

February 1, 2013

TO: Bill von Till, Chief  
Uranium Recovery Licensing Branch  
Decommissioning and Uranium Recovery  
Licensing Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Federal and State Materials  
and Environmental Management Programs

FROM: John L. Saxton, Project Manager **/RA/**  
Uranium Recovery Licensing Branch  
Decommissioning and Uranium Recovery  
Licensing Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Federal and State Materials  
and Environmental Management Programs

SUBJECT: REPORT OF DECEMBER 20, 2012 MEETING WITH STRATA ENERGY, INC.

Enclosed with this memorandum is a summary of the December 20, 2012, teleconference between representatives of Strata Energy, Inc. (Strata) and U.S. Nuclear Regulatory Commission (NRC) during which Strata and NRC staff discussed Strata's comments on the November 6<sup>th</sup> draft license for the Ross ISR Project. The meeting notice was published on December 10, 2012, and is available on NRC's Agencywide Documents Access and Management System (ADAMS) using Document Accession No. ML12345A013. If you have any questions, please contact me.

Docket No. 04009091  
Enclosure: Meeting Report

cc: Meeting Attendees

CONTACT: John Saxton, FSME/DWMEP  
(301) 415- 0697

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Date	1/22/13	1/22/13	2/1/13	2/1/13

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## MEETING REPORT

DATE: Thursday, December 20, 2013

TIME: 10:30 a.m. to 2:30 p.m.

PLACE: Two White Flint  
15545 Rockville Pike  
Rockville, MD 02852

PURPOSE: Strata Energy, Inc. (Strata) requested this meeting to discuss Strata's comments on the draft license issued on November 6, 2012, for the Ross ISR Project, Crook County, Wyoming

### ATTENDEES:

See Attendees List (Attachment 2).

### BACKGROUND:

On November 6, 2012, the U.S. Nuclear Regulatory Commission (NRC) staff issued to Strata Energy, Incorporated (Strata), a draft source material license for the Ross in situ recovery (ISR) project located in Crook County, Wyoming. The draft license was publicly available through the Agencywide Documents Access and Management System (ADAMS) under accession number ML12297A157. On December 7, 2012, Strata submitted written comments on the conditions listed in the draft license. Strata's December 7<sup>th</sup> submittal was made publicly available in ADAMS (ML12345A144) shortly after being submitted. Subsequently, Strata requested a public meeting to discuss several comments. The meeting documented in this report is a result of that request.

### DISCUSSION:

NRC staff read the opening statement for the meeting and introductions were made by all in attendance. NRC staff proceeded to discuss the license conditions for which Strata had commented. During the meeting, only a portion of the comments and the applicant's basis for the comment were read.

NRC staff discussed a "rating" scheme on staff's position on the applicant's proposed revision to a license condition. The rating scheme is as follows:

- Agreed.** Staff has no objection to the applicant's proposed revision and will likely modify the license condition.
- Disagreed.** Staff finds that the applicant did not provide a compelling basis for the revision and will be unlikely to modify the license condition. Staff will evaluate any information the applicant presents in the public meeting.

Enclosure

**Denied.** Staff has objections to the applicant's proposed revision and will likely not modify the license condition. Staff will evaluate any information the applicant presents in the public meeting.

The discussions on the various license conditions were as follows:

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## 9.5

### Applicant's Request(s):

- (a) 1<sup>st</sup> paragraph, change "*as warranted*" to "*consistent with 10 CFR Part 40 Appendix A, Criterion 5(B)5*" after the term "groundwater restoration."

Basis: None offered.

- (b) 2<sup>nd</sup> and 3<sup>rd</sup> paragraph, change/modify references to "*closure (decommissioning) plan*" or "*site closure plan*" to "*decommissioning plan*."

Basis: Consistency with the application and 10 CFR Part 40.

### Staff's Position:

- (a) **Agreed with changes.** Staff reviewed the licenses for the existing six NRC-licensed ISR facilities and all but one has the language as was included in the draft. The one exception is the PRI license, which is a carry-over from the past. That license is currently undergoing review for renewal and will likely be changed for consistency with the other licenses. Staff recommends removing the phrase "as warranted" or include a comma to separate it from the restoration clause.
- (b) **Disagreed.** All six existing licenses have the language as was proposed. The regulations in 10 CFR Part 40 include references to decommissioning plan, reclamation plan and/or closure plan. Appendix A includes definitions for closure plan and reclamation plan but not for decommissioning plan. For Criterion 9 (financial surety), the references are largely to "a plan" with several specific references to a reclamation plan; this criterion does not specifically reference a closure plan or a decommission plan. For Criterion 5 (Groundwater Protection), the one reference is to a closure plan.

Because "closure" and "closure plan" are included in the definitions in Appendix A, staff determined that a change in the language is unwarranted.

## Discussion

No additional information was presented. The discussion focused on the need to maintain consistency between licenses and any revision will have to undergo concurrence.

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### 9.6

#### Applicant's Request(s):

- (a) 1<sup>st</sup> paragraph, add the phrase "or suitable alternative procedures approved by NRC prior to any such release" to the end.

Basis: None offered.

- (b) 4<sup>th</sup> and 6<sup>th</sup> paragraphs, the applicant requests a clarification on the intent as the license condition (1) appears to reverse a common practice, and (2) misapplies contamination limits in Table 2 of RG 8.30, and requests that the license condition be deleted or modified to remove the requirement for performing contamination surveys.

Basis: This license condition creates an undue burden for a licensee and that a licensee will effectively control licensed material through a Contamination Control Program.

#### Staff's Position:

- (a) **Agreed.** This language is the same as in the draft revised license for Crow Butte Resources (CBR). However, staff notes that NRC will have to approve any alternates and cannot unless the regulations are revised to permit it.
- (b) **Denied.** Paragraphs 1 or Paragraphs 1 & 2 are incorporated into all existing licenses except one, which is under license renewal.

The paragraphs have been added to memorialize guidance in RG 8.30, which, in addition to other RGs, the applicant commits to follow in the application and by LC 9.7. With regard to historic practices, the practices have resulted in relaxed documentation procedures for a contamination control program and by reiterating guidance, ensures strict compliance in the future for all licensees.

With regard to misapplying RG 8.30, the applicant is referred to Section 2.7 of RG 8.30 which states:

*Surface contamination surveys should be conducted before potentially contaminated equipment is released to unrestricted areas. The surface contamination limits listed in Table 2 are recommended. If contamination above these limits is detected, the equipment should be decontaminated until additional efforts do not significantly reduce contamination levels.*

*The licensee should develop methods to prevent potentially contaminated equipment from leaving the restricted area without being monitored. In some cases this is facilitated if parking areas for workers and visitors are located outside the restricted area.*

Although the intent of the historic practices may have been not to release equipment to unrestricted areas, the lack of monitoring is inconsistent with a safety culture and may lead to inadvertent leaving of contaminated equipment in the restricted area. Staff will require this information to make a determination in accordance with 10 CFR 20.1301(a)(2) and 10 CFR 20.1501.

Staff contends that the applicant did not provide backup data substantiating the “undue burden” claim and in fact, this license condition in its entirety (with the proposed language of the applicant) has been agreed to by another licensee.

Therefore, staff finds the request for the proposed additional text in the first paragraph is acceptable but denies the request for changes to the latter paragraphs.

#### Discussion

No additional information was presented. The discussion focused on the need to maintain consistency between licenses and any revision will have to undergo concurrence.

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## 9.8

### Applicant's Request(s):

(a) 2<sup>nd</sup> paragraph, add the phrase “Wyoming State Historic Preservation Officer or the Bureau of Land Management” to the end.

Basis: The applicant wants to acknowledge that the other agencies may have a role in approving the continuation of work when previously unknown cultural resources are discovered and that the proposed revisions are consistent with two other existing licenses.

(b) 3<sup>rd</sup> paragraph, the applicant requests that this paragraph be deleted.

Basis: This license condition appears to be a relic from another license and applicable only to that former license.

### Staff's Position:

(a) **Agreed.**

(b) **Agreed.**

### Discussion

None.

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## 9.9

### Applicant's Request(s):

Add the phrase "11e.(2)" before the phrase "byproduct material" and "further" before the phrase "lixiviant injection".

Basis: The revisions will enhance clarity in the license condition.

### Staff's Position:

**Denied.** 10 CFR Part 40 refers to byproduct material; therefore, this term shall be used in the license.

### Discussion

Staff will evaluate to include the word "further" as recommended by the applicant.

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## 10.1

### Applicant's Request(s):

Add semicolons instead of commas among three components of lixiviant (i.e., native groundwater, the oxidant and complexing agent).

Basis: The revisions will enhance the grammatical format of the license condition.

### Staff's Position:

**Agreed.**

### Discussion

None.

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## 10.4

### Applicant's Request(s):

(a) 1<sup>nd</sup> paragraph, Subparagraph A), add the phrase "routine" after "all".

Basis: Operating procedures for non-routine operational activities may not be included in the Standard Operating Procedures (SOPs) but will be covered by a Radiation Work Permit (RWP).

(b) 1<sup>nd</sup> paragraph, Subparagraph B), add the phrase "routine" after "all."

Basis: Procedures for non-routine, non-operational activities may not be included in the SOPs but will be covered by an RWP.

Staff's Position:

(a & b) **Agreed with additional changes.** Staff's proposed changes:

At the end of the fourth paragraph, add the following sentence:

“Should an activity be deemed ‘non-routine’, its procedures will be documented in a specific Radiation Work Permit for that non-routine activity.”

Discussion

Staff discussed its position that non-routine activities need to be defined and that if an activity were deemed non-routine, the SOP will be enumerated in an RWP.

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**10.7**

Applicant's Request(s):

Replace the phrase “at a wellfield” with “within the perimeter monitor well ring.”

Basis: The applicant states that the assumption for the numeric model simulations in the application was maintaining an inward gradient at the perimeter ring. In addition, the applicant notes that any excursion could be interpreted as a failure to maintain an inward gradient (thus violating this license condition).

Staff's Position:

**Agreed with changes.** The intent of this license condition is to emphasize and clarify industry's commitment to maintain an inward hydraulic gradient to control fluid migration from production areas. In the past, the inward gradient was related to bleed, which was described as a percentage of production (e.g., 1 percent of the production). As described in the basis for the applicant, the inward gradient measurement may be difficult within an active wellfield as local gradients between injection and extraction wells would be difficult to characterize as an “inward gradient.” Staff acknowledges that inward gradient is the overall net gradient as measured from the perimeter monitoring well ring.

Staff acknowledges that the applicant's concern that one may interpret an excursion as violating this license condition. However, staff's position is that an excursion should be a local imbalance for which the existing license conditions for monitoring and correct actions provide reasonable assurance that the imbalance is local and corrected in a timely manner. However, staff proposes to revise the license condition as follows to address the applicant's concern:

*The licensee shall maintain a net inward hydraulic gradient at a wellfield as measured from the surrounding perimeter monitoring*



*well ring starting when lixiviant is first injected into the production zone and continuing until initiation of the stabilization period.*

Discussion

The applicant and staff tentatively agreed to the staff's proposed language.

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**10.8**

Applicant's Request(s):

Delete the second "any" in the fourth sentence under "A) Daily Inspections."

Basis: For clarity.

Staff's Position:

**Agreed.**

Discussion

None.

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**10.11**

Applicant's Request(s):

Replace "approval" with "verification."

Basis: Use of verification is defined in the license and consistent with the language in this license condition.

Staff's Position:

**Disagreed.** Staff's reasonable assurance that the ponds can be operated as proposed is based on, in part, that the initial setup and operations are as predicted by the applicant. The design of the dewatering system and containment barrier wall is unique for an NRC-or Agreement State-Licensed facility under the AEA. Several aspects of the design are based on simplified assumptions and/or calculations that can only be verified only during the construction phase.

Discussion

The applicant argued that the term "verification" is defined in the license and will be sufficient for this license condition. Staff acknowledged that the applicant must use the SERP to evaluate

use of Pond 2, and if it meets the SERP requirements for not requiring a license amendment, then verification may be appropriate.

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## 10.12

### Applicant's Request(s):

Delete "0.25 miles of"

Basis: Commitments in the application were to abandon holes within the perimeter monitoring well ring and not a 0.25-mile buffer, which is consistent with other licenses.

### Staff's Position:

**Agreed.** This language is a carryover from prior to the RAIs. In RAI-38, Strata clarified for staff its commitment to abandoned boreholes within the perimeter monitoring well ring. The confusion was that in Addendum 2.6-E of the application, the applicant stated that it was its "intent to locate each of the Nubeth boreholes within the proposed Ross Permit Boundary and plug them from bottom to top, in accordance with WDEQ/LQD Chapter 11, Section 6, part (c)". The original language in the license condition was an attempt to define that intention into a commitment. Staff is confident that locating and abandoning drill holes within the perimeter monitoring well ring is sufficient to protect human health and the environment.

### Discussion

None.

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## 10.13

### Applicant's Request(s):

Delete the entire license condition or if kept, clarify the term "principal activities."

Basis: The applicant provides several detailed arguments which are summarized as follows:

- (1) Negates benefits of a performance-based license by the delay for an NRC review.
- (2) NRC will have the opportunity for review during the SERP review.
- (3) WDEQ reviews the package within a timely manner.

### Staff's Position:

**Denied, discussion on terms.** First, for its basis, the applicant incorrectly describes the purpose for performance-based licensing philosophy by focusing on "the benefits." The applicant has referred to the White Paper on Risk-Informed (RI) and Performance-Based (PB)

Regulations (ADAMS Accession No. ML003753595) for the rationale and purposes for NRC RIPB or PB Licensing philosophies.

For an RIPB approach, the white paper states that this is an *“approach in which risk insights, engineering analysis and judgment including the principle of defense-in-depth and the incorporation of safety margins, and performance history are used, to (1) focus attention on the most important activities, (2) establish objective criteria for evaluating performance, (3) develop measurable or calculable parameters for monitoring system and licensee performance, (4) provide flexibility to determine how to meet the established performance criteria in a way that will encourage and reward improved outcomes, and (5) focus on the results as the primary basis for regulatory decision-making.”* For a PB approach, the white paper states that *“[s]uch an approach would require that objective performance criteria be based on deterministic safety analysis and performance history.”* Staff’s position is to require NRC staff review and verification of wellfield data packages for new applicants without a past NRC-history of performance, though the applicant may have experienced personnel on staff.

Second, the applicant is right that staff expects the wellfield data packages to be approved through its SERP, even those packages reviewed and verified by NRC staff. The SERP will serve as a surrogate to establish Commission-approved background concentrations pursuant to Criterion 5B(5)(a).

Finally, staff acknowledges that WDEQ requires its approval of the wellfield data package. Staff will incorporate that fact into staff’s review and attempt to expedite any review and verification. The goal is to complete the review and verification within 60 days.

The term “principal activities” is specifically stated in 10 CFR Part 40; therefore, it is considered to be the appropriate term. Staff is open for discussion on an agreeable term.

#### Discussion

No additional information was presented.

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## 10.14

### Applicant's Request(s):

Replace "daily inspections" to "weekly inspections"; rename title from "Wellfield Inspection" to "Inspections"

Basis: Consistency with the application (Section 5.3.3); the license condition includes in-plant inspections.

### Staff's Position:

**Agreed, with additional changes.** The proposed changes include "weekly", as requested, the title will be renamed to "Facility Inspections", and a sentence will be added to note that the pond inspections are listed in LC 10.8.

### Discussion

No additional information was presented.

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## 10.17

### Applicant's Request(s):

Add the phrase "either a controlled area or" after "as."

Basis: Consistency with license conditions for other existing facilities and recognize that the dose from external sources does not exceed 2 millirem in any one hour for any unrestricted area.

### Staff's Position:

**Disagreed.** The license condition as proposed is the correct version. Based on the definition for restricted area in Part 20 and for controlled areas in Section 3.20.1003 of NUREG-1736, if access to an area is controlled due to radiological hazards, then the area is a restricted area. This license condition arose to clarify the differences between a posted radiation area (exceeding 5 millirems per hour at a distance of 30 cm from the source) and areas to which access needed to be limited because the exposure rates were between 2 and 5 millirems for any one hour.

For all intents and purposes, this license condition is identical to 10 CFR 20.1303(b)(2)(ii), though the language in the regulations is slightly different (i.e., the licensee should demonstrate that the limits are met in an unrestricted area). The fact is that licensees can and have been cited for exposure rate exceedences of 2 millirem per hour in unrestricted areas by the existing regulations. The intent of this license condition is to inform the licensee that this regulation exists and they can be cited for it.

Staff's position is that it does not impose any additional requirement and is useful to ensure compliance in the future.

Discussion

No additional information was presented.

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**10.18**

Applicant's Request(s):

Delete "the requirements" and add "as described in Section 5.5 of the approved Technical-Report Application."

Basis: RGs are guidance and the training as outlined by the applicant in the application is in more detail.

Staff's Position:

**Disagreed.** By including this license condition, the guidance in the RGs become an enforceable requirement.

Discussion

No additional information was presented.

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**10.19**

Applicant's Request(s):

Replace the restriction in the license condition (to Mine Unit 1) to 0.25 miles of the three industrial wells. Replace "operations" with "pumping."

Basis: To be consistent with the analysis (groundwater modeling) in the application; as mine units are further refined, the reference to MU1 may be confusing.

Staff's Position:

**Disagreed with changes.**

Details on the analyses were lacking to provide adequate "reasonable assurance" for staff. The executive summary in Addendum 2.7-H states:

*Based on ISR simulations, the three industrial wells currently in use by Merit may be impacted. If these wells continue to operate during ISR operations water levels, within the OZ aquifer may drop to the point that the potentiometric head within the aquifer locally drops below the top of the aquifer. This decrease in the*

*potentiometric head may have implications for ISR operations as well as for Merit.*

Also in the executive summary is the following:

*Due to the abstraction introduced by the Merit wells, ISR wellfields located immediately adjacent to Merit's wells will be difficult to operate with Merit's wells in operation. The abstraction caused by Merit's wells decreases substantially at distances more than 0.25 mile from the wells. As such, it may be possible for the Merit wells to continue operating during active ISR in the northernmost and southernmost proposed wellfields. Further modeling will be necessary to determine the most efficient method to operate ISR wellfields if Merit's wells are operated during ISR operations.*

Page 82 of the Addendum has the same narrative as the above but with the following additional sentence:

*Generally, operating a wellfield in the immediate vicinity of the Merit wells will require excessive bleed in order to contain ISR fluids within the wellfield.*

Additional information on how the 0.25-mile buffer zone was determined is lacking. Staff assumes that the zone was based on graphical portrayals of the hydraulic gradient. Staff drew a 0.25-mile radial circle around the wells on Addendum Figure 4.7-5. The circles do coincide with steep hydraulic gradients in the northerly and southerly directions. Staff then reviewed the model predicted gradients for the end of operations (Figure on Page 141 of Addendum 2.7-H). The steep gradients extend farther north and south of those predicted on Figure 4.7-5. Finally, staff superimposed the 0.25-mile radius buffer on Figure RAI GEN-1-3. The only "wellfields" not encumbered by the buffer are (1) the small wellfield immediately south of Oshoto Reservoir and (2) the southernmost wellfield.

The Technical Report did not include any discussion on the procedures to be used if Merit wells continued to be in use. For example, would only one-half of the wellfield outside of the 0.25-mile buffer be used? How will the baseline be determined? Perimeter wells?

Staff disagrees with the applicant's assertion that the reference to MU1 will be confusing. The license condition clearly identifies a figure in the application. Although the wellfields nomenclature may be modified, the figure in an application will not be modified unless the change was approved through the SERP, which would have been required to address impacts of changes on the SER evaluation.

Rationale for changing "operations" to "pumping" was not provided.

## Discussion

The applicant reiterated its position. The applicant stressed that the 0.25-mile buffer was based on a technical evaluation but acknowledged that the evaluation was not sufficiently documented in the application.

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### **10.20**

#### Applicant's Request(s)

Delete the license condition

Basis: The proposed plan for groundwater monitoring in the CPP area in Section 5.7.8.2 of the Technical Report complies with the regulatory requirements.

#### Staffs Position:

**Disagreed.** As stated in its basis for this request, the applicant includes components of the monitoring program that would, if implemented appropriate, meet the basic requirements of a groundwater detection monitoring program. However, overall, the application is vague on details and purpose for the CPP groundwater monitoring program. Major elements of a groundwater protection detection monitoring program consist of defining the point of compliance, determining compliance levels, and establishing an assessment and/or corrective action program should the compliance levels be exceeded. As discussed below, these elements are lacking in the application.

As the applicant states, in Section 5.7.8.2 of the application, the applicant discusses several aspects of its monitoring program. In that section, a large focus of the program is to monitor water levels across the containment barrier wall (CBW). While that aspect will be required for an operational monitoring program, monitoring the efficiency of the CBW is not part of a groundwater protection detection monitoring program. In addition, the applicant states that the monitoring program will be able to detect spills or leaks and that monitoring the French drains/collector system will also be part of the program. A groundwater protection monitoring program is specific for monitoring a release from the regulated unit and the applicant fails to specify whether or not it would differentiate between a spill or a release from the ponds.

In Table 5.7-1, the applicant lists the groundwater monitoring up-gradient and downgradient of the CPP area as an effluent monitoring program (based on RG 4.14). The parameters listed on that table are only the radionuclides, which is insufficient for a groundwater protection monitoring program.

The applicant specifies one upgradient and three downgradient wells. On Figure 5.7-13, four monitoring wells are depicted outside of the CBW and three wells inside the CBW. The applicant fails to specify which wells are the designated wells for the groundwater detection monitoring program.

In Section 5.7.8.2, the applicant states that measuring water levels across the CBW “will serve to demonstrate the ability of the CBW to isolate the CPP area from the background groundwater flow regime.” That nature of an “isolated environment” at the CPP area is mentioned in various sections of the application (e.g., Sections 3.1.8, 5.7.8.3, and 7.3.3). However, because of the complexities of the proposed setting, the applicant fails to discuss in sufficient detail how the isolated environment factors into the groundwater protection detection monitoring program.

#### Discussion

No additional information was presented.

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### 11.1

#### Applicant’s Request(s):

A) delete “weekly.”

Basis: to include biweekly results and for consistency with other licenses

B) delete “averaged.”

Basis: LC 10.14 requires daily measurement but not averaging.

C) delete “for a wellfield (module) that is”; change submittal time from 30 to 60 days.

Basis: redundant; reporting period consistent with other draft license

F) change “the Ross Project” to “any production area.”

Basis: consistent with other licenses.

#### Staff’s Position:

A) **Agreed.**

B) **Agreed.** Pressures will not likely fluctuate to a large degree

C) **Agreed with changes.** Staff is replacing “status of wellfields (wellfield modules) in restoration” with “progress of wellfields (wellfield modules) in restoration.” (Standard Language)

F) **Agreed with Stipulations.** Staff agrees that consistency with other licenses should be a factor in evaluating license conditions. However, this request for LC 12.3 will be denied.

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## Discussion

None

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### 11.3

#### Applicant's Request(s):

A) Change one well per two acres to one well per 4 acres; replace "criteria" with "criterion."

Basis: Consistent with the application, WDEQ permit to mine and other NRC licenses.

E) Change "5.7.8.2" to "5.7.8.1."

Basis: Incorrect reference to the application.

#### Staff's Position:

A) **Disagreed.**

From Section 5.7.8.3 of the Standard Review Plan (NUREG-1569)

*An acceptable set of samples should include all well field perimeter monitor wells, all upper and lower aquifer monitor wells, and at least one production/injection well per acre in each well field. For large well fields, it may not be practical to sample one production/injection well per acre. Consequently, enough production/injection wells must be sampled to provide an adequate statistical population if fewer than one well per acre is used. As a general guideline, for normally and log-normally distributed populations, at least six samples are required to achieve 90 percent confidence that any random sample will lie within two standard deviations from the sample mean. In no case should the baseline sampling density for production/injection wells be less than one per 4 acres.*

Staff had difficulty in reconciling all the information – the applicant's proposed 2 mine units of approximately 40-45 acres each; the applicant's proposed one baseline well per 3 to 4 acres; and the applicant's proposed one well per module with an average module covering an area of approximately 5.7 acres.

Staff found that the applicant did not provide sufficient background data to support the contention that the Lance/Fox Hills formations were similar to other formations hosting ISR operations. The applicant acknowledges the differences by the phrase "[a]lthough *depositionally and formationally different*" in Section 6.1.6.1 of the application, but otherwise makes the case that the properties are similar.

However, staff acknowledges that in a broad sense, the mudstone, siltstone, and sandstone sedimentary lithologies are consistent with those host ISR operations. However, the distinct depositional environment (i.e., marine or marginal marine) for the minerals comprising the

Lance/Foxhills formations may lead to subtle differences for sedimentary rocks formed in a terrestrially environment, in particular, the heterogeneities.

In Section 2.6.2.1 of the application,

*No faults of major displacement exist within the proposed project area; however, minor localized slumps, folds and differential compaction features are common. Lineal features originally interpreted by Buswell (1982) as structural faults are now believed by Strata to actually be depositional rather than structural in origin.*

In Addendum 2.7-F, the applicant determined that the horizontal anisotropy (2.6:1) is greater than vertical anisotropy (1.5:1). But these factors are scale dependent.

In Section 2.6.2.1 of the application,

*As for the aquifer test cited by Buswell, the groundwater hydrologist (P.A. Manera) who conducted and analyzed the test stated in his report (Manera 1978) that the changing permeability and lateral discontinuity in the stratigraphy was the more probable reason for some observation wells to be hydrologically isolated rather than structural faulting causing no-flow boundary conditions.*

Staff reviewed documents from the former Nubeth R&D facility. Two monitoring wells in the production aquifer were hydraulically isolated from the production pattern and that the scale of the Nubeth operations were approximately 2 acres.

Consequently, staff finds that the applicant did not provide sufficient data to warrant a density of one well per four acres and will require a baseline data of one well per two acres. In the future, this could be modified as staff receives more information on operations in the Lance/Fox Hills aquifer.

E) **Agreed.**

#### Discussion

The applicant reiterated its contention that the Lance/Fox Hills formations are similar to the host formations at existing ISR facilities. The applicant brought up the fact that the Lost Creek facility will be operating in “new” formation (i.e., Battle Spring Formation) and the Lost Creek license condition allows a minimum density of one baseline well per four acres.

Staff acknowledged that the Battle Spring Formation is new, but it is equivalent to the Wasatch Formation (which other ISR facilities are operating), its outcrops were observed by staff at the Kennecott facility, and Lost Creek performed several long term, multi-well, high-yielding pumping tests.

The applicant stated that a condition on the WDEQ permit allowed one baseline well per four acres. Staff stated that this was a minimum requirement and that a higher density of baseline wells should not invalidate the permit condition.

The applicant stressed that pumping tests to be performed as part of a wellfield data package would be sufficient to identify heterogeneities. Staff acknowledged that pumping tests for a wellfield may identified heterogeneities and would re-evaluate the license condition.

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## 11.5

### Applicant's Request(s):

1st) Change "after the verification sampling" to "results of the first analyses are received."

Basis: To allow laboratory turn-around-time.

2nd) Change "below" to "in License Condition 11.6."

Basis: Clarification through specificity.

3<sup>rd</sup>) Change the density of SA wells, baseline monitoring requirement, and sampling requirement.

Basis: (1) Minimal area of saturated alluvium in production area; (2) intent to monitor for spill or release rather than excursion monitoring; (3) migration dowgradient consistent with topography; and (4) seasonal variations in the SA aquifer quality have been shown to be minimal and the baseline sampling can be conducted as the confined aquifers and monitoring on a quarterly basis or after a reportable leak/spill.

### Staff's Position:

1st) **Agreed with clarifications/additions.** The language in the CBR license is "no more than 14 days apart" whereas for this license, to be consistent with the application and the desired intent (of not having the sampling too close in time), the language is "at least 10 days apart." In the second to last sentence, the phrase "the well is placed on excursion status" is changed to "the well shall be on excursion status."

2<sup>nd</sup>) **Agreed.**

3rd) **Agreed in part. Disagreed in part.** Staff agrees that the important aspect is to monitor for a "release" and that the monitoring is best on the downgradient side of a wellfield. However, the proposed language is vague as to the location (between the wellfield and nearest downgradient surface water feature). This language would allow a well to be placed on the banks of a surface water feature regardless of the distance to the wellfield. In addition, the language of "after a reportable surficial leak/spill" is also sufficiently vague to measure for compliance. For example, would a release from underground piping meet this definition? Most importantly, staff assumes the applicant means reportable to the State but reportable can be interpreted as reportable to NRC, which has a higher threshold.

The applicant argues that information included in the application, and submitted as Attachment 1 to its comments on the draft license, do not support "fluctuations that can be attributed to season influences from precipitation and runoff." However, the information is insufficient for

staff to concur. First, only one well, SA43-18-3, is completed in the unconsolidated sediments; the other SA wells are completed in the shallow Lance Formation. Second, only three quarters of data were reported for well SA-43-18-3 in the application. Data collected during 2011 were reported electronically with the RAI responses; however, no QA/QC or field sampling data were reported. Staff notes that the graphs presented in the comments somewhat disagree with the electronic data, the differences for which the staff cannot reconcile. Finally, the applicant, in RAI responses, states that it is "*apparent that the valley fill groundwater quality is influenced by a relatively greater degree of groundwater movement and flushing*" when discussing the quality relative to the surrounding shallow bedrock. Therefore, staff concludes that the applicant has failed to adequately demonstrate the lack of season trends in the unconsolidated aquifer.

#### Discussion

The discussions focused on the SA aquifer conditions. The applicant's perspective is that the monitoring of the SA aquifer was warranted for a release/spill rather than an excursion and should be part of the effluent monitoring program. Staff agreed that the excursion monitoring was only part of the potential source of an impact (through loss of integrity of a well) and that releases through leaks from surficial piping or surficial spills are perhaps sources of impacts with a high potential. Staff wanted assurances that the monitoring would (1) be timely detection of an impact; and (2) lead to corrective actions should an impact be detected. The applicant agreed.

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### **11.6**

#### Applicant's Request(s):

3rd paragraph – change 30 days to 60 days.

Basis: Consistent with the application and other licenses.

#### Staff's Position:

**Denied.**

CBR, Moore Ranch, PRI, Willow Creek, Lost Creek, Nichols Ranch - 30 days.

#### Discussion

None.

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### **11.7**

#### Applicant's Request(s):

Delete license condition.

Basis: Commitment in application; not consistent with draft regulatory guide; New requirement

Staff's Position:

**Agreed.**

Discussion:

None

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**11.8**

Applicant's Request(s):

Delete license condition

Basis: Commitment in application; not consistent with draft RG; New requirement

Staff's Position:

**Agreed.**

Discussion:

None

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**12.3**

Applicant's Request(s):

Change "licensed area" to "proposed wellfield area"; add 30-day submittal requirement.

Basis: Commitment with other licenses and proposed modification to LC 11.1(D).

Staff's Position:

**Agreed with changes.**

Discussion:

None

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**12.7**

Applicant's Request(s):

Delete license condition.

Basis: Additional data was submitted in response to RAIs and exceeds regulatory requirements.

Staff's Position:

**Denied.**

The applicant submitted data collected after the submittal of the application electronically in response to ER RAI WR-4. Response to ER RAI WR-4 also includes references to ER RAI EM-1, which is not acceptable. Language in 10 CFR 40.31(b) states:

*The Commission may at any time after the filing of the original application, and before the expiration of the license, require further statements in order to enable the Commission to determine whether the application should be granted or denied or whether a license should be modified or revoked. All applications and statements shall be signed by the applicant or licensee or a person duly authorized to act for and on his behalf.*

Discussion:

The applicant committed to providing revised summary tables and replacement pages to the application on the data collected during 2011. Assuming the data are sufficient and pending review of the applicant's submittal, staff will consider removing this license condition.

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## 12.8

Applicant's Request(s):

Delete license condition.

Basis: The information requested was documented in the application.

Staff's Position:

MILDOS is approved for licensing; it is not approved for compliance with the regulations, which require monitoring to demonstrate validity of the modeling results and provide actual data.

Discussion:

Staff's position is this license condition is a standard license condition. However, staff's opinion is that the applicant provided an evaluation of the members of the public likely to receive the highest exposure and agrees that the sub-paragraph on this requirement can be removed.

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## 12.12

### Applicant's Request(s):

Delete license condition.

Basis: Sampling for the pre-operational monitoring consistent with the regulations and guidance.

### Staff's Position:

**Agreed with conditions.** The applicant did not clarify the sampling occurred at the maximum likely spot for sediment deposition or provided a composite sample along a traverse. The latter sampling strategy is primarily intended for streams with flowing water and not ephemeral streams.

### Discussion:

The applicant clarified that the sediment sampling was taken at the thalweg and thus the likely spot for sediment deposition. Staff agreed that the sampling strategy was appropriate and, if the applicant submitted revised pages that clarified the sampling strategy, the license condition could be deleted.

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## 12.13

### Applicant's Request(s):

Delete license condition.

Basis: The third sampling was conducted during 2011 and sample results were provided in the comment letter.

### Staff's Position:

**Agreed with conditions.** The regulatory guides recommend three food samples but the applicant only submitted results of a beef sample and a venison sample in the application. If the additional sampling is properly documented by revising the application, the license condition is no longer needed.

### Discussion:

The applicant agreed to revising the application to include the third food sampling results.

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**12.14**

Applicant's Request(s):

Delete license condition.

Basis: The applicant collected additional data to test for seasonal variations during 2011. The additional data were provided in the comment letter.

Staff's Position:

**Agreed with conditions.** The applicant committed to collecting additional data to establish seasonal variations in the background data. If the additional data is incorporated into application, this license condition could be omitted.

Discussion:

The applicant agreed to revise the application to include the additional data for evaluation of seasonal variations.

**12.15**

Applicant's Request(s):

B) Delete this license condition.

Basis: Maximum pressure of 175 psi applies to all wells.

D) Change LC 10.21 to LC 10.20.

Basis: Typographical error.

Staff's Position:

B) **Agreed.** The intent was to allow for a reduced pressure for monitoring wells.

D) **Agreed.**

Discussion:

None

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**12.16**

Applicant's Request(s):

Change "NRC review and approval" to "NRC review and verification."



Basis: Level of detail already provided in application.

Staff's Position:

**Agreed.**

Discussion:

None

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Staff acknowledged that other license conditions may be revised based on further review. At the time of the meeting, staff informed the applicant that license conditions 9.7, 10.9, 11.1 and 11.5 may include some minor word changes.

Staff discussed an additional license condition to revise the financial assurance calculations. The calculations were based on 7.5 pore volumes but the text in the application indicated 8.5 pore volumes. The applicant committed to revising the financial assurance calculations to omit this license condition.

The meeting was adjourned at approximately 13:35 p.m.

#### ACTION ITEMS:

NRC Action Items:

Discuss well density with WDEQ.

Strata Action Items:

Provide revised tables and/or text for the application as discussed for license conditions 10.13, 12.7, 12.12, 12.13 and 12.14.

Provide revised financial assurance calculations to omit a license condition to revise those calculations.

#### ATTACHMENTS

1. Agenda
2. List of Attendees

**ATTACHMENT 1**

**Meeting Agenda  
Strata Energy, Inc.  
Ross In Situ Recovery Project, Crook County, WY  
April 12, 2012**

MEETING PURPOSE: Discuss Strata's Responses to the November 6<sup>th</sup> Ross Draft License

MEETING PROCESS:

<u>Time</u>	<u>Topic</u>	<u>Lead</u>
10:30 a.m.	Introductions	All
	Discuss Responses	Moderator
	Summary of Action Items	Moderator
2:15 p.m.	Public Comment/Questions	Moderator
2:30 p.m.	Adjourn	



## ATTACHMENT 2

### MEETING ATTENDEES

Date: Thursday December 20, 2012

Room T-8C5

10:30 a.m. – 2:30 p.m.

Topic: Strata Energy, Inc. Response to Ross Draft License

NAME	AFFILIATION
Stephen J. Cohen	USNRC
Ben Schiffer	WWC Engineering (via telephone)
Ralph Knode	Strata (via Telephone)
Mike Griffin	Strata (via Telephone)
Shannon Anderson	Powder River Basin Resource Council (via Telephone)
Miles Bennett	WDEQ (via Telephone)
Emily Monteith	USNRC
John L. Saxton	USNRC
Molly Marsh	USNRC
James Webb	USNRC
Elise Striz	USNRC