



July 16, 2015

U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555-0001

Re: Strata Energy Ross In Situ Recovery Project  
Source Materials License SUA-1601, Docket No. 040-09091  
Request to Amend License Condition 11.3

To Whom It May Concern:

Strata Energy, Inc. (Strata) recently completed activities associated with the preparation of the Mine Unit 1 (MU1) Wellfield Package required by License Condition 10.13. As part of this effort, Strata characterized the BFS 2 sand underlying the ore zone. The BFS 2 sand represents the first underlying sand beneath the OZ and is the DM interval. The BFS 2 sand ranges from 10 to 20 feet thick in MU1 and is continuous throughout the mine unit. The BFS 2 sand is a very low yielding zone with yields typically less than 0.1 gallon per minute (gpm) in the DM wells within MU1. Analysis of the recharge following swabbing in the DM wells in MU1 suggests that there are not useable quantities of water in this zone within the boundaries of MU1. Calculated DM well yields based on measured hydraulic conductivities at each well range from 0.02 to 0.12 gpm and averaged 0.06 gpm.

Strata does not believe that the DM meets the definitions of an aquifer within MU1. Based on WDEQ/LQD Guideline 8 and WDEQ/WQD Rules and Regulations, Chapter 8, an "aquifer" is defined as "a zone, stratum, or group of strata that stores and transmits water in sufficient quantities for a specific use." Since stock watering is the predominant use of groundwater in the area and the minimum yield to sustain a typical stock watering system ranges from 2 to 5 gpm, the DM interval does not appear to meet State of Wyoming definitions (in guidance or regulation) for an aquifer. Similarly, EPA's conservative definition of "limited use groundwater" in 40 CFR Part 192.11(e) includes groundwater with a quantity of water reasonably available for sustained continuous use of less than 150 gallons per day (0.1 gpm). Finally, the EPA provides guidance on the definition of an Underground Source of Drinking Water (USDW) in the document "Technical Program Overview: Underground Injection Control Regulations" (EPA, 2002). The guidance states that "[f]or the purpose of defining a USDW, the Office of Ground Water and Drinking Water uses 1 gpm as the threshold value for determining if an aquifer produces a significant amount of water." Based on these definitions and the technical support provided in Attachment 5 of the MU1 Wellfield Data Package, Strata concludes that the DM interval in MU1 does not meet the specific criteria to be defined as an aquifer or USDW by multiple state and federal agencies. Furthermore, within MU1 there are shallow aquifers above both the DM and OZ intervals that have much higher well yields than the DM. Given the existence of additional shallow aquifers within



MU1 that provide higher well yields, it would not be economically viable to utilize water out of the DM interval and it is unlikely that it would be utilized as a primary water supply for any future wells.

License Condition 11.3 requires that Strata collect samples "...from all monitoring wells in the first overlying and first underlying aquifer..." As noted, characterization activities at Mine Unit 1 indicate that the DM in this area of the Ross project does not meet the definitions of an aquifer. Guidance provided by the USGS (2006) recommends that "Low-yielding wells, especially those that exhibit slow recovery or are pumped dry, are not recommended for water quality sampling." The USGS guidance also includes a rule-of-thumb that recommends against sampling wells at which, after being purged, the water levels take more than 24 hours to recover to 90 percent. DM wells were installed in Mine Unit 1 but extraordinary efforts were required to obtain samples, primarily by swabbing the wells dry and then sampling the water that collected in the well over the course of the following days. As such, the DM sand in Mine Unit 1 will be very difficult if not impossible to monitor as required by License Condition 11.3. Therefore Strata is requesting an amendment to License Condition 11.3.

Strata recognized this potential situation during preparation of the License Amendment Request for the Kendrick Expansion Area (KEA) and requested this License Condition be amended to allow some flexibility in monitoring the DM interval based on site specific hydrologic conditions encountered in the DM in each specific Mine Unit. In the KEA amendment request Strata proposed that the density of the underlying or DM monitor wells be established following mine unit delineation drilling and the wellfield data package development and reporting required by LC 10.13. Strata noted that characteristics of the clay and silty sandstones that comprise the underlying aquitard and water bearing intervals (BFS 1, BFH 1, BFS 2 and BFH 2) include: highly variable thickness, significant depths in most of the KEA, low water yields, very slow recovery following stress and a general lack of geologic consistency. Considering these attributes, Strata proposed the following criteria to be assessed on a mine unit basis in order to justify and ensure protection of the interval.

1. If the thickness of BFH 1 or BFH 2 interval (whichever is the first underlying aquitard at a given location) exceeds 50 feet, Strata would propose that no monitoring of the underlying interval is necessary. This is consistent with ongoing practices at Cameco's Crow Butte Mine, Cameco's North Butte Satellite and Uranium One America's Willow Creek Project. The low permeability and significant thickness of the underlying aquitards comprised of marine shales effectively prevent vertical migration of solutions into the DM interval.
2. If the thickness of the immediately underlying aquitard is less than 50 feet, Strata will evaluate whether the DM interval meets the definitions of an aquifer discussed in the Ross SER (pages 73-74) and Section 2.7.3.3 of the KEA TR. Specifically, Strata proposed to evaluate the thickness and the lithology of the DM interval to determine if the DM interval is capable of yielding a significant amount of groundwater to a well consistent with the definition in 10 CFR Part 40, Appendix A, as cited in the Ross SER. Preliminary airlift data from development of the DM regional baseline cluster wells constructed in the KEA suggests that DM wells with a completion thickness of less than 15 feet are not likely to yield 2 gpm or more. Therefore, Strata proposes to drill at least one delineation drill hole to intercept the BFS 1 and BFH 1 or BFS 2 and BFH 2 intervals at a density of not more than one per four acres. The following criteria will then be used to evaluate the DM interval.
  - a. If the thickness of the DM interval is less than 15 feet, a well will not be completed in the interval at that location.



- b. If the thickness of the DM interval is greater than 15 feet, Strata will evaluate the nature of the drill cuttings from the underlying intervals as well as the lithologic attributes as provided in the resistivity and spontaneous potential logs (electric logs). If during an evaluation of the drill cuttings and the electric logs it is determined that the lithology within the DM interval is sufficiently permeable (lacking clays and silts) that it may produce water, a well will be constructed. If it is determined that DM interval lithology consists of fine-grained silty sands or clays not conducive of an aquifer, a well will not be completed at that location. In the event that the aquifer thickness is greater than 15 feet thick and it is determined that the lithology is not conducive of an aquifer, a well will not be constructed. The electric logs used to make the determination will be indicated in the wellfield package.
3. If, based on the above criteria, a well is installed in the DM interval, performance will be assessed during air-lift development to ascertain estimated yield and determine if representative samples can be collected from the well in a timely manner. Specific criteria to be used include: bucket and stopwatch measurements of yield, pH measurements to ensure a lack of contamination by cementing operations, and turbidity measurements to demonstrate the well produces sufficient yield to clean out the fine sediments immediately surrounding the completion interval. In general, air-lift yields should exceed 5 gpm, pH measurements should be less than 10.0 s.u. and turbidity should be less than 20 NTU.
4. If an underlying (DM) monitor well cannot be sampled or is not representative in terms of water quality, a short-duration single well aquifer test will be conducted to confirm the aquifer parameters and expected yield, with documentation of the results reported in the wellfield data package. These wells would not be used for compliance monitoring purposes because the DM interval would not be an aquifer at that location. These wells would be plugged and abandoned in accordance with WDEQ/LQD requirements following the procedures in Addendum 2.6-E of the approved Ross TR.
5. If an underlying (DM) well demonstrates sufficient thickness and lithologic characteristics to warrant completion, sufficient yield to provide representative samples, and can recover in a reasonable amount of time (to 90% of the static water level in less than 24 hours per USGS 2006), then it will be included in the compliance monitoring program baselined consistent with LC 11.3, and monitored twice monthly during operations consistent with LC 11.5.

Documentation of this analysis and the application of these criteria will be included in the specific wellfield data packages provided to NRC for review in accordance with LC 10.13 of SUA-1601 and to WDEQ/LQD for review and approval as well as in the SERP review of the wellfield data package.

Since the interval is not an aquifer or USDW, Strata requests that NRC amend SUA-1601 and will request that WDEQ/LQD revise Permit to Mine No. 802 in order to allow more flexibility in assessing and eventually monitoring the underlying interval in the excursion monitoring program. Until the license is amended and the permit revised, Strata commits to twice monthly (semi-monthly) operational excursion monitoring of the DM interval consistent with LC 11.5.



Strata requests that NRC amend LC 11.3(C) of SUA-1601 as follows:

**Current License Condition 11.3(C) Amendment 1:**

*C) Overlying and Underlying Aquifers. Samples shall be collected from all monitoring wells in the first overlying and first underlying aquifer at a minimum density of one well per 4 acres of wellfield.*

**Proposed License Condition 11.3(C):**

*C) Overlying and Underlying Aquifers. Samples shall be collected from all monitoring wells in the first overlying and first underlying aquifer at a minimum density of one well per 4 acres of wellfield **unless wellfield-specific conditions as described in the individual wellfield package demonstrates a lower density is justified. In the event that no viable underlying aquifer exists or there is more than 50 feet of shale between the OZ and DM aquifers, no monitoring of the underlying aquifer will be required.***

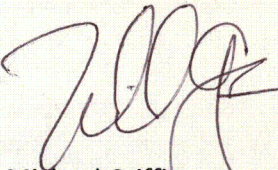
To support Strata's request, attached please find the following information:

- Completed Form 313, as required by 10 CFR 40 (Attachment 1)
- Supplement to Form 313 (Sections 5-11) (Attachment 2)

Please contact me if you have any questions. You can reach me at (307) 686-4066 or [mgriffin@stratawyo.com](mailto:mgriffin@stratawyo.com).

Sincerely,

Strata Energy, Inc.



Michael Griffin  
Vice President of Permitting, Regulatory and Environmental Compliance

Cc: Mr. John Saxton, NRC Project Manager – **via email**

**References:**

USGS (United States Geological Survey) 2006, Collection of water samples (ver. 2.0), U.S. Geological Survey Techniques of Water-Resources Investigations, Book 9, Chap. A4, September 2006. Available on the Internet as of July 2015: <[http://water.usgs.gov/owq/FieldManual/chapter4/html/Ch4\\_contents.html](http://water.usgs.gov/owq/FieldManual/chapter4/html/Ch4_contents.html)>



(03-2014)  
10 CFR 30, 32, 33, 34  
35, 36, 37, 39, and 40



## APPLICATION FOR MATERIALS LICENSE

Estimated burden per response to comply with this mandatory collection request: 4.3 hours. Submittal of the application is necessary to determine that the applicant is qualified and that adequate procedures exist to protect the public health and safety. Send comments regarding burden estimate to the FOIA, Privacy, and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to [Infocollections.Resource@nrc.gov](mailto:Infocollections.Resource@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0120), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

**INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW. \*AMENDMENTS/RENEWALS THAT INCREASE THE SCOPE OF THE EXISTING LICENSE TO A NEW OR HIGHER FEE CATEGORY WILL REQUIRE A FEE.**

**APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:**

OFFICE OF FEDERAL & STATE MATERIALS AND  
ENVIRONMENTAL MANAGEMENT PROGRAMS  
DIVISION OF MATERIALS SAFETY AND STATE AGREEMENTS  
U.S. NUCLEAR REGULATORY COMMISSION  
WASHINGTON, DC 20555-0001

**ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:****IF YOU ARE LOCATED IN:**

ALABAMA, CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, FLORIDA, GEORGIA,  
KENTUCKY, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY,  
NEW YORK, NORTH CAROLINA, PENNSYLVANIA, PUERTO RICO, RHODE ISLAND, SOUTH  
CAROLINA, TENNESSEE, VERMONT, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA,

**SEND APPLICATIONS TO:**

LICENSING ASSISTANCE TEAM  
DIVISION OF NUCLEAR MATERIALS SAFETY  
U.S. NUCLEAR REGULATORY COMMISSION, REGION I  
2100 RENAISSANCE BOULEVARD, SUITE 100  
KING OF PRUSSIA, PA 19406-2713

**IF YOU ARE LOCATED IN:**

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN,  
SEND APPLICATIONS TO:

MATERIALS LICENSING BRANCH  
U.S. NUCLEAR REGULATORY COMMISSION, REGION III  
2443 WARRENVILLE ROAD, SUITE 210  
LISLE, IL 60532-4352

ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS,  
LOUISIANA, MISSISSIPPI, MONTANA, NEBRASKA, NEVADA, NEW MEXICO, NORTH  
DAKOTA, OKLAHOMA, OREGON, PACIFIC TRUST TERRITORIES, SOUTH DAKOTA, TEXAS,  
UTAH, WASHINGTON, OR WYOMING,

**SEND APPLICATIONS TO:**

NUCLEAR MATERIALS LICENSING BRANCH  
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV  
1600 E. LAMAR BOULEVARD  
ARLINGTON, TX 76011-4511

**PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTIONS.**

**1. THIS IS AN APPLICATION FOR (Check appropriate item)**☐

A. NEW LICENSE

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B. AMENDMENT TO LICENSE NUMBER

SUA-1601

☐

C. RENEWAL OF LICENSE NUMBER

**2. NAME AND MAILING ADDRESS OF APPLICANT (Include ZIP code)**

Strata Energy Inc.  
PO Box 2318  
Gillette, WY 82717-2318

**3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED**

Strata Energy  
2929 New Haven Road  
Oshoto, WY 82721

**4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION**

Michael Griffin

BUSINESS TELEPHONE NUMBER

(307) 686-4066

BUSINESS CELLULAR TELEPHONE NUMBER

BUSINESS EMAIL ADDRESS

[mgriffin@stratawyo.com](mailto:mgriffin@stratawyo.com)

SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

**5. RADIOACTIVE MATERIAL**

a. Element and mass number; b. chemical and/or physical form; and c. maximum amount which will be possessed at any one time.

**6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.****7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE.****8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.****9. FACILITIES AND EQUIPMENT.****10. RADIATION SAFETY PROGRAM.****11. WASTE MANAGEMENT.****12. LICENSE FEES (Fees required only for new applications, with few exceptions\*)  
(See 10 CFR 170 and Section 170.31)**

FEE CATEGORY

AMOUNT  
ENCLOSED \$**13. CERTIFICATION. (Must be completed by applicant) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.**

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, 36, 37, 39, AND 40, AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

CERTIFYING OFFICER -- TYPED/PRINTED NAME AND TITLE

SIGNATURE

DATE

7/16/2015

**FOR NRC USE ONLY**

TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED	CHECK NUMBER	COMMENTS
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APPROVED BY

DATE



**ROSS URANIUM PROJECT SUA-1601 SOURCE MATERIALS LICENSE AMENDMENT REQUEST**

**NRC Form 313 Attachment**

**Items 5 Through 11**

Applicant

Strata Energy, Inc.

1900 W. Warlow Dr., Bldg. A,

Gillette, Wyoming 82716

**5. Radioactive Material:**

a) Element and Mass Number:

Uranium- Unat (U238, U234, and U235)

b) Chemical and/or Physical Form:

Chemical form is U3O8

Solution of 0 to 50 grams/liter

Dried Yellowcake- 50% to 80% U

c) Maximum Amount which will be possessed at any one time:

Unlimited

**6. PURPOSE FOR WHICH LICENSED MATERIAL WILL BE USED:**

Fuel for electricity generation from nuclear power plants.



**7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE:**

Individual: Michael Griffin

Training: 31 years as Radiation Safety Officer experience including Uranium Mill Tailings Remedial Action (UMTRA) Project; Title II conventional uranium mill decommissioning projects; Manager of Health, Safety and Environment Affairs for Cameco Resources (Crow Butte Mine (SUA-1534) 1998-2006); Vice President of Safety, Health, and Environment for Uranium One (Willow Creek Uranium Project (SUA-1341) 2007 to 2012); Vice President of Permitting, Regulatory and Environmental Compliance for Strata Energy, Inc. (2012 to Present).

**8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS:**

This information is provided in detail in Section 5 of the approved License Application and supplemental submissions.

**9. FACILITIES AND EQUIPMENT:**

This information is provided in detail in Section 3 of the approved License Application and supplemental submissions.

**10. RADIATION SAFETY PROGRAM:**

This information is provided in detail in Section 5 of the approved License Application and supplemental submissions.

**11. WASTE MANAGEMENT:**

This information is provided in detail in Section 4 of the approved License Application and supplemental submissions.