

U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and the applicable parts of Title 10, Code of Federal Regulations, Chapter I, Parts 19, 20, 30, 31, 32, 33, 34, 35, 36, 39, 40, 70, and 71, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Uranium One USA, Inc.	3. License Number SUA-1341, Amendment No. 4
2. 907 N. Poplar Street, Suite 260 Casper, Wyoming 82601	4. Expiration Date March 7, 2023
	5. Docket No. 040-08502

6. Byproduct Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum amount that Licensee May Possess at Any One Time Under This License
Uranium and Atomic Energy Act 11e.(2) byproduct	Unspecified	Unlimited

SECTION 9: Administrative Conditions

- 9.1 The authorized place of use shall be the licensee's Willow Creek Project comprised of both Irigaray and Christensen Ranch projects in Johnson and Campbell Counties, Wyoming.
- 9.2 All written notices and reports to the Nuclear Regulatory Commission (NRC) required under this license, shall be sent to the following address: ATTN: Document Control Desk, Director, Office of Nuclear Material Safety and Safeguards, U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001. An additional copy shall be submitted to: Deputy Director, Division of Decommissioning, Uranium Recovery, and Waste Programs, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Mailstop T8 F5, 11545 Rockville Pike, Two White Flint North, Rockville, MD 20852-2738.

Required telephone notification shall be made to the NRC Operations Center at (301) 816-5100, unless otherwise specified in license conditions.

[Applicable Amendment: 4]

- 9.3 The licensee shall conduct operations in accordance with the commitments, representations, and statements contained in the following:
- License Renewal Application (LRA), May 30, 2008, NRC Agencywide Documents Access and Management System (ADAMS) Accession Package Number ML081850689
 - LRA Revision, October 31, 2008, ADAMS Accession Number ML083110405
 - LRA Revision, July 17, 2009, ADAMS Accession Package Number ML092110700
 - LRA Revision, November 19, 2010, ADAMS Accession Number ML103280266.
 - LRA Revision, March 7, 2012, ADAMS Accession Package Number ML120820095.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number
SUA-1341

Docket or Reference Number
40-8502

Amendment No. 4

- LRA Revision, July 10, 2012, ADAMS Accession Number ML12206A436.
- Response to Confirmatory Action Letter, September 21, 2012, ADAMS Accession Number ML12268A270. The redrying of dried Honeymoon, Australia yellowcake as documented in NRC Safety Evaluation Report (ADAMS Accession Number ML14212A154) is not subject to the 4.5 hour dryer retention time commitment by the licensee in Response to Confirmatory Action Letter, September 21, 2012, ADAMS Accession Number ML12268A270.
- Amendment Request to Redry Dried Honeymoon, Australia yellowcake, February 28, 2014 (ML14066A112), March 27, 2014 (ML14113A421), June 28, 2014 (ML14192B247) August 26, 2014 (ML14240A045), September 9, 2014 (ML14253A026) and October 2, 2014 (ML14275A443).

The documents listed in this section are hereby incorporated by reference except where superseded by license conditions below.

The land and structures will be decommissioned according to the Decommissioning Plan submitted December 19, 2000 (ADAMS Accession No. ML003781238), as revised by submittals dated June 15, 2001 (ADAMS Accession No. ML011700655), June 18, 2001 (ADAMS Accession No. ML011710035), and August 31, 2001 (ADAMS Accession No. ML012490112) and in accordance with 10 CFR 40.42.

Whenever the word "will" is used in the above referenced documents, it shall denote a requirement.

[Applicable Amendment: 3]

9.4 Change, Test and Experiment License Condition

- a) The licensee may, without obtaining a license amendment pursuant to 10 CFR 40.44, and subject to conditions specified in paragraph (b) of this condition:
 - (i) Make changes in the project as described in the license application (as updated); and
 - (ii) Make changes in the procedures as described in the license application (as updated); and
 - (iii) Conduct tests or experiments not described in the license application (as updated).
- b) The licensee shall obtain a license amendment pursuant to 10 CFR 40.44 prior to implementing a proposed change, test, or experiment if the change, test, or experiment would:
 - (i) Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the license application (as updated);
 - (ii) Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a project structure, equipment, or monitoring system (SEMS) important to safety previously evaluated in the license application (as updated);
 - (iii) Result in more than a minimal increase in the consequences of an accident previously evaluated in the license application (as updated);
 - (iv) Result in more than a minimal increase in the consequences of a malfunction of an

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number
SUA-1341

Docket or Reference Number
40-8502

Amendment No. 4

SEMS previously evaluated in the license application (as updated);

- (v) Create a possibility for an accident of a different type than any previously evaluated in the license application (as updated);
- (vi) Create a possibility for a malfunction of an SEMS with a different result than previously evaluated in the license application (as updated);
- (vii) Result in a departure from the method of evaluation described in the license application (as updated) used in establishing the final safety evaluation report (FSER), environmental statement (ES), environmental assessment (EA) or technical evaluation reports (TERs) or other analyses and evaluations for license amendments.

For purposes of this paragraph as applied to this license, SEMS means any SEMS that has been referenced in a staff SER, TER, EA, or ES and supplements and amendments thereof.

- c) The licensee is not required to obtain a license amendment if a proposed change, test, or experiment is consistent with NRC's previous conclusions, or the basis of, or analysis leading to, the conclusions of actions, designs, or design configurations analyzed and selected in the site or project SER, TER, ES, or EA. This would include all supplements and amendments to this license, and the TERs, EAs, EISs issued with those amendments.
- d) The licensee's determinations concerning whether a proposed change, test, or experiment meets the criteria in paragraphs (b) or (c) of this condition, shall be made by a Safety and Environmental Review Panel (SERP). The SERP shall consist of a minimum of three individuals. One member of the SERP shall have expertise in management (e.g., Plant Manager) and shall be responsible for financial approval for changes; one member shall have expertise in operations and/or construction and shall have responsibility for implementing any operational changes; and one member shall be the radiation safety officer (RSO) or equivalent, with the responsibility of assuring changes conform to radiation safety and environmental requirements. Additional members may be included in the SERP, as appropriate; to address technical aspects such as ground water or surface water hydrology, specific earth sciences, and other technical disciplines. Temporary members or permanent members, other than the three above-specified individuals, may be consultants.
- e) The licensee shall maintain records of any changes made pursuant to this condition until license termination. These records shall include written safety and environmental evaluations made by the SERP that provide the basis for determining changes are in compliance with paragraph (b) of this condition. The licensee shall furnish, in an annual report to the NRC, a description of each change, test, or experiment, including a summary of the safety and environmental evaluation made under paragraph (d) of this condition. In addition, the licensee shall annually submit to the NRC changed pages to the approved LRA, which shall include both a change indicator for the area changed, e.g., a bold line vertically drawn in the margin adjacent to the portion actually changed, and a page change identification (date of change or change number or both), to the operations plan and reclamation plan of the approved license application (as updated) to reflect changes made under this condition.

9.5 The licensee shall maintain an NRC-approved financial surety arrangement, consistent with 10 CFR 40,

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**License Number
SUA-1341Docket or Reference Number
40-8502

Amendment No. 4

Appendix A, Criterion 9, adequate to cover the estimated costs, if accomplished by a third party, for decommissioning and decontamination, offsite disposal of radioactive solid process or evaporation pond residues, and ground-water restoration as warranted. The surety shall also include the costs associated with all soil and water sampling analyses necessary to confirm the accomplishment of decontamination.

Within 3 months of NRC approval of a revised Decommissioning Plan and its cost estimate, the licensee shall submit, for NRC review and approval, a proposed revision to the financial surety arrangement if estimated costs in the newly approved Decommissioning Plan exceed the amount covered in the existing financial surety. The revised surety shall then be in effect within 3 months of written NRC approval.

Proposed annual updates to the surety amount, required by 10 CFR 40, Appendix A, Criterion 9, shall be provided to the NRC by August 18 of each year. Financial surety coverage for the full amount of the NRC-approved decommissioning cost estimate shall not lapse for any time period prior to license termination. If the NRC has not approved a proposed revision 30 days prior to the expiration date of the existing surety arrangement, the licensee shall extend the existing arrangement, prior to expiration, for one year. Along with each proposed revision or annual update, the licensee shall submit supporting documentation, showing a breakdown of the costs and the basis for the cost estimates with adjustments for inflation, maintenance of a minimum 15 percent contingency, changes in engineering plans, activities performed, and any other conditions affecting estimated costs for site closure.

At least 90 days prior to beginning construction associated with any planned expansion or operational change which was not included in the annual surety update, the licensee shall provide, for NRC approval, an updated surety to cover the expansion or change.

The licensee shall also provide the NRC with copies of surety-related correspondence submitted to the State of Wyoming, a copy of the State's surety review, and the final approved surety arrangement. The licensee must also ensure that the surety, where authorized to be held by the State, expressly identifies the NRC-related portion of the surety and covers the cost of above-ground decommissioning and decontamination, offsite disposal, soil and water sample analyses, and ground-water restoration associated with the site. The basis for the cost estimate is the NRC-approved site closure plan or the NRC-approved revisions to the plan. The Reclamation/Decommissioning Plan, cost estimates, and annual updates should follow the outline in the Appendix C to NUREG-1569 (NRC, 2003), entitled, "Recommended Outline for Site-Specific *In Situ* Leach Facility Reclamation and Stabilization Cost Estimates."

The licensee's currently approved surety, Irrevocable Standby Letter of Credit issued in favor of the State of Wyoming, Department of Environmental Quality (WDEQ) shall be continuously maintained in an amount no less than \$21,672,638, for the purpose of complying with 10 CFR 40, Appendix A, Criterion 9, until a replacement is authorized by both the State of Wyoming and the NRC.

[Applicable Amendment: 1, 2, 4]

- 9.6 Written standard operating procedures (SOPs) shall be established and followed for all operational process activities involving radioactive materials that are handled, processed, stored, or transported by the licensee at or between the Irigaray and Christensen Ranch sites. SOPs for operational activities shall enumerate pertinent radiation safety practices to be followed in accordance with 10 CFR Part 20.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**License Number
SUA-1341Docket or Reference Number
40-8502

Amendment No. 4

Additionally, written procedures shall be established and followed for non-operational activities to include in-plant and environmental monitoring, bioassay analyses, and instrument calibrations. An approved, up-to-date copy of each written procedure shall be kept in specified locations in the process area to which it applies.

All written procedures for both operational and non-operational activities shall be reviewed and approved in writing by the RSO before implementation and whenever a change in a procedure is proposed to ensure that proper radiation protection principles are being applied. Additionally, the RSO shall perform a documented review of all operating procedures at least annually.

- 9.7 The licensee shall dispose of Atomic Energy Act, as amended (AEA), Section 11e.(2) byproduct material, including evaporation pond residues, from the Irigaray and Christensen Ranch Satellite facilities at a site licensed by the NRC or an NRC Agreement State to receive AEA 11e.(2) byproduct material. The licensee shall identify the disposal facility to the NRC in writing. The licensee's approved waste disposal agreement must be maintained onsite. In the event the agreement expires or is terminated, the licensee shall notify the NRC in writing, in accordance with License Condition 9.2, within 7 days after the date of expiration or termination. A new agreement shall be submitted for NRC approval within 90 days after expiration or termination, or the licensee will be prohibited from further lixiviant injection. If the licensee is not able to secure this agreement, then the licensee must increase the surety to include disposal at a commercial AEA 11e.(2) disposal facility.
- 9.8 Release of surface contaminated equipment, materials, or packages from restricted areas shall be in accordance with the NRC guidance document "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," dated April 1993 (ADAMS Accession No. ML003745526) (the Guidelines) or suitable alternative procedures approved by NRC prior to any such release.

Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides shall apply independently.

Personnel performing contamination surveys for items released for unrestricted use shall meet the qualifications as health physics technicians or radiation safety officer as defined in Regulatory Guide 8.31 (as revised). Personal effects (e.g., notebooks and flash lights) which are hand carried need not be subjected to the qualified individual survey or evaluation, but these items should be subjected to the same survey requirements as the individual possessing the items.

Regulatory Guide 8.30 (as revised), Table 2, shall apply to the removal of equipment, materials, or packages that have the potential for accessible radiological surface contamination levels above background to unrestricted areas. The licensee shall submit to the NRC for review and written verification a contamination control program within 90 days of license renewal. The program shall provide sufficient detail to demonstrate how the licensee will maintain control over the equipment, materials, or packages that have the potential for accessible radiological surface contamination levels above background, until they have been released for unrestricted use as specified in the Guidelines, and what methods will be used to limit the spread of contamination to unrestricted areas. The contamination control program shall demonstrate how the licensee will limit the spread of contamination when moving or transporting potentially contaminated equipment, materials, or packages (i.e. pumps, valves, piping, filters, etc.) from wellfield areas (restricted or controlled areas) through uncontrolled areas. The licensee shall receive written verification of the licensee's

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number
SUA-1341

Docket or Reference Number
40-8502

Amendment No. 4

contamination control program prior to its implementation.

The licensee may identify a qualified designee(s) to perform surveys, as needed, associated with the licensee's contamination control program when moving or transporting potentially contaminated equipment, materials, or packages from restricted or controlled areas through uncontrolled areas and back into controlled or restricted areas. The qualified designee(s) shall have completed education, training, and experience, in addition to general radiation worker training, as specified by the licensee. The education, training, and experience required by the licensee for qualified designees shall be submitted to the NRC for review and written verification. The licensee shall receive written verification of the licensee's qualified designee(s) training program prior to its implementation.

- 9.9 Before engaging in any developmental activity not previously assessed by the NRC, the licensee shall administer a cultural resource inventory. All disturbances associated with the proposed development will be completed in compliance with the National Historic Preservation Act of 1966 (as amended) and its implementing regulations (36 CFR Part 800), and the Archaeological Resources Protection Act of 1979 (as amended) and its implementing regulations (43 CFR Part 7).

To ensure that no unapproved disturbance of cultural resources occurs, any work resulting in the discovery of previously unknown cultural artifacts shall cease. The artifacts shall be inventoried and evaluated in accordance with 36 CFR Part 800, and no disturbance shall occur until the licensee has received authorization from the NRC to proceed.

- 9.10 The licensee shall maintain restricted area boundaries at the Irigaray and Christensen Ranch facilities as described in Section 5.8.1 of the approved license application. Additionally, the Irigaray and Christensen Ranch well field buildings shall be restricted, if required, based on the results of radiological surveys.
- 9.11 The licensee is hereby exempted from the requirements of Section 20.1902(e) of 10 CFR 20 for areas within the Irigaray and Christensen Ranch facilities, provided that all entrances to the facility are conspicuously posted in accordance with Section 20.1902(e) and with the words, **"ANY AREA WITHIN THIS FACILITY MAY CONTAIN RADIOACTIVE MATERIAL."**
- 9.12 The RSO shall have the health physics authorities, responsibilities, and technical qualifications identified in Regulatory Guide 8.31, as revised. Health Physics Technicians or Radiation Safety Technicians should have qualifications that are equal or equivalent to those specified in Regulatory Guide 8.31, as revised.

The licensee shall follow the guidance set forth in Regulatory Guide 8.30, as revised, "Health Physics Surveys in Uranium Recovery Facilities," or NRC-approved equivalent with the following exception:

Within 90 days of license renewal, the licensee will develop an SOP and specific training for personnel that do not meet the qualifications of RSO or Health Physics Technician, as defined in Regulatory Guide 8.31, as revised, that are designated to survey resin trucks leaving a restricted area and traveling to another restricted area authorized by the license. The SOP and training shall be submitted to the NRC for review and verification.

The licensee shall follow the guidance set forth in Regulatory Guide 8.31, as revised, or NRC-approved equivalent with the following exception:

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number
SUA-1341

Docket or Reference Number
40-8502

Amendment No. 4

The licensee shall describe in an SOP the training provided and procedures used by the RSO designate to conduct daily inspections in the temporary absence of the RSO or Radiation Safety Technician. The SOP for the conduct of daily inspections and training requirements shall be submitted to the NRC for review and written verification. Weekly inspections shall be performed by the RSO and follow the recommendations of Regulatory Guide 8.31, as revised. The licensee shall describe in an SOP the procedures used to conduct weekly inspections in the temporary absence of the RSO. The SOP for the conduct of weekly inspections shall be submitted to the NRC for review and written verification.

- 9.13 Sage Grouse leks at the Irigaray and Christensen Ranch sites shall be monitored on an annual basis. The licensee shall consult with the Fish and Wildlife Service or the Bureau of Land Management for mitigative measures to reduce potential impacts.
- 9.14 If any officer, director, board member, employee, or representative of a parent company of Uranium One, Inc., will be appointed, hired, or designated as an officer, board member, or director of the licensee under any NRC license held by Uranium One, Inc. or its subsidiaries, Uranium One, Inc. or its subsidiaries must provide written notice to NRC at least 30 days prior to such appointment, hiring, or designation.
- 9.15 The licensee shall review and compare the data collected from a regional weather station during the same period as the onsite meteorological data collected to the long-term data collected from the same regional weather station. The licensee shall determine if the data collected onsite is representative of long-term conditions. Justification of the similarity or validity of the data will include analysis of the statistical data presented to illustrate confidence in the representativeness of the data. The meteorological data will include wind speed, wind direction, an annual wind rose, and a summary of the stability classification. The licensee shall submit this review and comparison to NRC within 6 months of license renewal for NRC review and written verification that the onsite meteorological parameters previously collected will allow the licensee to demonstrate compliance with regulatory requirements of 10 CFR Part 20.
- 9.16 reserved
- 9.17 The security requirements and control of radioactive materials located outside restricted areas and during transportation activities by the licensee shall conform to the requirements of 10 CFR Part 20, Subpart I and 10 CFR 71.5. The licensee will develop SOPs or other plans to comply with 10 CFR Part 20, Subpart I and 10 CFR 71.5 requirements.
- 9.18 The SERP shall review annually LRA Section 7.5, Effects of Accidents, and update the LRA as necessary to reflect newly identified accident analyses based on industry experience or the licensee's lessons-learned.

SECTION 10: Operations, Controls, Limits, and Restrictions

- 10.1 The licensee shall use a lixiviant composed of native groundwater, with added sodium bicarbonate and/or CO₂ gas and oxygen or hydrogen peroxide, as described in the approved license application.

The licensee shall maintain an inward hydraulic gradient by maintaining a bleed in each individual

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number
SUA-1341

Docket or Reference Number
40-8502

Amendment No. 4

wellfield starting when lixiviant is first injected into the production zone and continuing until the ground water restoration stability monitoring has begun.

- 10.2 The licensee shall construct all wells in accordance with methods described in Section 3.3.2 of the approved license application.

The licensee shall perform well integrity tests on each injection and production well before the wells are utilized and on wells that have been serviced with equipment or procedures that could damage the well casing. Additionally, each well shall be retested at least once every five years. Integrity tests shall be performed in accordance with Section 3.3.2.2 of the approved license application. Any failed well casing that cannot be repaired to pass the integrity test shall be appropriately plugged and abandoned, using procedures set out in Section 3.3.2 of the approved license application.

Mechanical integrity testing is required prior to returning to service any injection well suspected of having subsurface damage due to unusual operating conditions or unusual natural phenomenon.

- 10.3 The licensee shall establish pre-operational baseline water quality data for all production units. Baseline water quality sampling shall provide representative pre-mining ground water quality data and restoration criteria as described in the approved license application. The data shall be from wells established in the mining zone, the mining zone perimeter, the upper aquifer and the lower aquifer where present, with spacing and locations as specified in the approved license application. The data shall, at a minimum, consist of the sample analyses shown in Table 5.24 of Section 5.8.2.2 of the approved LRA, unless superseded by this license condition.

The wells used for obtaining baseline ground water quality in current and future production areas shall be established at the following minimal density:

<u>Monitored Unit</u>	<u>Density</u>
Ore Zone Monitors	All
Ore Zone Baseline (restoration)	1 well per 3 acres of pattern area
Shallow Zone Monitors	1 well per 4 acres of pattern area
Deep Zone Monitors (where zone present)	1 well per 4 acres of pattern area

Baseline ground water quality in previously approved production areas shall be the mean data values (well field average) from the following submittals:

Christensen Ranch

Unit 3 and Module 2 expansion	December 1, 1988 (Table 2)
Unit 3 expansion and Module 4A expansion	August 8, 1991 (Table 6)
Unit 2 south portion	November 27, 1992 (Table 2)
Unit 2 north portion	April 16, 1992 (Table 2)
Unit 4	April 1, 1994 (Table 6)
Unit 5	February 28, 1995 (Table 7)

Four samples shall be collected and analyzed for Assay Suite A from each monitor well to establish baseline water quality parameters including the ore zone perimeter, overlying and underlying monitor

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number
SUA-1341

Docket or Reference Number
40-8502

Amendment No. 4

wells, and mine unit baseline wells. Consecutive sampling events shall be at least 14 calendar days apart. The third and fourth sample events may be analyzed for a reduced list of parameters. The parameters that may be deleted from the third and fourth sampling events are those that are below the minimum analytical detection limits during the first and second sampling events.

- 10.4 Prior to mining in each production unit, the licensee shall collect ground water samples and establish Upper Control Limits (UCLs) in accordance with Section 5.8 of the approved license application. UCLs shall be applied to all monitor wells (with the exception of the mine unit baseline wells) in conformance with the approved license application and appropriate SOPs. The UCL parameters shall be chloride, conductivity, and total alkalinity.

UCLs for monitor wells established prior to the issuance of the Performance Based License Condition (PBLIC) in December 1996, are provided in Table 5.26 for the Irigaray site and Table 5.27 for the Christensen Ranch site in Section 5.8 of the 1998 approved license application.

- 10.5 The licensee is authorized to conduct operations at a maximum flow rate of 9000 gallons per minute, exclusive of restoration flow. Annual dried yellowcake production shall not exceed 2.5 million pounds.
- 10.6 Solution evaporation ponds A, B, C, D and E, shall have at least 2 feet of freeboard. Ponds RA and RB shall have at least 8 feet of freeboard. The 8-foot freeboard may be temporarily changed to a 2-foot freeboard in either RA or RB as long as sufficient reserve capacity is available in the overall pond system to accept the contents of one of the ponds in case of leakage. The Christensen Ranch permeate storage pond, brine ponds and filter backwash pond (if constructed) shall have at least 2 feet of freeboard.

Additionally, the licensee shall, at all times, maintain sufficient reserve capacity in the evaporation pond system to enable the transfer of the contents of a pond to other ponds. In the event of a leak and subsequent transfer of liquid, the freeboard requirements shall be suspended during the repair period.

- 10.7 All liquid effluents from process buildings and other process waste streams, with the exception of sanitary wastes, shall be returned to the process circuit, discharged to the solution evaporation ponds, or disposed of as allowed by NRC regulations.

Additionally, the licensee is authorized to dispose of process solutions, injection bleed, and restoration brine in the following wells:

Christensen Ranch DW No. 1
Christensen Ranch 18-3
Christensen Ranch DW No. 2
Christensen Ranch DW No. 3

The licensee shall maintain a record of the volumes of solution disposed in these wells and submit this information in the annual monitoring report.

- 10.8 The licensee shall maintain effluent control systems, as specified in Section 4.0 of the approved license application, with the following additions:
- A. Operations shall be suspended within 1 hour in the dry/pack area of the plant if any of the emission control equipment for the yellowcake drying or packaging areas is not operating within the ranges permitted by WDEQ Air Quality Permit No. OP-254.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**License Number
SUA-1341Docket or Reference Number
40-8502

Amendment No. 4

- B. Parameters that determine efficiency of yellowcake stack emission control must be identified and these parameters must be checked and logged hourly. If automated systems are used to satisfy the checking and logging requirements, the licensee must demonstrate in its SOPs how the automated system will meet the hourly requirement. In addition, the licensee must identify the type and locations of human interfaces (alarms, lights, and monitoring stations), how and what frequency the operability of emission control systems are tested and recorded, and, in the case of inoperability, how shutdown is initiated (manually or automatically).
- C. The furnace draft pressure shall be read and documented once per 12-hour shift, and maintained within the design specification of -0.1 to -0.5 inches of water.
- 10.9 The licensee shall use a Radiation Work Permit (RWP) for all work or non-routine maintenance jobs where the potential for significant exposure to radioactive material exists and for which no standard written operating procedure exists. All RWPs shall be accompanied by a breathing zone air sample or applicable area air sample. The RWP shall be issued by the RSO or designee, qualified by way of specialized radiation protection training, and RWPs shall include, as a minimum, the information described in Section 2.2 of Regulatory Guide 8.31, as revised.
- 10.10 The licensee shall sample particulates and radon progeny on a monthly frequency at the Irigaray and Christensen Ranch Satellite locations shown on Figures 5.2 and 5.3 of the approved license application. Additional sampling locations can be added by the licensee through the SERP.
- 10.11 If employees do not shower prior to leaving the restricted area, they shall monitor themselves with an alpha survey instrument prior to exiting in conformance with Regulatory Guide 8.30, as revised.
- 10.12 The licensee shall implement the bioassay program discussed in Regulatory Guide 8.22, Bioassay at Uranium Mills," as revised. Exceedance of the administrative or actions levels and corrective actions performed will be documented in the ALARA Audit Report.
- 10.13 All radiation monitoring, sampling, and detection equipment shall be recalibrated after each repair and as recommended by the manufacturer, or at least annually, whichever is more frequent. In addition, all radiation survey instruments shall be operationally checked with a radiation source each day when in use.
- 10.14 The licensee will analyze any material not normally associated with the uranium recovery process (e.g., scrubber solids) for compatibility (e.g., chemical and mechanical) with the uranium recovery process prior to processing that material to recover residual uranium.
- 10.15 The licensee shall conduct ground water restoration and post-restoration monitoring as described in Section 6.1 of the approved license application. The primary goal of restoration shall be to return the ground water quality, on a production-unit average, to baseline concentrations on a parameter-by-parameter basis. If the primary goal cannot be achieved, the ground water will, at a minimum, be returned to an alternate standard approved by the NRC. In submitting any license amendment application requesting review of proposed alternate concentration limits pursuant to 10 CFR 40, Appendix A, Criterion 5(B)(6), the licensee must also show that it has first made practicable efforts to restore the specified hazardous constituents to the background or maximum contaminant levels (whichever is greater).

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number
SUA-1341

Docket or Reference Number
40-8502

Amendment No. 4

The licensee shall conduct four rounds of sampling of all WDEQ-LQD Guideline 8, Assay Suite A constituents during stabilization monitoring, with each well sample being at least three months apart. The applicant shall continue the stability monitoring until the data show the most recent four consecutive samples indicate no statistically significant increasing trend for individual constituents which would lead to an exceedance above the approved target restoration values.

Changes to ground water restoration or post-restoration monitoring plans shall be submitted to the NRC for review and approval at least 2 months prior to ground water restoration in a mining unit.

The licensee shall conduct ground water restoration activities in accordance with the approved LRA. Permanent cessation of lixiviant injection in a production area would signify the licensee's intent to shift from the principal activity of uranium production to the initiation of ground water restoration and decommissioning for any particular production area. If the licensee determines that these activities are expected to exceed 24 months for any particular production area, then the licensee shall submit an alternate schedule request that meets the requirements of 10 CFR 40.42.

- 10.16 The licensee shall include the following as part of the ground water monitoring program: Annual sampling and analysis for chloride and conductivity from 5I7 and USMT Wells M-1, NM-3, M-4, SM-1, M-219, M-220, and M-221.
- 10.17 The licensee shall implement the respiratory protection program, as described in the approved LRA.
- 10.18 The licensee is hereby authorized to receive contaminated process equipment for reuse from licensed uranium recovery operators. Records of all receipts shall be maintained.
- 10.19 The licensee is hereby authorized to transfer source material to any facility licensed by NRC or an NRC Agreement State to receive source material for purposes of drying and storage. The licensee shall follow Standard Operation Procedure No. E-11 in the event of a transportation or storage accident.
- 10.20 Prior to initiating vanadium separation processing, the licensee's SERP, in accordance with License Condition 9.4 shall assess the potential safety and environmental impacts of that process. If those impacts are outside the scope of the impacts considered by NRC in the EA as part of the license renewal review, the licensee shall submit a license amendment request to NRC for review and approval.
- 10.21 The licensee shall use its SOP PBLIC-02, approved by NRC in December 1996, including the guidance for evaluating hydrologic connectivity between aquifers, in assessing the potential start up of new mine units.
- 10.22 Redried Honeymoon yellowcake shall be tested prior to shipment offsite. In addition to testing for the successful removal of organics, the licensee shall test the first Lot of redried Honeymoon yellowcake as specified below. A Lot is defined as a group of drums containing between 20,000 lbs and 50,000 lbs of yellowcake that are intended for shipment.

The licensee shall provide the following test information for the first Lot of Honeymoon redried yellowcake:

- residual organics
- information on how the optimal temperature and drying time was determined including dryer temperature profile, including (if available) minimum and maximum temperatures, time at designated temperature, and copies of temperature charts
- yellowcake product temperature, color and consistency as drummed

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number
SUA-1341

Docket or Reference Number
40-8502

Amendment No. 4

- an estimate of time the yellowcake is physically in the dryer with a technical basis for determining that estimate
- information on individual drum venting and cooling times, and drum pressurization tests conducted on site
- Samples for yellowcake chemical analysis, including results for $\text{UO}_4 \cdot 2\text{H}_2\text{O}$, amorphous UO_x , where $(3 < x \leq 3.5)$ (refer to Information Notice 1999-03, Rev. 1), and crystalline UO_3 and lower oxides, will be taken during each significant change in the dryer temperature, the speed of the dryer rake arm, or yellowcake feed rate to the dryer as recommended in RAI-2 (b) response "Recommendations for Dryer Operating Conditions" Nos. 1 - 4 (ML14192B247, ML14275A443) during the redrying of the first Lot, as the optimal drying conditions are established.

Results from the testing of the first Lot of the redried material will be submitted in writing to the NRC for review and written verification. Redried Honeymoon yellowcake shall not be shipped offsite until written verification is received from NRC headquarters staff.

[Applicable Amendment: 3]

SECTION 11: Monitoring, Recording, and Bookkeeping Requirements

- 11.1 Injection manifold pressures and flow rates shall be measured and recorded daily. During well-field operations, injection pressures shall not exceed 120 psi at the Irigaray site, and 140 psi at the Christensen Ranch site. Also, during maintenance tasks, injection pressures shall not exceed the integrity test pressures.
- 11.2 All designated monitor wells shall be sampled and tested for the UCLs established in accordance with Condition 10.4. Sampling shall be performed on the routine sampling schedule in the approved license application.

If the routine sampling results indicate an exceedance of at least two UCLs, a second sample shall be collected from that well within 48 hours and analyzed for chloride, conductivity, and total alkalinity. The well shall be placed on excursion status if the results from the second sample also exceed at least two of the established UCLs.

If the results from the second sample do not confirm the initial exceedance, a third sample shall be collected within 48 hours of receiving the results from the second sampling, and analyzed. The routine sampling shall be considered in error if the second and third samples do not confirm the initial exceedance. The well shall be placed on excursion status if the results from the second or third samples exceed at least two of the established UCLs.

Upon confirming an excursion, the licensee shall implement corrective actions, and increase the sampling frequency for the excursion indicators to weekly. Written progress reports of the excursion status shall be submitted to the NRC, in accordance with Condition 9.2, on a quarterly basis, until the excursion has been mitigated. An excursion is considered mitigated when the concentrations of at least two excursion indicators remain below the established UCLs for three consecutive samples.

- 11.3 The licensee shall conduct effluent, personnel, and environmental monitoring programs in accordance with Sections 5.7 and 5.8 of the approved license application.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number
SUA-1341

Docket or Reference Number
40-8502

Amendment No. 4

The licensee shall conduct airborne samples for natural uranium, Ra-226, Po-210, Th- 230 and Pb-210 at each in-plant air particulate sampling location at a frequency of once every 6 months for 2 years, and annually thereafter, to ensure compliance with 10 CFR 20.1204. The licensee shall also evaluate changes to plant operations to determine if more frequent radionuclide analyses are required to demonstrate compliance with 10 CFR 20.1204. The licensee may demonstrate compliance or provide alternative procedures specific to in-plant air particulate sampling to show compliance with 10 CFR 20.1204 to the NRC for review and verification within 6 months of license renewal.

The licensee shall conduct airborne samples for natural uranium, Ra-226, Po-210, and Pb-210 at each Christensen Ranch environmental monitoring location at a frequency of once every 6 months for 2 years, and annually thereafter, to ensure compliance with 10 CFR 20.1301. The licensee shall also evaluate changes to plant operations to determine if more frequent radionuclide analyses are required to demonstrate compliance with 10 CFR Part 20.1301. The licensee may demonstrate compliance or provide alternative procedures specific to environmental monitoring for natural uranium, Ra-226, Po-210, and Pb-210 to show compliance with 10 CFR 20.1301 to the NRC for review and verification within 6 months of license renewal.

The licensee shall describe how the environmental monitoring program demonstrates that 10 CFR Part 20 public dose limits in controlled and unrestricted areas are met. The documentation of the areas designated as restricted, controlled and unrestricted areas and the environmental monitoring station locations shall be updated periodically, as needed.

The licensee shall provide the following information for the airborne effluent and environmental monitoring program in which it shall develop written procedures, that shall be submitted to NRC for verification prior to implementation, to:

- a. Discuss, in accordance with 10 CFR 40.65, how the quantity of the principal radionuclides from all point and diffuse sources will be accounted for, and verified by, surveys and/or monitoring.
- b. Evaluate, consistent with 10 CFR 20.1301 and 10 CFR 20.1302, the highest exposures likely for member(s) of the public from licensee operations.
- c. Discuss how radon progeny (radon-222) will be factored into the determination of potential public dose from the licensee's operations consistent with 10 CFR Part 20, Appendix B, Table 2.
- d. Discuss, in accordance with 10 CFR Part 20.1501, how the occupational dose (gaseous and particulate) received throughout the entire license area from licensee operations will be accounted for, and verified by surveys and/or monitoring.

- 11.4 The licensee shall perform and document weekly visual inspections of the Irigaray and Christensen Ranch Satellite evaporation pond embankments, fences and liners, as well as measurements of pond freeboard and checks of the leak detection system. Any time 6 vertical inches or more of fluid is detected in the leak detection system standpipes, it shall be analyzed for chloride, conductivity, pH and uranium. If analyses indicate that the pond is leaking, the licensee shall lower the pond fluid level by transferring its contents to an alternate cell, and undertake repairs, as needed. If standpipe water exists, quality samples shall be analyzed for the above parameters weekly during the leak period and for at least 2 weeks following repairs.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number
SUA-1341

Docket or Reference Number
40-8502

Amendment No. 4

- 11.5 The licensee shall conduct the weekly in-plant inspection and audit programs described in Section 5.3 of the approved license application. In addition, the RSO or designee shall document a daily walk-through of the Irigaray and Christensen Ranch Satellite facilities to determine that radiation control practices are being implemented appropriately.
- 11.6 The results of the following activities, operations, or actions shall be documented: sampling, analyses, surveys and monitoring, survey/monitoring equipment calibration, results of reports on audits and inspections, all meetings and training courses required by this license; and any subsequent reviews, investigations and corrective actions. Unless otherwise specified in the NRC regulations, all such documentation shall be maintained for a period of at least five (5) years.
- 11.7 The licensee shall monitor for external exposure in accordance with 10 CFR 20.1502(a)(1), and Section 5.7.2 of the approved license application. The licensee shall monitor for internal exposure in accordance with 10 CFR 20.1502(b)(1) and Section 5.7.3 of the approved license application.
- The licensee shall conduct surveys in accordance with 10 CFR 20.1501 in header houses to evaluate the magnitude and extent of radiation levels and to determine potential radiological hazards present.
- 11.8 The licensee shall identify the location of any new ground water wells or new use of existing wells, where the information is publicly available and/or known to the licensee, that are located within the license area and within 2 kilometers of any production area monitoring ring wells. The licensee shall also report publicly available information such as well depth, screen depth and estimated pumping rate. The licensee shall evaluate the impact of ISR operations on ground water wells and recommend any additional monitoring or other measures to protect ground water users. The evaluation shall be submitted as part of the annual reporting to the NRC.
- 11.9 The licensee shall provide for NRC review the surface contamination detection capability (minimum detectable concentration (MDC)) for radiation survey instruments, including scan MDC for portable instruments, used for contamination surveys to release equipment and materials for unrestricted use and for personnel contamination surveys. The detection capability in the scanning mode for the alpha and beta radiation expected shall be provided in terms of disintegrations per minute per 100 cm².
- The licensee shall revise the applicable radiation safety training program to specify when alpha and beta contamination surveys are required to be conducted for personnel, equipment, and materials leaving a restricted area.

SECTION 12. Reporting Requirements

- 12.1 Effluent and environmental monitoring program results provided in the semi-annual report and in accordance with 10 CFR 40.65, "Effluent monitoring reporting requirements," shall be reported in the format shown in Table 3 of Regulatory Guide 4.14, (Rev. 1) entitled, "Sample Format for Reporting Monitoring Data." The report shall also include injection rates, recovery rates and injection manifold pressure, status of well fields in operation (including last date of lixiviant injection), status of well fields in restoration and restoration progress, status of any long term excursions, and a summary of mechanical integrity tests during the reporting period.
- 12.2 Spill, Leak, Excursion, and Incident/Event Reporting

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**License Number
SUA-1341Docket or Reference Number
40-8502

Amendment No. 4

Until license termination, the licensee shall maintain documentation of unplanned releases of source or AEA 11e.(2) byproduct materials (including extraction solutions) and process chemicals. Documented information shall include, but not be limited to: date, volume, total activity of each radionuclide released, radiological survey results, soil sample results (if taken), corrective actions, results of post remediation surveys (if taken), and a map showing the spill/event location and the impacted area.

The licensee shall have procedures which will evaluate the consequences of the spill or incident/event against 10 CFR 20, Subpart M and 10 CFR 40.60 reporting criteria. If the criteria are met, the licensee must report this information to the NRC Operations Center as required.

If the licensee is required to report any spills, leaks, or excursions of source, AEA 11e.(2) byproduct material, or process chemicals because of impact on the environment, or to report any other incidents/events to State or Federal agencies, a report shall be made to the Region IV Branch Chief for Uranium Recovery Inspection and the NRC Project Manager, by telephone or electronic mail, within 48 hours. This notification shall be followed, within 30 days of the notification, by submittal of a written report, according to Condition 9.2, detailing the conditions leading to the release or incident/event, corrective actions taken, and results achieved.

- 12.3 An annual report will be submitted to the NRC in accordance with License Condition 9.2, that includes the ALARA audit report, land use survey, monitoring data, and the SERP information required under License Condition 9.4(d). The report shall include a summary of the daily walk-through inspections.

FOR THE NUCLEAR REGULATORY COMMISSION

Date: 08/20/2015/RA/

Andrew Persinko, Deputy Director
Division of Decommissioning, Uranium Recovery,
and Waste Programs
Office of Nuclear Material Safety
and Safeguards