assumes the feasibility of locating and plugging the thousands of drillholes throughout the Ross Project Area? (See Abitz Direct Testimony at A41)\*
2. Is it correct that in your direct testimony, you also state that there should be a full accounting of all improperly abandoned boreholes in the FSEIS? (See Abitz Direct Testimony at A41)\*
3. Dr. Larson, is it correct that in your testimony, you fault the staff's conclusion of a confined OZ aquifer because the Staff improperly relies on Strata abandoning all the Nubeth drillholes in the project area? (See Larson Direct Testimony at A73; Larson Rebuttal Testimony at A.16)\*
4. Drs. Abitz and Larson, isn't it true that the text you base your conclusion on is on p. 3-37 of the FSEIS, which states, in part, that License Condition 10.12 requires Strata to attempt to locate and properly abandon all historic drillholes within the ring of perimeter-monitoring wells in each wellfield prior to operations?\*
5. Isn't it true that for flow to occur between aquifers during mining operations, the groundwater pressure in the source aquifer must be greater than the pressure in the receiving aquifer?\*
6. And isn't it true that if lixiviant is detected in the production aquifer at or beyond the perimeter well ring, License Condition 11.5 requires Strata to pursue corrected actions?\*
7. So therefore, isn't it true that the highest potential for excursions from the production aquifer to an overlying or underlying aquifer is if an unplugged drillhole were located within the production area?\*

8. Isn't it true that by locating and properly abandoning the drillholes within the ring of the perimeter-monitoring wells, as required by License Condition 12.18, and by maintaining a net inward gradient, the chances of vertical excursions are severely limited?\*
9. Isn't it true then, that the focus of the FSEIS on drillholes within the ring of the perimeter-monitoring wells was appropriate, rather than on all historic drillholes within the Ross Project Area?\*
10. Isn't it true that if all drillholes were plugged within 522-radius feet of well 12-18OZ and if no response was observed during testing in either the SM or DM monitoring aquifers, Strata was successful in locating and plugging historical drillholes within the test area of the well?\*
11. If Strata was successful in locating and plugging historical drillholes within the test area of well 12-18OZ, doesn't this success demonstrate that Strata is able to locate and abandon drillholes within the area as required by License Condition 10.12?\*
12. In your prefiled testimony you argue that Strata needs to provide additional hydrogeological data on specific wellfields. Do you acknowledge that Condition 10.13 of Strata's license (Ex. SEI015) requires Strata to submit hydrogeologic information to the NRC for review and evaluation before it can operate in wellfields?\*
13. Do you acknowledge that, under License Condition 10.13, Strata must submit the same hydrologic information for NRC review *and verification* before beginning operations?\*

#### IV. Proposed Questions for Contention 3.2

- A. Issues Needing Further Examination:** In his Rebuttal Testimony, Dr. Larson claims that the Staff's determination not to use Uranium as an early excursion indicator was flawed because of the Staff's lack of understanding of subsurface geochemistry. Larson Rebuttal Testimony at A.8 (Exhibit JTI052). Dr. Larson attacks the Staff's analysis and provides statements allegedly supporting his determination and refuting the Staff's conclusion.
- B. Objective of the Examination:** To clarify Dr. Larson's arguments and to establish his claims to be unfounded regarding current subsurface geochemistry.
  1. Do you acknowledge that in your Rebuttal Testimony at A..9, you allege that the Staff's statement in the FSEIS and Direct Testimony that the constituents proposed as excursion indicators move through the water faster than other water-quality parameters is without support?\*
  2. Do you acknowledge that in A.72 of the Staff's Direct Testimony, the Staff references the discussion in Staub et al. (1986) that states that the constituents in question have no potential interfering chemical reactions that might slow their movement through

the aquifer, whereas trace elements are subject to chemical precipitation and adsorption on clay minerals?\*

3. Do you also acknowledge that the statement referencing in Staub et al. (1986) regarding the potential for chemical reactions in the constituents in question would also provide support for the statement in A.72 note 5 of the Staff's Direct Testimony?\*
4. Isn't it true that the fact that chloride and other ions such as sulfate and bicarbonate are conservative excursion indicators is accepted knowledge in the geochemical community?\*
5. Do you acknowledge that there are no circumstances where uranium would be transported faster than chloride in the case of an excursion?\*
6. Do you acknowledge that in your Rebuttal Testimony at A.15 you question Staff's characterization of well 5MW66 in restored mine unit 5 at the Christensen Ranch site as a successful example of horizontal uranium excursion recovery because "uranium concentrations were observed at 1.1 and 0.5 mg/L (4/23/2012 and 5/1/2012) while all three excursion parameters were below respective detection limits"?\*
7. However, isn't it true, based on the information included in NRC041 at 9 that the levels of uranium, 1.1 and 0.5 are expressed as U308, and conversion to uranium from U308 requires multiplication by 0.283, so the values of uranium that you note in your testimony are actually 0.31 and 0.14?\*
8. Isn't it also true that the three excursion parameters referenced in A.15 of your Rebuttal Testimony are not below respective detection limits, but are below UCLs.\*
9. And isn't it true that this invalidates your statement that "uranium can be very elevated while excursion parameters are below detection"?\*

Respectfully submitted,

**/Signed (electronically) by EM/**

Emily Monteith

Richard S. Harper

Counsel for NRC Staff

Dated at Rockville, Maryland  
this 18th day of September, 2014.

1/32

NRC

- Would you agree that the concerns you raise regarding the methods for determining the CARB and UCLs are primarily defined by the staff in the Safety Evaluation Report and are consistent with industry standards and are merely described in the FSEIS as opposed to being defined by the FSEIS?

- Are the ~~these~~ ~~concerns~~ concerns you raise regarding the ~~prop~~ approved methods that Strata will conduct to determine the CARB and UCLs concerns that are unique to the Ross Project or are these concerns that you have w/ the ISR industry and the NRC's licensing process in general?

## NRC Staff

1. Is it your opinion that there are site-specific characteristics at the Ross Project that would cause restoration to an ACL at the Ross Project to constitute a LARGE impact, or is it your opinion that restoration to an ACL at any ISR site would constitute a LARGE impact (contrary to the conclusion in the GEIS)?
2. Are you aware that existing NRC licensees have attempted to follow the proposed biorecovery methods similar to those discussed in JT1060, and those methods resulted in very limited success?

## NRC Staff

1. What do you think the rate of diffusion might be relative to advection to transport the chemicals in the aquifer.
2. Isn't it true that bentonite mud forms a film that is measured in 1/30<sup>th</sup> of an inch, an extremely narrow zone?
3. What is the source for defining complete baseline as a statistically derived value?
4. What do you calculate as the groundwater flow velocity, and how will drilling the wellfield wells affect the perimeter monitoring ring 400 ft away under preoperational conditions?

NRC STAFF

- ④ 1. Is the UCL established for each well in the monitoring well ring and for the wells that are put in for the overlying and underlying aquifers within the well field?
  - a. Or are they established for the monitoring well ring (and for each of the underlying and overlying aquifers) in its entirety?
- ② 2. Would screening monitoring wells within the full Ore Zone create operational problems

## NRC STAFF

Do you acknowledge that in section 4.5.12. of the FSEIS, (p. 216 of SEI 009A) which also refers to section 2.1.1.3, (p. 121 of SEI 009A), the staff ~~described~~ <sup>described</sup> the method strata will use to plug abandoned boreholes, and that such methods are approved by the Wyoming Department of Environmental Quality (as contained in exhibit SEI 013).

ATTACHMENT 2

Strata Energy, Inc., Proposed Questions

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

**BEFORE THE ATOMIC SAFETY AND LICENSING BOARD**

In the Matter of:	)	
	)	
STRATA ENERGY, INC.	)	Docket No.: 40-9091-MLA
	)	
(Ross In Situ Recovery Uranium Project)	)	Date: September 5, 2014
	)	
_____	)	

**STRATA ENERGY INC. PROPOSED INITIAL CROSS-EXAMINATION  
QUESTIONS FOR INTERVENORS' AND NRC STAFF'S WITNESSES**

**I. INTRODUCTION**

Pursuant to 10 CFR § 2.1207(a) and the Atomic Safety and Licensing Board's (Licensing Board) Scheduling Order dated June 2, 2014, Strata Energy, Inc. (Strata) hereby submits its Proposed Cross-Examination Questions on initial position statements, initial pre-filed testimony, and pre-filed exhibits for the Licensing Board to ask the Natural Resource Defense Council's and the Powder River Basin Resource Council's (hereinafter "Intervenors") and NRC Staff's witnesses. This proceeding currently involves consideration of three (3) admitted contentions (Contentions 1, 2, and 3) regarding Strata's currently active NRC combined source and 11e.(2) byproduct material license for the Ross *in situ* leach uranium recovery project (hereinafter "Ross ISR Project") in the State of Wyoming. As directed by the Licensing Board, these proposed cross-examination questions are being submitted *in camera*. Strata respectfully requests that the Licensing Board strongly consider asking Intervenors' and NRC Staff's expert witnesses the following questions.

## **II. PROPOSED CROSS-EXAMINATION QUESTIONS**

Strata is proposing cross-examination question for all three (3) of the admitted contentions in this proceeding including: (1) Contention 1 regarding the adequacy of “baseline” groundwater quality data, (2) Contention 2 regarding the adequacy of the FSEIS’ analysis of environmental impacts if the applicant cannot restore groundwater to primary or secondary limits, and (3) Contention 3 regarding the adequacy of the information developed to demonstrate Strata’s ability to contain fluid migration.

Prior to offering its proposed cross-examination questions, Strata would like to note for the record that there have been several legal issues addressed in all parties’ initial position statements for each of the admitted contentions. In the event that the Licensing Board deems it appropriate to address such issues with legal argument at the scheduled evidentiary hearing, Strata respectfully requests that the Licensing Board provide all parties with advance notice of its intent to conduct oral argument or to receive additional argument on such issues prior to the evidentiary hearing date.

**A. CONTENTION 1: Alleged Failure of the FSEIS to Adequately Characterize Baseline Groundwater Quality**

For Contention 1, Strata has identified several areas within the scope of this Contention that should be subject to additional Licensing Board scrutiny, in addition to the legal and factual arguments presented in its and NRC Staff's initial statements of position, initial pre-filed testimony, and pre-filed exhibits. For this Contention, Strata has prepared its cross-examination questions as follows: (1) identify the issue needing further examination, (2) state the objective of the cross-examination question(s), and (3) propose a line of cross-examination questioning.

Strata specifically notes that there is a substantial legal issue regarding allegations on the adequacy of "baseline" groundwater quality sufficient to justify an initial licensing decision for the Ross ISR Project, including but not limited to the legal difference between groundwater quality characterization to determine 10 CFR Part 40, Appendix A, Criterion 7 "baseline" groundwater quality in a license application and the determination of Criterion 5 "Commission-approved background" post-license issuance. To the extent that the Licensing Board requires additional legal argument regarding these issues, Strata's counsel is prepared to offer such argument at the evidentiary hearing or in advance if necessary.

***1-1: Issue Needing Further Examination:***

Dr. Abitz' experience and qualifications

***Objective of the Examination:***

To establish that Dr. Abitz does not have direct, professional experience in many of the aspects of licensing or operating an ISR facility about which he has provided testimony

**Proposed Line of Questioning (Dr. Abitz):**

1. Have you ever:
  - a. Designed and implemented a baseline groundwater characterization program for an NRC or Agreement State ISR license application?
  - b. Designed or conducted an aquifer pumping test for an NRC or Agreement State ISR license application?
2. Have you ever worked at a commercial-scale uranium ISR facility?
3. Have you ever supervised or overseen construction and development of monitoring, production or injection wells at an ISR facility?
4. Have you ever supervised or overseen exploration or delineation drilling for uranium at a proposed or licensed ISR facility?
5. Have you ever assembled and submitted an aquifer reclassification and exemption request to either a state agency or the EPA, for a proposed uranium ISR project?

**1-2: Issue Needing Further Examination:**

The phased nature of baseline groundwater quality data acquisition and analysis

**Objective of the Examination:**

To establish that Dr. Abitz does not understand NRC regulations at 10 CFR Part 40, Appendix A, Criteria 5 and 7, as interpreted by ISR specific guidance contained in NUREG 1569, by insisting that detailed, pre-operational baseline groundwater quality data, including “Commission-approved background,” should be collected for each ISR wellfield prior to license issuance.

**Proposed Line of Questioning (Dr. Abitz):**

1. You note in A.33 of your initial written testimony (Ex. JTI001 at 36, lines 6-7) that “... NRC guidance is to place one baseline well in every four acres,” citing page 5-39 of NUREG-1569 (Ex. JTI007 at 136).
  - a. Are you aware that this criterion is in NUREG-1569 Chapter 5, which is titled “Operations”?
  - b. Are you aware that there are separate acceptance criteria for Criterion 7 site-wide baseline groundwater quality characterization in Chapter 2 of NUREG-1569?

- c. Have you provided any specific examples that show that Strata's license application failed to satisfy any of the NUREG-1569 Chapter 2 criteria for site-wide baseline groundwater quality characterization?
  - d. Have you provided any specific examples that show that the procedures in Strata's license application fail to meet any of the NUREG-1569 Chapter 5 criteria for establishing Commission-approved background (CAB) and upper control limits (UCLs) for each wellfield prior to operations?
  - e. Regarding your specific testimony on placing one baseline well in every four acres of wellfield area, are you aware that license condition 11.3 (Ex. SEI015 at 12) requires Strata to sample at least one production or injection well per two acres of wellfield production area to establish CAB?
  - f. Would you agree this density exceeds the operational guidance of one well per four acres in NUREG-1569?
2. Are you familiar with NRC guidance including NUREG-1569 and Regulatory Guide 4.14?
- a. Are you aware that these were issued by the Commission after public comment (NUREG 1569 was released for two rounds of public comment)?
  - b. Are you aware that the Commission accords its guidance special weight and compliance with such guidance is an acceptable means to obtain a license?
3. In your initial testimony (Ex. JTI001 at 35, lines 7-10) you state that, "NRC Staff's permissive allowance in the FSEIS for the meaningful baseline (i.e., the restoration mark) to be set after NEPA and licensing processes have concluded is outside the accepted industry and regulatory protocols for establishing baseline water quality."
- a. Are you speaking of the uranium ISR industry when you refer to "accepted industry and regulatory protocols"?
  - b. Do you agree that performance-based licensing is a policy endorsed by the Commission for ISR [CLI-99-22]?
  - c. Are you aware that the performance-based licensing approach approved in Strata's license is the same approach that has been approved by NRC in other recently issued licenses (e.g., HRI, Lost Creek, Nichols Ranch, Dewey-Burdock, and Moore Ranch)?
  - d. Do you agree that an ISR license applicant is prohibited from constructing an entire wellfield monitoring network that is used to establish CAB, UCLs and target restoration values (TRVs) prior to license issuance?

- e. If so, do you agree with the statement in NUREG-1569 that “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)]”? (Ex. JTI007 at vxiii, PDF p. 28)
4. In A.17 of your initial testimony you stated that “because the groundwater quality data necessary to establish baselines were not collected, nor were baselines established, prior to completing the NEPA process and issuing the license, the FSEIS fails to disclose to the agency and the public the actual baseline conditions on the site” (Exhibit JTI001 at 10, lines 14-17).
- a. Do you agree with the statement in NUREG-1569 cited above that an ISR applicant is not permitted to construct a wellfield (which is used to establish TRVs) prior to license issuance?
  - b. Would you agree that the FSEIS clearly delineates what types of construction are permissible prior to issuance of the license in the following statement: “These preconstruction activities could include site excavation and preparation, such as clearing, grading, and constructing design components intended to control drainage and erosion as well as other mitigation measures; erection of fences and other access control measures that are not related to the safe use of, or security of, radiological materials; support-building construction; infrastructure construction, such as paved roads and parking lots, exterior utility and lighting systems, domestic waste-water facilities, and transmission lines; and other activities which have no measurable relationship to radiological health and safety nor common defense and security” (Ex. SEI009A at 97) and that this does not include construction of the entire monitoring well network for each wellfield?
  - c. Do you agree with the similar statement in the FSEIS that “point-of-compliance, specific hazardous constituent concentrations would not be Commission-approved until after a license is granted and thus cannot be legally obtained by the Applicant prior to the granting of a license.” (Ex. SEI009A at 561)
  - d. Is it not true that the procedures for establishing CAB, UCLs and TRVs Are provided for public review and evaluated in the FSEIS, specifically in Section 2.1.1.1 (Ex SEI009A at 109-110) and Section 6.3.2 (Ex. SEI009A at 471-473)?
  - e. Are you aware of the Licensing Board’s and the Commission’s decisions in *Hydro Resources, Inc.* regarding “baseline” versus “Commission-approved background” groundwater quality at ISR projects?

- f. Have you submitted any evidence that challenges these procedures or describes how they do not meet NUREG-1569 Chapter 5 (Operations) or Chapter 6 (Groundwater Restoration) acceptance criteria?
- g. If so, is it not true that your testimony cannot be reconciled with the Commission's express mandate regarding "baseline" versus "Commission-approved background" groundwater quality determination and the process by which this is done?

**1-3: Issue Needing Further Examination:**

Allegation that the baseline data have been biased to show higher concentrations of uranium, radium-226, and other constituents

**Objective of the Examination:**

To establish that Dr. Abitz's testimony does not support the theory that Strata has biased the baseline data in the host (OZ) aquifer to show higher concentrations of uranium, radium-226, and other constituents

**Proposed Line of Questioning (Dr. Abitz):**

1. In A.24 of your initial testimony you state that the baseline groundwater quality data collected from the OZ aquifer in Strata's monitoring well network were biased since the wells are "screened only through the part of the ore zone (OZ) water horizon that is in contact with the ore zone, rather than the entire column of water in the OZ sand interval" (Ex. JTI001 at 21, lines 9-10). You also present a table at page 22 that shows the screened length in these wells ranged from 30 to 110 feet compared to a sand thickness of 150 to 200 feet.
  - a. Isn't it true, however, that the average thickness of the actual uranium ore is only 8.9 feet as stated in Ex. SEI014C at 24?
  - b. Therefore, compared to the average mineralized intercept thickness of 8.9 feet, wouldn't you agree that the screened length of the OZ cluster wells ranged from about 3 to 12 times this length?
  - c. Are you aware that the actual ISR production and injection wells will be screened only through the actual ore zone and not through the entire sand thickness (e.g., see Ex. SEI014C at 53)? Are you also aware that post-licensing, pre-operational background water quality for the ore zone will be established using these wells that are discretely screened in the actual ore zone and not the full aquifer thickness?
2. You also state in A.24 of your initial testimony that "NRC Guidance (NRC013, at 5-43) also recognizes this bias and the NRC states that fully screened

intervals are more accurate in their representation of the water quality that a user of the water will encounter” (Ex. JTI001 at 22, lines 8-10).

- a. As a point of clarification, Ex. NRC013 (NUREG-1748) does not contain a page 5-43. Should this reference NUREG-1569 at page 5-43 (Ex. SEI007 at 140)?
  - b. Isn't it true that page 5-43 of NUREG-1569 (top of the page) discusses screened intervals for perimeter overlying and underlying monitor wells and not for ore zone wells used to establish CAB?
  - c. In contrast, would you agree that page 268 of the SER (Ex. SEI010 at 268) describes Strata's commitment to using "partially penetrating wells targeting the discrete mineralized zones within the OZ aquifer" to establish CAB for each wellfield?
  - d. Therefore wouldn't you agree that this reference to NUREG-1569 is not relevant to establishing baseline groundwater quality in the production zone of each wellfield?
  - e. Are you aware that Strata has committed to screening monitor wells to fully penetrate the aquifers that will be monitored in conformance with NUREG-1569 page 5-43 (see Ex. SEI014C at 238)?
3. You also state in A.24 of your initial testimony that the regional cluster wells are "improperly located" (Ex. JTI001 at 21, line 8) and should have been at "random locations across the proposed mining area" (line 12).
- a. Are you familiar with Ex. SEI019 showing the location of the regional baseline monitor well clusters with respect to the license boundary and mineralized areas?
  - b. Doesn't this figure show that the regional baseline monitor wells are distributed throughout the license area in and around mineralized areas?
  - c. Isn't it true that some of these wells (based on the locations shown in Ex. SEI019 presented in the license application, Ex. SEI014A at 310-315) are in mineralized areas (e.g., 12-18OZ, 34-18OZ) while others are near but not within mineralized areas (e.g., 34-7OZ, 41-19OZ)?

***1-4: Issue Needing Further Examination:***

Relevance and application of EPA MCLs for uranium, radium-226 and other parameters in SEI and NRC Staff characterization of pre-license, groundwater quality

**Objective of the Examination:**

To demonstrate that Dr. Abitz' emphasis on comparing the baseline groundwater quality to EPA MCLs is not relevant to the current groundwater use within the license area nor the basis for Strata's approved aquifer exemption

**Proposed Line of Questioning (Dr. Abitz):**

1. Are you aware that Strata has obtained an aquifer exemption from EPA [Ex. SEI 034]?
2. Much of your initial written testimony focuses on comparing the baseline groundwater quality to EPA MCLs for uranium and radium-226. For example, in A.22 you state that "there is no attempt to perform a valid statistical analysis on the data to determine whether there are a sufficient number of wells and samples to conclude with a stated level of confidence that the water exceeds the EPA drinking water MCLs for hazardous metals and radionuclides" (Ex. JTI001 at 17, lines 1-4).
  - a. EPA MCLs are drinking water standards, are they not?
  - b. Isn't it true, however, that the groundwater within the aquifer exemption area is not currently used as a source of drinking water? For example, SEI014A at 208 states that historical and current groundwater use within the aquifer exemption area is limited to livestock watering and industrial use.
  - c. Do you agree that Strata is required by Criterion 5B(5), license conditions and commitments in its license application to establish CAB for each wellfield and then establish target restoration values (TRVs) based on the higher value of CAB or EPA MCLs?
3. Is it your position that it is necessary to demonstrate that the baseline groundwater quality in the ore zone exceeds EPA MCLs in order to both reclassify and ultimately exempt an aquifer from protection as an underground source of drinking water (USDW) under the Safe Drinking Water Act?
  - a. If so, are you aware that the basis for Strata's aquifer exemption, which has been approved by EPA, does not mention a comparison to MCLs?
  - b. See Ex. SEI034 at 2, which lists the two criteria used to exempt a portion of the OZ aquifer within the license area: (1) it does not currently serve as a source of drinking water, and (2) it is mineral producing and can be demonstrated to contain minerals that, considering their quantity and location, are expected to be commercially producible.

**Proposed line of Questioning (NRC Staff):**

1. Is it true that NRC, as part of its NEPA evaluation, considered the basis for EPA's grant of an aquifer exemption at the Ross site that forever removes this resource as an underground source of drinking water under the Safe Drinking Water Act?

**1-5: Issue Needing Further Examination:**

Whether providing the site characterization groundwater quality data in FSEIS Appendix C meets the requirement in 10 CFR Part 51 to describe data at a level of detail commensurate with the importance of the impact

**Objective of the Examination:**

To demonstrate that the level of detail of the baseline groundwater quality data provided in the FSEIS meets the 10 CFR Part 51 requirements and exceeds the level of detail commonly found in recent FSEIS's issued for ISR facilities

**Proposed line of Questioning (NRC Staff):**

1. In ¶A.1.5 of your initial written testimony, you state that 10 CFR Part 51 requires an SEIS to "succinctly describe the environment to be affected by the proposed action, with data and analyses in the statement to be described at a level of detail commensurate with the importance of the impact ..." (Ex. NRC001 at 9). You also describe in ¶A.1.2 (Ex. NRC001 at 4) how the pre-licensing, site-characterization baseline groundwater quality data are provided in Appendix C of the FSEIS. Does the staff believe that the data in Appendix C satisfy the 10 CFR Part 51 requirements with respect to the detail necessary to describe the affected environment?
2. Do you agree that Table 1 of NUREG 1569 (Ex. SEI007 at 29-31) indicates that satisfaction of its acceptance criteria for site-wide baseline groundwater quality (Section 2.7) directly factors into NRC's environmental assessment for an ISR license application under 10 CFR Part 51?

**1-6: Issue Needing Further Examination:**

Whether NRC Staff considered NUREG-1569 criteria in determining whether Strata defined pre-licensing, site-characterization groundwater quality in accordance with 10 CFR Part 40, Appendix A, Criterion 7

**Objective of the Examination:**

To demonstrate that NUREG-1569 contains specific criteria for establishing site-characterization groundwater quality commonly used to determine whether an application satisfies Criterion 7 requirements

**Proposed line of Questioning (NRC Staff):**

1. In your testimony under ¶A.1.4 (Ex. NRC001 at 8), you describe how the NRC Staff compared Strata's sampling and analysis efforts to guidelines in Wyoming DEQ Guideline No. 8 and NRC's Regulatory Guide 4.14. Did you also compare Strata's sampling and analysis efforts to guidelines in NUREG-1569?
2. For example, did you compare Strata's list of sample parameters for site-wide baseline groundwater quality with that in NUREG-1569, Table 2.7.3-1 (Ex. SEI007 at 63)?
3. You state that "The water quality datasets that are generated from following Criterion 7 and Reg. Guide 4.14 are sufficient to meet the requirements of NEPA, which requires a description of the water that could be affected by the proposed action, specifically providing the mean, range, and temporal spatial variations in water quality" (Ex. NRC001 at 8). Do acceptance criteria in NUREG-1569 help the Staff determine whether the application satisfies Criterion 7? Did NRC Staff determine that Strata's license application satisfied these criteria?

**1-7: Issue Needing Further Examination:**

The applicability of a RCRA-based monitoring approach to an NRC-licensed ISR facility.

**Objective of the Examination:**

To demonstrate that the allegation by Drs. Abitz and Larson that post-licensing, pre-operational background values are only viable if those values are established with samples collected from wells hydraulically upgradient of disturbed areas is not applicable to ISR facilities.

**Proposed line of Questioning (NRC Staff):**

1. In A.1.7 of your initial testimony, you respond to Drs. Abitz's and Larson's allegation that RCRA regulations indicate that post-licensing, pre-operational background values are only viable if established from wells hydraulically upgradient of the

disturbed area (Ex. NRC001 at 14). Is it correct that a RCRA-based upgradient/downgradient monitoring approach is not directly applicable to an ISR operation where each wellfield is entirely surrounded by a monitor well network?

***1-8: Issue Needing Further Examination:***

The adequacy of the duration of characterizing site-wide groundwater quality

***Objective of the Examination:***

To determine whether the number of samples and the duration of sampling met or exceeded applicable regulations and guidance

***Proposed line of Questioning (NRC Staff):***

1. In your initial testimony at ¶ A.1.10 (Ex. NRC001 at 24-25), you state that Strata collected quarterly groundwater samples over an initial 4-quarter monitoring period in 2010 and a subsequent 4-quarter monitoring period in 2010-2011. You also state that NUREG-1569 specifies that groundwater samples should be collected over a 12-month period.
  - a. Is it your understanding that Strata collected 8 quarters of groundwater sampling data?
  - b. Do you agree this exceeds the requirements of NUREG-1569 and exceeds the duration of site-wide baseline groundwater quality sampling that was used to support other recently approved NRC ISR license applications?

**B. CONTENTION 2: Alleged Failure of the FSEIS to Analyze the Environmental Impacts That Will Occur if the Applicant Cannot Restore Groundwater to Primary or Secondary Limits**

For Contention 2, Strata has identified several areas within the scope of this Contention that should be subject to additional Licensing Board scrutiny, in addition to the legal and factual arguments presented in its and NRC Staff's initial statements of position, initial written testimony, and exhibits. For this Contention, Strata has prepared its cross-examination questions as follows: (1) identify the issue needing further examination, (2) state the objective of the cross-examination question(s), and (3) propose a line of cross-examination questioning.

**2-1: Issue Needing Further Examination:**

Dr. Larson's qualifications

**Objective of the Examination:**

To establish that Dr. Larson does not have direct, professional experience in many of the aspects of licensing or operating a uranium ISR facility about which he has provided testimony

**Proposed Line of Questioning (Dr. Larson):**

1. Have you ever:
  - a. Performed baseline groundwater characterization for an NRC or Agreement State ISR license application?
  - b. Designed or conducted an aquifer pumping test for an NRC or Agreement State ISR license application?
  - c. Worked at a commercial-scale uranium ISR facility?
  - d. Submitted a groundwater restoration evaluation to NRC?

**2-2: Issue Needing Further Examination:**

Dr. Larson's understanding of an EPA aquifer exemption

**Objective of the Examination:**

To establish that Dr. Larson does not understand the relationship between an MCL and an aquifer exemption

**Proposed Line of Questioning (Dr. Larson):**

1. Do you understand that while post-restoration uranium values are relevant with regard to Criterion 5B(5), they are not relevant for protection of drinking water as the aquifer is permanently exempted from being a USDW?

**2-3: Issue Needing Further Examination:**

Dr. Larson's views on the adequacy of license conditions and federal regulations regarding groundwater restoration

**Objective of the Examination:**

To establish that Dr. Larson is challenging NRC regulations by asserting that restoration to current NRC standards as defined by SUA-1601, license condition 10.6 is not sufficient

**Proposed Line of Questioning (Dr. Larson):**

1. Did NRC, in the SER, determine that ISR operations could be conducted in a manner that would be protective of human health and the environment?
2. Do you agree that license condition 10.6 of SUA-1601 requires that: “Hazardous constituents in the ground water shall be restored to the numerical ground water protection standards as required by 10 CFR Part 40, Appendix A, Criterion 5B(5)” (Exhibit SEI015 at 7)?
3. Do you agree that the 10 CFR Part 40, Appendix A, Criterion 5B(5) groundwater protection standards as applied to ISR facilities are adequately protective of human health and the environment?

**2-4: Issue Needing Further Examination:**

Whether a license applicant is permitted to install the monitoring network necessary to establish specific aquifer restoration values prior to license issuance

**Objective of the Examination:**

To establish that license applicants are not allowed to install a complete monitoring network for a wellfield that is needed to establish specific target restoration values prior to licensing

**Proposed Line of Questioning (NRC Staff):**

1. In ¶A.2.3 of your initial written testimony (Ex. NRC001 at 28-29), you describe how “it is not possible to include a meaningful estimation of any or all potential restoration values for the Ross Project in the FSEIS.” In the same paragraph you also describe how “the FSEIS describes the criteria for aquifer restoration that are applicable to Strata’s Ross Project.” Does the FSEIS describe the specific procedures that will be used to establish target restoration values (TRVs) for each wellfield prior to operations?
2. Did the intervenors challenge these specific procedures in their allegations?

3. Do you understand that a license applicant is not permitted to install a complete monitoring network for an ISR wellfield in order to determine the specific, numerical TRVs prior to license issuance?

**2-5: Issue Needing Further Examination:**

Whether a separate NEPA evaluation will be required if Strata requests an ACL

**Objective of the Examination:**

To establish that an ACL application is for a license amendment, which requires a NEPA evaluation

**Proposed Line of Questioning (NRC Staff):**

1. In ¶A.2.4 of your initial written testimony (Ex. NRC001 at 30, 1<sup>st</sup> ¶) you state that “To request Commission approval of a proposed ACL, the licensee must submit an application for a license amendment.” Is it your understanding that the license amendment process will involve a NEPA evaluation of potential environmental impacts?

**C. CONTENTION 3: Alleged Failure to Include Adequate Hydrological Information to Demonstrate SEI’s Ability to Contain Groundwater Fluid Migration**

For Contention 3, Strata has identified several areas within the scope of this Contention that should be subject to additional Licensing Board scrutiny, in addition to the legal and factual arguments presented in its and NRC Staff’s initial statements of position, initial written testimony, and exhibits. For this Contention, Strata has proposed its cross-examination questions as follows: (1) identify the issue needing further examination, (2) state the objective of the cross-examination question(s), and (3) propose a line of cross-examination questioning.

Strata specifically notes that there is a substantial legal issue regarding allegations on the adequacy of “baseline” hydrogeologic characterization sufficient to justify an initial licensing decision for the Ross ISR Project, including but not limited to the legal difference between site-wide information that a license applicant must provide in conformance with Chapter 2 of

NUREG-1569 and wellfield-specific information that a licensee must provide for each wellfield after license issuance but prior to operations. To the extent that the Licensing Board requires additional legal argument regarding these issues, Strata's counsel is prepared to offer such argument at the evidentiary hearing or in advance if necessary.

**3-1: Issue Needing Further Examination:**

Dr. Larson's and Dr. Abitz' understanding of activities that are required after licensing to demonstrate aquifer confinement sufficient to safely conduct ISR operations

**Objective of the Examination:**

To establish that after licensing additional aquifer testing will be completed to assure that the ISR wellfields are confined and identify potential operational issues.

**Proposed Line of Questioning (Dr. Abitz and Dr. Larson):**

1. Are you familiar with the requirement in license condition 10.13 (Ex. SEI015 at 9-10) to prepare a wellfield package prior to operating each wellfield and submit all wellfield packages to NRC Staff prior to operations?
2. Are you aware that the initial wellfield package must be submitted to NRC Staff for review and written verification and that it must "provide an evaluation of the heterogeneities and confirm the hydraulic isolation of the OZ aquifer" (SEI010 at 93)?
3. Are you aware that Strata has committed as part of its wellfield packages to conduct aquifer testing for each wellfield and that these tests will serve to demonstrate that the overlying and underlying aquifers are hydrologically isolated from the production zone aquifer and that the perimeter monitor wells are in communication with the production zone (Ex. SEI014C at 239)?
4. Are you familiar with Strata's commitment and the license requirement to install monitor wells in the overlying and underlying aquifers at a minimum density of one well unit per 4 acres of wellfield (See License Condition 11.3(C), Ex. SEI015 at 12)?
5. During the aquifer test(s) water levels within the ore zone will be lowered by pumping and water levels in the overlying and underlying aquifers would be monitored. Do you agree that if during the aquifer test water levels in the overlying

or underlying wells decreased that it may indicate a potential operational issue such as a leaky borehole?

6. Are you aware of how the results from aquifer tests can be used to assess whether there might be an issue with geologic conditions, historical wells/boreholes, or well construction?
7. Are you aware of how historical testing results at other ISR operations have been used to successfully remediate wells that allowed communication between two aquifers such that ISR operations could be safely conducted?
8. Are you aware that these wellfield packages will be subject to review by NRC staff and the Wyoming Department of Environmental Quality (WDEQ)?

**3-2: Issue Needing Further Examination:**

Intervenors' witness Dr. Larson's understanding of an excursion

**Objective of the Examination:**

To establish that an excursion does not mean that areas outside of the exempted aquifer boundary have been impacted

**Proposed Line of Questioning (Dr. Larson):**

1. In ¶A.75 of your initial testimony you state that "The FSEIS should have disclosed that excursions are likely, and then addresses [sic] the steps that will be taken to address them when detected" (Ex. JTI003 at 56). Is it your allegation that an excursion in and of itself represents an adverse environmental impact? Or do you agree that they are an early warning system as stated by Hal Demuth and Errol Lawrence in their initial testimony (Ex. SEI026 at ¶A.28):

"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 or license conditions; rather it is an indication that mining fluids may be migrating away from the hydraulic control of the wellfield unless corrective action is undertaken. The ultimate point of compliance is the aquifer exemption boundary not the monitor well itself."

2. Do you agree that an excursion is not a violation of NRC regulations or license conditions?
3. Are you aware of the Licensing Board's and the Commission's decision's in *Hydro Resources, Inc.* (ASLBP No. 95-706-01-ML) regarding excursions and that they serve as early warnings of recovery solution migration and not as confirmation of contamination of adjacent, non-exempt underground sources of drinking water (USDW)?
4. Do you disagree with the findings in NRC Staff's 2009 report to the Commission regarding excursions at NRC-licensed ISR projects and their conclusion that: "The staff is unaware of any situation indicating that: (1) the quality of groundwater at a nearby water supply well has been degraded; (2) the use of a water supply well has been discontinued; or (3) a well has been relocated because of impacts attributed to an ISR facility" (Ex. SEI014A at 2)?

**3-3: Issue Needing Further Examination:**

Whether NRC Staff inspections for compliance with license requirements will be announced or unannounced

**Objective of the Examination:**

To determine whether unannounced inspections will occur and to establish that a pre-operational inspection will be required prior to initiating operations

**Proposed Line of Questioning (NRC Staff):**

1. In ¶A.3.1.7 of your initial written testimony (Ex. NRC001 at 48, last ¶) you mention that "the Staff will also perform routine on-site compliance inspections of the facility ... to ensure the licensee complies with the regulations and license conditions in the approved license. The frequency of the inspections is either semi-annual or annual." Will these inspections be announced, unannounced or a combination of both?
2. Will there also be a pre-operational inspection to ensure that Strata in is compliance with its license conditions prior to initiating operations? If so, please describe this pre-operational inspection.

**III. CONCLUSION**

Strata respectfully requests that the Licensing Board strongly consider asking each of the aforementioned questions of Intervenors' and NRC Staff's witnesses.

Respectfully Submitted,

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

---

Anthony J. Thompson, Esq.  
Christopher S. Pugsley, Esq.  
Thompson & Pugsley, PLLC  
1225 19<sup>th</sup> Street, NW  
Suite 300  
Washington, DC 20036  
COUNSEL TO STRATA ENERGY, INC.

Dated: September 5, 2014

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

**BEFORE THE ATOMIC SAFETY AND LICENSING BOARD**

In the Matter of: )

STRATA ENERGY INC. )

(Ross In Situ Recovery Uranium Project) )  
\_\_\_\_\_ )

) Docket No.: 40-9091-MLA

) Date: September 5, 2014

**CERTIFICATE OF SERVICE**

I hereby certify that copies of the foregoing “**STRATA ENERGY INC’S PROPOSED INITIAL CROSS-EXAMINATION QUESTIONS FOR INTERVENORS’ AND NRC STAFF’S WITNESSES**” in the above captioned proceeding have been served via the Electronic Information Exchange (EIE) this 5th day of September 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)/  
Christopher S. Pugsley, Esq.**

Dated: September 5, 2014

\_\_\_\_\_  
Anthony J. Thompson, Esq.  
Christopher S. Pugsley, Esq.  
Thompson & Pugsley, PLLC  
1225 19<sup>th</sup> Street, NW  
Suite 300  
Washington, DC 20036  
COUNSEL TO STRATA

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

**BEFORE THE ATOMIC SAFETY AND LICENSING BOARD**

In the Matter of:	)	
	)	
STRATA ENERGY, INC.	)	Docket No.: 40-9091-MLA
	)	
(Ross In Situ Recovery Uranium Project)	)	Date: September 18, 2014
	)	
_____	)	

**STRATA ENERGY, INC. PROPOSED REBUTTAL CROSS-EXAMINATION  
QUESTIONS FOR INTERVENORS' WITNESSES**

**I. INTRODUCTION**

Pursuant to 10 CFR § 2.1207(a)(3)(ii) and the Atomic Safety and Licensing Board's (Licensing Board) Order ruling on the motion to amend the general schedule dated August 7, 2014, Strata Energy, Inc. (Strata) hereby submits its Proposed Cross-Examination Questions on rebuttal position statements and pre-filed rebuttal testimony and exhibits for the Licensing Board to ask the Natural Resources Defense Council's and the Powder River Basin Resource Council's (hereinafter "Intervenors") witnesses. This proceeding currently involves consideration of three (3) admitted contentions (Contentions 1, 2, and 3) regarding Strata's currently active NRC combined source and 11e.(2) byproduct material license for the Ross *in situ* leach uranium recovery project (hereinafter "Ross ISR Project") in the State of Wyoming. As directed by the Licensing Board, Strata's proposed cross-examination questions are being submitted *in camera*. Strata respectfully requests that the Licensing Board strongly consider asking Intervenors' expert witnesses the following questions.

## **II. PROPOSED CROSS-EXAMINATION QUESTIONS**

Strata is proposing cross-examination questions for all three (3) of the admitted contentions in this proceeding including: (1) Contention 1 regarding the alleged adequacy of “baseline” groundwater quality data, (2) Contention 2 regarding the alleged adequacy of the FSEIS’ analysis of environmental impacts if the applicant cannot restore groundwater to primary or secondary limits, and (3) Contention 3 regarding the alleged adequacy of the information developed to demonstrate Strata’s ability to contain fluid migration.

Prior to offering its proposed cross-examination questions on Intervenors’ rebuttal offerings, Strata would like to note for the record that there have been several legal issues addressed in all parties’ initial and rebuttal position statements for each of the admitted contentions. In the event that the Licensing Board deems it appropriate to address such issues with legal argument at the scheduled evidentiary hearing, Strata respectfully requests that the Licensing Board provide all parties with advance notice of its intent to conduct oral argument or to receive additional argument on such issues prior to the evidentiary hearing date.

**A. CONTENTION 1: Alleged Failure of the FSEIS to Adequately Characterize Baseline Groundwater Quality**

For Contention 1, Strata has identified several areas within the scope of this Contention that should be subject to additional Licensing Board scrutiny, in addition to the legal and factual arguments presented in its and NRC Staff's initial and rebuttal statements of position, initial and rebuttal pre-filed testimony, and pre-filed exhibits. For this Contention, Strata has prepared its proposed cross-examination questions as follows: (1) identify the issue needing further examination; (2) state the objective of the cross-examination question(s); and (3) propose a line of cross-examination questioning.

***1-1: Issue Needing Further Examination:***

Dr. Abitz's erroneous assumption that there is any requirement in applicable regulations or guidance documents to provide baseline groundwater quality data from randomly located wells

***Objective of the Examination:***

To establish that the regional baseline well clusters were installed consistent with applicable NRC and Wyoming DEQ regulatory guidance

***Proposed Line of Questioning (Dr. Abitz):***

1. In A.3 and A.4 of your rebuttal testimony, you allege that "Strata has failed to collect representative samples from a sufficient number of randomly placed wells" (Ex. JTI051 at 2, lines 14-15), and "Neither Strata nor the Staff provided a basis to justify the location of Strata's 6 monitoring well clusters" (Ex. JTI051 at 4, lines 20-21). Have you read the list of factors considered when locating the monitoring well clusters in the ER and TR (Ex. SEI016A at 261 and SEI014A at 196)? Do you disagree that this "provided a basis to justify the location" of the well clusters?;
2. Specifically, the first factor is "Regulatory considerations (as detailed in WDEQ/LQD Guideline 4, In Situ Mining, WDEQ/LQD Guideline 8, Hydrology, WDEQ/WQD Chapter 8, and NRC Regulatory Guide 4.14." Are you familiar with the cited Wyoming guidelines?;

3. If not, would you disagree that the six monitor well clusters represent “A minimum of at least three (3) aerially spaced wells per affected aquifer,” which is one of the specifications of Guideline 4 (Ex. SEI012B at 173)? Do you see any evidence in Guideline 4 that WDEQ/LQD requires randomly placed wells?;
4. Or, would you disagree that the six monitor well clusters represent at least “1 well per mi<sup>2</sup>” in the production zone (host aquifer), which is another Guideline 4 specification (Ex. SEI012A at 17; Ex. SEI012B at 175)?;
5. Similarly, would you agree that Regulatory Guide 4.14 (Ex. SEI008) does not specify the use of randomly selected monitoring wells for hydrological analysis?;
6. Are you aware of any acceptance criteria in NUREG-1569 (Ex. SEI007) that specify the use of randomly selected monitoring well locations?

**1-2: Issue Needing Further Examination:**

Whether upgradient groundwater quality has been characterized on a site-wide basis and will be established for each wellfield

**Objective of the Examination:**

To establish that a) groundwater quality upgradient of the mineralized zones has been sampled and is presented in the FSEIS, and b) groundwater quality upgradient from each wellfield will be established in perimeter monitor wells prior to operating each wellfield

**Proposed Line of Questioning (Dr. Abitz):**

1. In A.4 of your rebuttal testimony, you allege that “Regulatory Guide 4.14 clearly requires at least one well up gradient to serve as a background sample” (Ex. JTI051 at 4, lines 18-19). Based on FSEIS Figure 3.15 (Ex. SEI009A at 180), which shows the potentiometric contours of the OZ aquifer and the placement of the regional well clusters, would you disagree that the 34-7OZ well is located in an upgradient portion of the license area?;
2. Now turning to Ex. SEI019, which depicts similar information to FSEIS Figure 3.15 with the addition of mineral outlines from TR Figure 3.1-2, isn’t the 34-7OZ well also upgradient of the mapped mineralized zones?;
3. Do you disagree that the specification in Regulatory Guide 4.14 to sample groundwater from “one well located hydrologically up gradient from the tailings

area” indicates that this is “to serve as a background sample” and that this is in a section of Regulatory Guide 4.14 called “Preoperational Sampling Program”? (Ex. SEI008 at 3);

4. Do you disagree that license condition 11.3 will require Strata to establish the Commission-approved background concentration for each wellfield prior to operations? (Ex. SEI015 at 12);
5. Would you disagree that a perimeter monitoring well network installed surrounding an ISR wellfield would be at least in part upgradient from that wellfield? In fact, isn't it your testimony that “the monitoring-well ring around the mining zone places wells upgradient and downgradient of the ore zone” (Ex. JTI051 at 4-5)?;
6. Therefore, isn't it true that preoperational background water quality will be sampled upgradient from each ISR wellfield according to the license condition? If so, how does this not satisfy the Regulatory Guide 4.14 specification to establish background water quality prior to operations in at least one well that is upgradient from the tailings area (or, in this case, from each ISR wellfield)?;
7. Moreover, from a practical standpoint, since during excursion monitoring the operational groundwater quality in each monitoring well will be compared to the pre-operational groundwater quality *from that well*, does it matter whether the well is upgradient, downgradient or side gradient? Isn't the important point that excursion monitoring will occur in wells that completely surround each wellfield?

**1-3: Issue Needing Further Examination:**

The allegation that EPA RCRA guidance should be applied to an ISR license application because NRC guidance does not specify how site characterization baseline monitor wells should be located

**Objective of the Examination:**

To establish that NRC guidance documents do provide criteria for locating wells and that Strata satisfied these criteria in its license application

**Proposed Line of Questioning (Dr. Abitz):**

1. In A.8 of your rebuttal testimony (Ex. JTI051 at 7, lines 11-14) you state “...NRC guidance [documents] ... are silent on the location of wells to obtain

representative samples from the aquifer...and the proper statistical methods for evaluating the data sets.” But wouldn’t you agree that Regulatory Guide 4.14 does provide guidance on the location of groundwater sampling wells as discussed in your rebuttal testimony at 4, lines 10-16 (i.e., at least three wells downgradient, at least three side gradient and one upgradient)?;

2. Wouldn’t you also agree that NUREG-1569 also provides recommendations for statistical analysis of groundwater data when it requests “The average water quality for each aquifer zone and the range of each indicator in the zone have been tabulated and evaluated” (Ex. SEI007 at 64)?;
3. Would you agree that the NRC Staff provided the range of each constituent concentration in the ore zone and tabulated them in the FSEIS (Ex. SEI009A at 184-185)? Would you also agree that Strata provided the range of each constituent concentration in each aquifer of interest (ore zone, overlying, underlying and surficial aquifers) in the license application (Ex. SEI014A at 267-268)?

**1-4: Issue Needing Further Examination:**

The applicability of the well diagram shown in Ex. JTI009 at 3 to the Ross ISR Project

**Objective of the Examination:**

To clarify that the ore zone potentiometric water level is hundreds of feet above the top of the ore zone at the Ross ISR Project, which reduces or eliminates the potential for adding oxygen during airlift development

**Proposed Line of Questioning (Dr. Abitz):**

1. In A.9 of your rebuttal testimony, you state that “The NRC Staff is well aware that ‘conventional techniques’ [for well drilling and development] will introduce oxygen into the ore body and bias results to high values” (Ex. JTI051 at 8, lines 3-4). In support of your testimony you have provided Ex. JTI009, which at slide 3 provides a well diagram. This diagram shows the potentiometric surface of the aquifer occurring within the screened interval of the well. Is this the case at the Ross ISR Project?;
2. In fact, isn’t it the case that the water in the OZ interval is actually well above the top of the screened interval in the regional baseline cluster wells – at least 150 feet up to more than 300 feet above the screened interval – as shown in ER Figures 3.4-15 through 3.4-20 (Ex. SEI016A at 373-378)?;

3. Have you provided any specific evidence to refute Mr. Knode's initial testimony at A.6, which describes how during airlifting at the Ross ISR Project, air is introduced a few tens of feet below the static water level (which is well above the screened interval) and that this creates a vacuum that causes fresh water from the formation to rush into the bottom of the well through the screened interval (Ex. SEI001 at 5)?;
4. Isn't it true, then, that the diagram provided in Ex. JTI009 at 3 is not applicable to wells completed in the ore zone aquifer at the Ross ISR Project?

**1-5: Issue Needing Further Examination:**

Dr. Abitz's view that differences in baseline uranium and radium concentrations at the Kingsville Dome Project could only be attributed to impacts from adjacent ISR production areas

**Objective of the Examination:**

To establish that it is not unusual to have varying baseline concentrations of radium and uranium between different ISR wellfields and that changes in groundwater quality could not have occurred without detection in the perimeter monitor well rings

**Proposed Line of Questioning (Dr. Abitz):**

1. You make the statement in your rebuttal testimony that "it is startling to read that the Staff disagrees with our proven statement that the development of 'baseline' in adjacent well fields after lixiviant injection has begun will degrade water quality. The operational data from the Kingsville Dome ISL site clearly shows the degradation in water quality as 'baseline' was determined as each new well field was developed" (Ex. JTI051 at 13, lines 3-6). You then cite your initial testimony (Ex. JTI001 at 29-30), which describes how the range of baseline concentrations of radium and uranium were highly varied between PAA1 and, PAA2 and PAA3 at Kingsville Dome. Is it your opinion that baseline uranium and radium concentrations do not naturally vary from one production area to the next?;
2. In fact, isn't it true that the restoration table uranium concentration for PAA3 was much lower than that for PAA2, which was mined prior to PAA3? See Ex. JTI018 at 3, which shows a restoration table uranium value of 1.89 mg/L for PAA2 compared to Ex. JTI020 at 4, which shows a restoration table uranium value of 0.338 mg/L for PAA3. If PAA1, PAA2 and PAA3 were developed sequentially and data from these production areas proves that baseline degrades

in adjacent well fields after lixiviant injection has begun, wouldn't a person expect the baseline uranium concentration in PAA3 to be higher than in PAA2?;

3. If ISR in one production area impacts baseline groundwater quality in another production area, wouldn't it first have to impact the groundwater quality in the perimeter monitoring ring?;
4. Have you submitted any evidence that shows that the groundwater quality changed significantly in the perimeter monitor well rings surrounding the Texas production areas?;
5. In fact, isn't it true that the Texas Commission on Environmental Quality determined that "The Executive Director is not aware of a documented case in over 30 years of *in situ* mining of off-site groundwater contamination from *in situ* uranium mining in South Texas" (Ex. SEI038 at 48)?

**B. CONTENTION 2: Alleged Failure of the FSEIS to Analyze the Environmental Impacts That Will Occur if the Applicant Cannot Restore Groundwater to Primary or Secondary Limits**

For Contention 2, Strata has identified several areas within the scope of this Contention that should be subject to additional Licensing Board scrutiny, in addition to the legal and factual arguments presented in its and NRC Staff's initial and rebuttal statements of position, initial and rebuttal written testimony, and exhibits. For this Contention, Strata has prepared its cross-examination questions as follows: (1) identify the issue needing further examination, (2) state the objective of the cross-examination question(s), and (3) propose a line of cross-examination questioning.

**2-1: Issue Needing Further Examination:**

Dr. Larson's allegation that there is a dose risk to human health from radium-226 and uranium concentrations within the exempted aquifer

**Objective of the Examination:**

To clarify that ISR will occur within an exempted aquifer and that there are no drinking water wells anywhere inside the license area

**Proposed Line of Questioning (Dr. Larson):**

1. You state in A.4 of your rebuttal testimony that “in neither the FSEIS or in Staff’s August testimony is there a risk or dose calculation to support the contention that the elevated radium-226 and uranium concentrations pose no threat to human health and the environment” (Ex. JTI052 at 3, last ¶). Isn’t it true that uranium ISR will only take place within an exempted aquifer?;
2. Do you disagree that in order to exempt the aquifer EPA and WDEQ determined that the aquifer does not now and is not anticipated in the future to serve as a drinking water source?;
3. Isn’t it also true that the exempted portion of the aquifer has been permanently exempted from classification as an underground source of drinking water (USDW)?;
4. Do you disagree that there are no domestic wells within the entire license area and that historical groundwater use has been limited to industrial and livestock use? (See Ex. SEI009A at 189, 2<sup>nd</sup> to last ¶.) Further, do you disagree that there are no livestock wells completed within the exempted aquifer?;
5. Do you disagree with NRC staff’s rebuttal testimony that states that “WDEQ proposed, and EPA approved, reclassification of groundwater within the mine unit [aquifer exemption boundary] to Class V Mineral Commercial” [industrial] use (Ex. NRC044 at 12, 2<sup>nd</sup> ¶)?;
6. Do you disagree that Strata will be required to comply with federal regulations in 10 CFR Part 40, Appendix A, Criterion 5D to ensure compliance with groundwater protection standards that are protective of human health and the environment as stated in Ex. SEI009A at 585?;
7. If there are no drinking water wells within the exempted aquifer or, indeed, within the entire license area, there are no livestock wells within the exempted aquifer, and groundwater will need to meet federal standards protective of human health and the environment at the point of compliance (the aquifer exemption boundary), where would the dose from radium-226 and uranium in groundwater occur?;

8. How many dose assessments have you performed for radium-226 and uranium in groundwater using RESRAD or similar software?

**2-2: Issue Needing Further Examination:**

Dr. Larson's use of non-site-specific research to hypothesize on uranium mobility at the Ross ISR Project

**Objective of the Examination:**

To demonstrate that hypotheses about uranium mobility at the Ross ISR Project are not supported by the evidence presented by Dr. Larson in his rebuttal testimony

**Proposed Line of Questioning (Dr. Larson):**

1. You state in your rebuttal testimony at A.9 that "uranium mobility in groundwater is dependent on a host of **site specific** hydro-biogeochemical conditions" (Ex. JTI052 at 16, 1<sup>st</sup> full ¶). Then you proceed to present a figure created from "representative average stability data from Christensen Ranch ISL mine unit 5" (Ex. JTI052 at 17, 3<sup>rd</sup> ¶). Is it your claim that these average stability data from Christensen Ranch are representative of the Ross ISR Project? If so, have you provided specific evidence showing how they are representative?;
2. Do you agree that there will be no adsorption of chloride, conductivity and alkalinity, which are the excursion monitoring parameters for the perimeter monitor wells?

**C. CONTENTION 3: Alleged Failure to Include Adequate Hydrological Information to Demonstrate SEI's Ability to Contain Groundwater Fluid Migration**

For Contention 3, Strata has identified several areas within the scope of this Contention that should be subject to additional Licensing Board scrutiny, in addition to the legal and factual arguments presented in its and NRC Staff's initial and rebuttal statements of position, initial and rebuttal written testimony, and exhibits. For this Contention, Strata has proposed its cross-examination questions as follows: (1) identify the issue needing further examination, (2) state the objective of the cross-examination question(s), and (3) propose a line of cross-examination questioning.

**3-1: Issue Needing Further Examination:**

Allegation in the Intervenor's rebuttal statement that "uranium can move faster than chemicals used as excursion parameters"

**Objective of the Examination:**

To demonstrate that this statement is not supported by Intervenor's initial or rebuttal testimony

**Proposed Line of Questioning (Dr. Abitz and Dr. Larson):**

1. Can you point to any specific examples in your initial or rebuttal testimony that support the statement on page 25 of the Intervenor's rebuttal statement of position that "uranium can move faster than chemicals used as excursion parameters"?;
2. Do you allege that uranium will move faster in the groundwater than chloride, conductivity and total alkalinity, which are the excursion monitoring parameters for the perimeter monitor wells? If so, why?

**3-2: Issue Needing Further Examination:**

Allegations that no evidence has been provided to demonstrate that Strata can maintain an inward hydraulic gradient and that the numerical model ignored the heterogeneity of the sediments in the aquifer

**Objective of the Examination:**

To demonstrate that Strata has provided sufficient information to demonstrate that it will be possible to maintain a net inward hydraulic gradient and that the numerical groundwater model did account for heterogeneity in the aquifer

**Proposed Line of Questioning (Dr. Abitz):**

1. In your rebuttal testimony you allege that NRC Staff has provided no evidence that Strata can maintain a net inward hydraulic gradient to prevent an excursion (Ex. JTI051 at 13, Line 10).
  - a. Would you agree that the potentiometric lines shown on Ex. SEI009A at 180 demonstrate that there is a net inward hydraulic gradient around the three existing industrial water supply wells?
  - b. Would you disagree that the existing potentiometric surface measured by Strata demonstrates that Strata would be able to maintain a net inward hydraulic gradient assuming they had a net bleed equal to or greater than the pumping rates at the existing industrial wells?
  - c. Do you disagree that the existing withdrawal rate from the three industrial wells is approximately 30 gallons per minute, as stated in Ex. SEI009A at

189? By comparison, do you understand that at maximum production the bleed rate from all wellfield production operations will be up to 94 gallons per minute (Ex. SEI014C at 35)? Doesn't the fact that an inward hydraulic gradient is currently maintained within the actual license area at a pumping rate of 30 gpm support the finding that an inward hydraulic gradient may be maintained at similar or higher bleed rates by Strata?

2. You also allege that "predictions on maintaining a net inward hydraulic gradient are based on simplistic models that assume the sediments in the aquifer are homogeneous and isotropic with respect to hydraulic conductivity" (Ex. JTI051 at 13, lines 13-17).
  - a. Did you, as part of your review of the permit application, review the numerical groundwater model report presented in TR Addendum 2.7-H (Ex. SEI014H)?
  - b. Does Figure 4.2-3 depict the spatial distribution of hydraulic conductivity assigned to the ore zone aquifer (Ex. SEI014H at 100)?
  - c. Would you agree that this figure shows that the modeled hydraulic conductivity in the ore zone varies spatially in the range from about 0.01 to 3 ft/day?
  - d. After reviewing this figure, do you still maintain that the model assumes that the ore zone aquifer is homogenous and isotropic with respect to hydraulic conductivity?

**3-3: Issue Needing Further Examination:**

Misconception that uranium and other constituents may travel hundreds of feet per year under natural (unstressed) groundwater conditions

**Objective of the Examination:**

To clarify that under a natural gradient, groundwater movement in an aquifer is much slower than during ISR operations

**Proposed Line of Questioning (Dr. Abitz):**

1. In A.14 of your rebuttal testimony, you claim that "historic evidence shows that excursions occur at all ISL sites, and these excursions are registered at monitoring-well rings that are generally displaced 400 ft outward from the production well field. Therefore, uranium can move over 400 feet in a period of several years" (Ex. JTI051 at 14, lines 13-16). Are you alleging that movement over 400 feet in a period of several years could occur without an induced gradient caused by ISR injection?;
2. Is it true that if an injection well located on the outside edge of a wellfield pattern had a higher injection rate than the adjacent recovery wells, then it would increase the gradient between injection well and the nearest perimeter monitoring wells?;

3. Is it true that if the gradient between the injection well and the perimeter monitor well increased, then the speed that the groundwater moved towards the monitor well would also increase?;
4. Is it true that if the source of the induced gradient were eliminated (i.e., the wellfield imbalance is eliminated) then the groundwater gradient would decrease?;
5. Is it true that after all ISR operations cease that the gradient in the wellfields would return to the natural gradient in the area?;
6. Is it true that the SER describes that the natural gradient in the Ross ISR Project area varies between 0.0086 and 0.0244 feet/foot (Ex. SEI010 at 62)?;
7. Using a hydraulic conductivity of 0.5 ft/day, which is over twice the predominant regional hydraulic conductivity used in the numerical groundwater model (SEI014H at 97), the estimated distance that groundwater would travel in one year under this natural gradient would be between 1.6 and 4.4 ft/yr. Is this not consistent with Mr. Knode's initial testimony, where he mentions that over a 20- to 30-year period groundwater may only move 100-200 feet in a natural system (Ex. SEI001 at 9, 1<sup>st</sup> ¶)?;
8. Further, since uranium is not used as an excursion monitoring parameter, how do excursions at historically operated ISR facilities support your conclusion that excursions show that "uranium can move over 400 feet in a period of several years"?

III. **CONCLUSION**

Strata respectfully requests that the Licensing Board strongly consider asking each of the aforementioned questions of Intervenors' expert witnesses.

Respectfully Submitted,

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

Dated: September 18, 2014

---

Anthony J. Thompson, Esq.  
Christopher S. Pugsley, Esq.  
Thompson & Pugsley, PLLC  
1225 19<sup>th</sup> Street, NW  
Suite 300  
Washington, DC 20036  
COUNSEL TO STRATA ENERGY, INC.

**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: September 18, 2014
(Ross In Situ Recovery Uranium Project)	)	
_____	)	

**CERTIFICATE OF SERVICE**

I hereby certify that copies of the foregoing “**STRATA ENERGY INC’s PROPOSED REBUTTAL CROSS-EXAMINATION QUESTIONS FOR INTERVENORS’ WITNESSES**” in the above captioned proceeding have been served via the Electronic Information Exchange (EIE) this 18th day of September 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)/  
Christopher S. Pugsley, Esq.**

Dated: September 18, 2014

\_\_\_\_\_  
Anthony J. Thompson, Esq.  
Christopher S. Pugsley, Esq.  
Thompson & Pugsley, PLLC  
1225 19<sup>th</sup> Street, NW  
Suite 300  
Washington, DC 20036  
COUNSEL TO STRATA

Question for Interneer witnesses

Based on

~~In~~ your extensive review of Strata's license application, are you aware that dozens of plugging and abandonment records are found in TR Appendix 2.7-F (Ex. SE10146 at 275-393)?

Are you aware that Strata has committed to providing future abandonment records in its well field packages? to NRC  
See Ex. SE1014C at 41-42.

Question for SEI witnesses:

Is it practical ~~to~~ or useful to estimate at this stage of the licensing process what parameters may ~~be~~ ~~include~~ require a potential future ACL and at what potential concentration?

(6) SE1

Question for SEI witnesses:

Will strata be required to perform excursion monitoring during aquifer restoration?

(3)

SEI

Question for SEI witnesses:

Please further explain the focus on monitoring the mineralized interval within the ore zone to establish CAB for restoration goals?

SEI

Question for NRC staff:

Is it true that the perimeter monitor wells will be fully screened in the ore zone aquifer as recommended in NUREG-1569?

(1) SEI

Question for SEI witnesses:

Please compare the 400' max. distance to perimeter monitoring wells with your experience at other ISR facilities.

ATTACHMENT 3

Joint Intervenors Proposed Questions

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY & LICENSING BOARD

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

**NATURAL RESOURCES DEFENSE COUNCIL'S & POWDER RIVER BASIN  
RESOURCE COUNCIL'S PROPOSED QUESTIONS FOR CROSS  
EXAMINATION IN SUPPORT OF  
ENVIRONMENTAL CONTENTIONS 1, 2 AND 3 (SUBMITTED IN CAMERA)**

**INTRODUCTION**

In accordance with 10 C.F.R. §§ 2.1207 and this Board's Orders of July 25, 2014 and August 7, 2014, Intervenors Natural Resources Defense Council and Powder River Basin Resource Council (Joint Intervenors) hereby submit proposed questions for cross examination.

**SUMMARY STATEMENT TO DIRECT CROSS EXAMINATION**

As noted in our initial Statement of Position, filed August 25, the principal legal issues in controversy in this proceeding are the extent to which an applicant and agency must collect empirical data to include in an EIS in order to assess the existing environmental conditions and corresponding environmental impacts of a project, and the extent to which potential environmental impacts may reasonably be characterized as "small" where serious analytical and empirical gaps in the data exist.

Regarding Contention 1, we propose cross-examination questions bearing on Staff and SEI's assertion that the applicant is prohibited from collecting such data pre-license, especially in light of SEI's extensive and ongoing drilling program. Further, we propose cross-examination questions exploring and documenting precisely the data Staff does

deem adequate under the law. As explained in our Statement of Position, *see* at 10-11, applicable regulatory requirements mandate much more data collection and analysis than what was included in the Final SEIS – matters explained in greater detail in the direct testimony of Dr. Abitz.

As regards contentions 2 and 3, the particular data included in the FSEIS falls far short of what would be necessary. Here, the issue in controversy is whether the FSEIS adequately supports its overall conclusions that the Ross Project will have only small impacts on water quality in the short and long-term. *See* SEI009A, FSEIS at xxii-xxiii; xxx; 4-34 to 4-50 (repeatedly characterizing impacts as “small”).<sup>1</sup> As Joint Intervenors’ Statement of Position and Testimony demonstrates, Staff’s conclusions in the SEIS are contradicted by scientific literature and data, including NRC’s own data related to abandoned wells and water restoration. It is well-established that an agency may not rely on “conclusory or unsupported suppositions,” *McDonnell Douglas Corp. v. U.S. Dep’t of the Air Force*, 375 F.3d 1182, 1186-87 (D.C. Cir. 2004), and it is insufficient to simply *assert* that an effect will be resolved at some point in the future. Accordingly, the proposed cross-examination questions address the degree to which the FSEIS adequately addresses these issues.

Finally, Joint Intervenors propose cross-examination questions bearing on the admissibility of, and credibility and weight the Board should afford to, the testimony of NRC Staff’s and SEI’s expert witnesses.

---

<sup>1</sup> *See also* Staff Opening Statement at 32: “In other words, the Staff concluded in the FSEIS that the potential impacts to water quality of the exempted aquifer as a result of ISR operations would be SMALL and temporary regardless of which of the three options defined in 10 C.F.R. Part 40, Appendix A, Criterion 5B, is used.”

**A. Proposed Cross-Examination Questions Specific to Contention 1**

*For Staff Witnesses Ms. Moore, Mr. Saxton and Ms. Johnson*

Objective: To examine the basis for the experts' conclusions that the NRC has adequately characterized baseline water quality for the Ross project.

1. In light of Intervenor's objections to what they believe is a legally-unsanctioned distinction – between incomplete and non-binding pre-licensing “baseline” data that purports to satisfy NEPA “site characterization” requirements, and binding post-licensing “background” groundwater quality data to be used for actual environmental regulation and mitigation – please direct our attention to the specific provisions in NRC rules governing NEPA analyses or the environmental consequences of uranium recovery, which Staff believes specifically establish this distinction?
2. If the post-licensing “monitoring data” on wellfield “background water quality” that a licensee supposedly must provide under Criterion 5B(5) is not “baseline groundwater information,”(as Staff asserts on page 17 of its Statement of Position), then is the essential water quality information that must, per force, be required to be submitted found under Criterion 7: *i.e.*, “a preoperational monitoring program must be conducted to provide complete baseline data on a milling site and its environs?”
3. Nubeth had two operations: one in 1976 north of Oshoto reservoir and one in 1978 south of Oshoto reservoir. Groundwater restoration was discussed and the site was presented in the FSEIS and even used as ‘pre-licensing site characterization’ data. What were the results of groundwater restorations in the northern Nubeth ISL operation?
4. Where, specifically was this push-pull well located?

- IF they answer in the affirmative that they know, then please follow up with: why wasn't this well, or any well around it, sampled and discussed as part of the 'pre-licensing site characterization' groundwater data in the Ross FSEIS?
- If they answer in the negative, that they don't know where the well was located, please follow up with: how can the FSEIS appropriately discuss former impacts and current groundwater characterization conditions if all previous ISL mining activities have not been considered?

5. Is it the NRC Staff's position that it has the inherent discretion to include or exclude relevant environmental data in an FSEIS, based on "consistency with industry practice," or established "NRC methodology?" Have you been instructed that either industry practices or NRC methodologies supersede otherwise applicable NEPA requirements?

6. CEQ regulations applicable to all federal agencies state that "agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements" and "shall identify any methodologies used and shall make explicit reference by footnote to the scientific and other sources relied upon for conclusions in the statement." [40 CFR 1502.24]. What, if any, specific steps did the Staff take to independently ensure the "scientific integrity" of the Applicant's submission of allegedly "complete baseline data" regarding the groundwater on the proposed Ross ISL site "and its environs?"

7. Both 10 CFR 51.71 and 51.90 require that "the analysis for all draft [and final] environmental impact statements will, to the fullest extent practicable, quantify the

various factors considered.” Compared with Dr. Abitz, have you quantified the baseline groundwater quality?

*For SEI Witnesses Mr. Demuth, Mr. Lawrence, Mr. Schiffer and Mr. Knode*

Objective: To explore whether the experts have biases that diminishes the weight the Board should afford their testimony.

9. Have you have testified in ISL proceedings before? If so, which ones, and on whose behalf?

9a. Have you contracted with any other ISL uranium recovery companies at any stage in their NRC licensing process? If so, which ones and in what capacity?

9b. Have you testified for any entity besides an industry with an interest in natural resource extraction?

9c. For any project you’ve worked on at the licensing phase, has the groundwater baseline been challenged during subsequent enforcement proceedings as unreliable?

10. Has your work ever included defending ISL companies against NRC enforcement actions or has it included reporting incidents of excursions, leaks, and other regulatory actions that while not reaching the enforcement level were reportable events to the NRC?

If answer is yes, please follow with -

b. An accurate and reliable baseline is critical to carrying out later enforcement actions and correcting incidents, isn’t that correct?

c. An unreliable or limited baseline could be used as a defense against later alleged violations, isn’t that correct?

**B. Proposed Cross-Examination Questions Specific to Contention 2**

*For SEI Witnesses Mr. Demuth, Mr. Lawrence, Mr. Schiffer and Mr. Knode*

Objective: To establish that SEI's experts have not established SEI will, or even intends to, restore the Ross site to baseline – or pre-mining - water quality levels.

11. Has the groundwater in the target zone in any of the projects you've worked on before been returned to baseline?

12. For the ISL wellfields you've worked on that have ceased production, all have required adoption of Alternate Concentration Limits, isn't that correct?

13. In any previous NRC testimony, or in preparation of any NRC license applications or associated materials, have you asserted that groundwater would be returned to baseline for all parameters?

If yes: Did your statements regarding restoration to baseline for all parameters prove accurate?

If no: why did you believe that the company could not return groundwater to baseline conditions for all parameters?

15. You don't assert that groundwater can be returned to baseline in your direct testimony in this proceeding, isn't that correct?

16. Has SEI carried out any kind of analysis of what an Alternative Concentration Limit would be for the Ross Project?

If yes: did you share that with NRC staff?

If no: why did SEI make the decision not to do this analysis, even after the Board's initial order admitting contentions indicated that a bounding analysis of potential limits and associated impacts would be appropriate?

*For Staff Witnesses Ms. Moore, Mr. Saxton and Ms. Johnson*

Objective: To establish that Staff's experts have not demonstrated the FSEIS addresses the degradation of water quality that will likely be engendered by the Ross project.

16. Please cite the NRC and/or CEQ regulations wherein the Staff is authorized to replace a discussion of potentially quantifiable hazardous environmental impacts with a "qualitative" discussion of the future "process" by which information about such impacts will be gathered and used long after the SEIS is completed and a Record of Decision taken on the proposed license?

17. Why are presenting concentration values for contaminants of concern that are directly released during ISL important for assessing the potential for "protecting human health and the environment"?

18. To your knowledge, has any ISL uranium facility restored groundwater at a wellfield to pre-mining or baseline conditions for all parameters?

**C. Proposed Cross-Examination Questions Specific to Contention 3**

*For SEI Witnesses Mr. Demuth, Mr. Lawrence, Mr. Schiffer, Mr. Moores, Mr. Griffin and Mr. Knode*

Objective: To explore the credibility of the experts' conclusions that excursions are unlikely from the Ross project.

18. How do natural conditions seal historical boreholes?

(See Strata Exhibit SEI-001 at ¶ A.21)

19. Has this been proven elsewhere?
20. Have any excursions occurred in any of the other projects you've consulted upon?
21. In any pre- or post- licensing proceeding, did you predict any of those excursions?
22. You do not claim that excursions will not occur for the current project, isn't that correct?
23. Could you tell us how many abandoned exploration wells are in the Ross Project area? Follow-up: Why does this number differ from the number contained in your application or the number that was earlier posted on your website (5,000)? Do you actually know how many wells are in the area and have you located all of them?

**D. Proposed Cross-Examination Questions Related to Weight Board Should Give To SEI Witnesses' Testifying as to Contentions 1-3**

Objective: To explore the admissibility, credibility and weight to be given to witnesses based on questions regarding area of testimony, reliability, bias, and preparation.

*For SEI Witnesses Mr. Knode, Mr. Griffin, Mr. Schiffer, Mr. Moores, Mr. Lawrence, and Mr. Demuth.*

1. You do not have a doctorate in any field you intend to testify, is that correct?
- 2a. You have testified in NRC proceedings about other ISL projects, isn't that correct?
- 2b. If the answer is yes, please ask: Your testimony has always been in support of the environmental review done for those projects, correct?
- 3a. Who determined the scope of your work on this project, and how much were you, or are you, being paid for this testimony and related work?
4. Did you negotiate with SEI to obtain a greater amount of time to prepare your work?
5. Did SEI put you on a budget that was smaller than what you initially requested?

6. When you reached the end of your budget, you stopped working, isn't that correct?
7. The data you present is limited by SEI's budget, isn't that correct?
8. Do you or your employer have a financial stake in the success of SEI? Do you own shares or stock options?
9. Do you or your employer have a contract to conduct post-license work related to the Ross project? Will you be able to proceed with that work if the Ross license is vacated?
10. If you knew that every prior ISL operation resulted in substantially degraded water quality post-restoration, would that change your view of the likelihood that the Ross project will result in degraded water quality?

Respectfully submitted,

/s/ Geoffrey H. Fettus

Geoffrey H. Fettus, Senior Attorney  
Natural Resources Defense Council, Inc.  
1152 15th St., NW, Suite 300  
Washington, D.C. 20005  
Tel: (202) 289-6868/Fax: (202) 289-1060  
Email: [gfettus@nrdc.org](mailto:gfettus@nrdc.org)

/s/ Shannon Anderson

Shannon Anderson, Staff Attorney  
Powder River Basin Resource Council  
934 N. Main St.  
Sheridan, WY 82801  
Tel: (307) 672-5809/Fax: (307) 672-5800  
Email: [sanderson@powderriverbasin.org](mailto:sanderson@powderriverbasin.org)

*Counsel for Powder River Basin Resource  
Council*

s/ (electronically signed)

Howard M. Crystal  
Meyer Glitzenstein & Crystal  
1601 Connecticut Ave., N.W., Suite 700  
Washington, D.C. 20009  
(202) 588-5206  
[hcrystal@meyerglitz.com](mailto:hcrystal@meyerglitz.com)

*Counsel for NRDC*

Date: September 5, 2014

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing *Proposed Cross-Examination Questions* in the captioned proceeding were served via the Electronic Information Exchange (“EIE”) via an in Camera Submission to the Board on the 5<sup>th</sup> day of September 2014, which to the best of my knowledge resulted in transmittal of same to the Board Members and ASLB staff but not to the parties in this proceeding per the Board instructions and applicable NRC regulations.

Shannon R. Anderson(electronic signature)

Date: September 5, 2014

Joint Intervenors Proposed Questions for Our Witnesses on Contention 3

Question #1: Dr. Larson, could you please explain the data you reviewed at other ISL sites showing vertical excursions and some of the reasons for those excursions?

## Joint Intervenors Proposed Questions for NRC Witnesses on Contention 2

Question for Dr. Johnson – you testified that in evaluating the size and level of the environmental impacts on groundwater, the focus is on the non-exempt aquifer and that therefore the impacts to the exempted aquifer itself are immaterial. Does this mean that if the NRC were to approve an ACL thousands of times above EPA Safe Drinking Water Act standards for uranium the impacts would still be small?

Joint Intervenors Additional Questions for Dr. Abitz for Contention 1

#1: Could you please explain in more detail how one establishes pre-disturbance groundwater quality at a contaminated CERCLA or RCRA clean-up site? Is there anything differently you would do to establish a scientifically defensible baseline for an ISL site?

# Joint Intervenor

## Questions for the SEI Panel

- ① #1 If you only screen the ore zone but admit that the pore volumes account for vertical and horizontal migration of mining fluid beyond the ore zone, then is that truly a representative sample of the aquifer zone that is affected?
- ⑤ #2 In response to Judge White's question whether construction of monitoring wells itself may increase the presence of compounds later used to detect excursions, Mr. Demuth testified he has not seen such increases. Can he explain how he would know that such increases have occurred? Does he have data from a well installed in an ore zone using non-oxygenated fluids and nitrogen instead of air lifting? In other words, does he have any data from a well installed without using any oxygen in the drilling fluids or development stage?

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

In the Matter of )  
)  
Strata Energy, Inc. ) Docket No. 40-9091-MLA  
(Ross In Situ Recovery Uranium Project) )  
)  
(Materials License Application) )  
)

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing **MEMORANDUM AND ORDER (Providing Parties' Proposed Questions for the Official Record)** have been served upon the following persons by Electronic Information Exchange.

U.S. Nuclear Regulatory Commission  
Atomic Safety and Licensing Board Panel  
Mail Stop T-3F23  
Washington, DC 20555-0001

G. Paul Bollwerk, III, Chair  
Administrative Judge  
[paul.bollwerk@nrc.gov](mailto:paul.bollwerk@nrc.gov)

Dr. Craig M. White  
Administrative Judge  
[craig.white@nrc.gov](mailto:craig.white@nrc.gov)

Kathleen Schroeder, Law Clerk  
[kathleen.schroeder@nrc.gov](mailto:kathleen.schroeder@nrc.gov)

Alana Wase, Law Clerk  
[alana.wase@nrc.gov](mailto:alana.wase@nrc.gov)

U.S. Nuclear Regulatory Commission  
Office of Commission Appellate Adjudication  
Mail Stop O-7H4  
Washington, DC 20555-0001  
[OCAAMAIL@nrc.gov](mailto:OCAAMAIL@nrc.gov)

U.S. Nuclear Regulatory Commission  
Office of the General Counsel  
Mail Stop O-15D21  
Washington, DC 20555-0001  
Catherine Scott, Esq.  
Carrie Safford, Esq.  
Christopher Hair, Esq.  
Emily Monteith, Esq.  
David Cylkowski, Esq.  
Sabrina Allen, Paralegal  
[catherine.scott@nrc.gov](mailto:catherine.scott@nrc.gov)  
[carrie.safford@nrc.gov](mailto:carrie.safford@nrc.gov)  
[christoper.hair@nrc.gov](mailto:christoper.hair@nrc.gov)  
[emily.monteith@nrc.gov](mailto:emily.monteith@nrc.gov)  
[david.cylkowski@nrc.gov](mailto:david.cylkowski@nrc.gov)  
[sabrina.allen@nrc.gov](mailto:sabrina.allen@nrc.gov)

U.S. Nuclear Regulatory Commission  
Office of the Secretary of the Commission  
Mail Stop O-16H12  
Washington, DC 20555-0001  
Hearing Docket  
[hearingdocket@nrc.gov](mailto:hearingdocket@nrc.gov)

STRATA ENERGY, INC., Ross In Situ Recovery Uranium Project, Docket No. 40-9091-MLA  
**MEMORANDUM AND ORDER (Providing Parties' Proposed Questions for the Official Record)**

Strata Energy, Inc.  
Thompson & Pugsley, PLLC  
1225 19<sup>th</sup> Street, NW, Suite 300  
Washington, DC 20036  
Anthony J. Thompson, Esq.  
Christopher S. Pugsley, Esq.  
Cindy Seaton, Paralegal  
[ajthompson@athompsonlaw.com](mailto:ajthompson@athompsonlaw.com)  
[cpugsley@athompsonlaw.com](mailto:cpugsley@athompsonlaw.com)  
[cseaton@thompsonlaw.com](mailto:cseaton@thompsonlaw.com)

Winston & Strawn, LLP  
1700 K Street, NW  
Washington, DC 20006-3817  
Tyson R. Smith, Esq.  
Carlos L. Sisco, Paralegal  
E-mail: [trsmith@winston.com](mailto:trsmith@winston.com)  
[csisco@winston.com](mailto:csisco@winston.com)

Natural Resources Defense Council, Inc.  
1152 15<sup>th</sup> Street, NW, Suite 300  
Washington, DC 20005  
Geoffrey H. Fettus, Esq.  
Senior Attorney  
[gfettus@nrdc.org](mailto:gfettus@nrdc.org)

Powder River Basin Resource Council  
934 N. Main Street  
Sheridan, WY 82801  
Shannon Anderson, Esq.  
[sanderson@powderriverbasin.org](mailto:sanderson@powderriverbasin.org)

Natural Resources Defense Council  
Powder River Basin Resource Council  
Meyer, Glitzenstein & Crystal  
1601 Connecticut Avenue, N.W., Suite 700  
Washington, DC 20009  
Howard M. Crystal, Esq.  
[hcrystal@meyerqlitz.com](mailto:hcrystal@meyerqlitz.com)

[Original signed by Herald M. Speiser \_\_\_\_\_]  
Office of the Secretary of the Commission

Dated at Rockville, Maryland  
this 27<sup>th</sup> day of January, 2015