NRC FORM 374

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, 51, 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. Crow Butte Resources, Inc.	3. License Number SUA-1534, Amendment No. 4
2. 550 N. Poplar Casper , WY 82601	4. Expiration Date November 5, 2024
	5. Docket No. 40-8943 Reference No.

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
a. Natural Uranium b. Byproduct material as defined in 10 CFR 40.4	Any Unspecified	a. Unlimited b. Quantity generated under Operations authorized by this license

9. Administrative Conditions (Crow Butte Project and Marsland Expansion Area)

9.1 Authorized places of use shall be:

1) The licensee's Crow Butte Project uranium recovery and processing facility located in Dawes County, Nebraska. The licensee shall conduct operations within the license boundaries shown in Figure 1.7-2 of the license renewal application dated November 27, 2007 (Agencywide Documents Access and Management System (ADAMS) package ML073480264), and

2) The Marsland Expansion Area (MEA) located in Dawes County, Nebraska. The licensee shall conduct operations within the license boundaries shown in Figure 1.7-5 of the MEA license amendment application dated November 12, 2015 (ADAMS package ML15328A422).

[Applicable amendment: 3]

9.2 The licensee shall conduct operations in accordance with the commitments, representations, and statements contained in the respective license application submittals, for each facility, which are hereby incorporated by reference. These submittals include the following:

Crow Butte Project Application dated November 27, 2007 (ADAMS package ML073480264), as supplemented by submittals dated August 28, 2008 (ML082410902), May 12, 2009 (ML091470116), July 13, 2009 (ML091980473), September 17, 2010 (ML102640195), September 28, 2010 (ML102740030), February 8, 2012 (ML120450518), April 19, 2012 (ML121170487), August 16, 2012 (ML12235A355), August 30, 2012 (ML12250A421), October 4, 2012 (ML12285A075), March 4, 2014

(ML14064A143), May 15, 2014 (ML14135A414), August 13, 2014 (ML14247A155), April 2, 2015 (ML15097A140), March 20, 2017 (ML17080A486), October 31, 2017 (ML17313A803), and the commitments submitted for verification listed below.

Marsland Expansion Area Technical Report submittal dated November 12, 2015 (ADAMS package ML15328A422), as supplemented by submittals dated May 20, 2016 (ML16155A283), June 27, 2017 (ML17193A311), August 31, 2017 (ML17251A260), October 26, 2017 (ML17300A227), October 31, 2017 (ML17313A803), and November 8, 2017 (ML17319A211).

Verification submittals:

Airborne Effluent and Environmental Monitoring Program -

January 2, 2015 (ML15009A031), June 30, 2015 (ML15217A332), September 21, 2015 (ML15310A373), November 24, 2015 (ML15335A040) and December 4, 2015 (ML15341A030)

Operational Soil Sampling Program -

May 11, 2015 (ML15146A026)

Wellfield Decommissioning Plan, Additional Details -

December 19, 2014 (ML14364A228), September 14, 2015 (ML15266A187), September 25, 2015 (ML15279A075)

The approved application, supplements, and information submitted for verification are hereby incorporated by reference, except where superseded by license conditions below.

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

[Applicable amendments: 2, 3]

9.3 All written notices and reports sent to the U.S. Nuclear Regulatory Commission (NRC) as required under this license and by regulation shall be addressed as follows: 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, Mail Stop T-5A10, 11545 Rockville Pike, Two White Flint North, Rockville, MD 20852-2738. Incidents and events that require telephone notification shall be made to the NRC Operations Center at (301) 816-5100 (collect calls accepted).

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 (B) of this condition:

i. Make changes in the facility as described in the license application (as updated);

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 facility 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 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 impact statement (EIS), environmental assessment (EA) or technical evaluation reports (TERs) or other analyses and evaluations for license amendments.

viii. 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 EIS and supplements and amendments thereof.

C) Additionally, the licensee must obtain a license amendment unless the 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 facility SER, TER, and EIS or EA. This would include all supplements and amendments, and TERs, EAs, EISs issued with amendments to this license.

D) The licensee's determinations concerning (B) and (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 (B) of this condition. The licensee shall furnish, in an annual report to the NRC, a description of such changes, tests, or experiments, including a summary of the safety and environmental evaluation of each. In addition, the licensee shall annually submit to the NRC changed pages, 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 Financial Assurance. The licensee shall maintain an NRC-approved financial surety arrangement, consistent with 10 CFR Part 40, Appendix A, Criterion 9, adequate to cover the estimated costs, if accomplished by a third party, for decommissioning and decontamination, which includes offsite disposal of radioactive solid process or evaporation pond residues, and ground water restoration as warranted. The surety shall also include the estimated costs associated with all soil and water sampling analyses necessary to confirm the accomplishment of decontamination.

Proposed annual updates to the financial assurance amount, consistent with 10 CFR Part 40, Appendix A, Criterion 9, shall be provided to the NRC by October 1 of each year. If the NRC has not approved a proposed revision 30 days prior to the expiration date of the existing financial assurance arrangement, the licensee shall extend the existing arrangement, prior to expiration, for one year. Along with each proposed revision or annual update of the financial assurance estimate, 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 the estimated costs for site closure.

Within 90 days of NRC approval of a revised closure (decommissioning) plan and its cost estimate, the licensee shall submit, for NRC review and approval, a proposed revision to the financial assurance arrangement if estimated costs exceed the amount covered in the existing arrangement. The revised financial assurance instrument shall then be in effect within 30 days of written NRC approval of the documents.

At least 90 days prior to beginning construction associated with any planned expansion or operational change that was not included in the annual financial assurance update, the licensee shall provide, for NRC approval, an updated estimate to cover the expansion or change. The licensee shall also provide the NRC with copies of financial assurance-related correspondence submitted to the State of Nebraska, a copy of the State's financial assurance review, and the final approved financial assurance arrangement. The licensee also must ensure that the financial assurance instrument,

where authorized to be held by the State, identifies the NRC-related portion of the instrument and covers the aboveground decommissioning and decontamination, the cost of offsite disposal of solid byproduct material, 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. Reclamation or decommissioning plan cost estimates and annual updates should follow the outline in Appendix C to NUREG-1569 (NRC, 2003), entitled "Recommended Outline for Site-Specific In Situ Leach Facility Reclamation and Stabilization Cost Estimates."

Crow Butte Resources, Inc., shall continuously maintain an approved surety instrument for the Crow Butte Project, in favor of the State of Nebraska in the amount of no less than $47,740,447 for the purpose of complying with 10 CFR Part 40, Appendix A, Criterion 9, until a replacement is authorized by both the State of Nebraska and NRC.

9.6 Release of surficially contaminated equipment, materials, or packages for unrestricted use 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," (the Guidelines) dated April 1993 (ADAMS Accession No. ML003745526), or in accordance with a suitable alternative program which shall be approved by NRC prior to any such release.

The Guidelines or approved alternative program shall also apply to the removal of equipment, materials, or packages from restricted areas that have the potential for accessible surface contamination levels above background regardless of the intent to release these items for unrestricted use. The licensee shall document their surveys of equipment, materials, or packages prior to removing them from a restricted area.

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

Personnel performing these contamination surveys for items released for unrestricted use or from restricted areas shall meet the qualifications for health physics technicians or radiation safety officer as defined in Regulatory Guide 8.31, except as provided in an alternative program submitted under one of the last two paragraphs of this license condition. Personal effects (e.g., notebooks and flash lights) which are hand carried need not be surveyed by personnel meeting the above qualifications, but these items should be subjected to the same survey requirements as the individual possessing the items.

For release to unrestricted areas, the licensee may provide an alternative program for releasing equipment, materials, or packages that have the potential for accessible surface contamination levels above background (i.e., “controlled release”) to the NRC headquarters staff for review and written verification. The alternative program for controlled release shall demonstrate how the licensee will maintain radiological controls over the equipment, materials, or packages that have the potential for accessible surface contamination levels above background until they have been released for unrestricted use as specified in the first paragraph above, and shall describe the methods that will be used to limit the spread of contamination to unrestricted areas. An alternative program proposed under this paragraph shall not be implemented without written verification from NRC headquarters staff.

For releases with a final destination to one of the licensee's restricted areas, whether through an unrestricted area or not, the licensee may, as part of an alternative program, identify one or more qualified designees to perform the surveys associated with releasing equipment, materials, or packages that have the potential for accessible surface contamination levels above background. The qualified designees shall have completed education, training, and experience, in addition to general radiation worker training as specified by the licensee. The licensee must submit the education, training, and experience requirements for qualified designees to the NRC headquarters staff for review and written verification, and must receive written verification of those requirements prior to allowing qualified designees to perform these surveys.

9.7 The licensee shall follow the guidance set forth in NRC Regulatory Guides 8.22, "Bioassay at Uranium Mills" (as revised), and 8.30, "Health Physics Surveys in Uranium Recovery Facilities" (as revised), or NRC-approved equivalent.

The licensee shall follow the guidance set forth in Regulatory Guide 8.31, "Information Relevant to Ensuring That Occupational Radiation Exposures at Uranium Recovery Facilities Will Be as Low as Is Reasonably Achievable" (as revised), or NRC approved equivalent, with the following exception:

> The licensee may identify one or more qualified designees to perform daily inspections in the occasional absence of the radiation safety officer (RSO) and health physics technicians (HPTs). A qualified designee will meet the minimum qualifications and perform only those duties as outlined for a qualified Designated Operator as specified in the licensee's submittals dated March 4, 2014 (ML14064A143) and May 15, 2014 (ML14135A414).
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> A qualified designee may perform daily inspections on weekends, holidays, and times when both the RSO and HPTs must both be absent (e.g., illness or offsite training). With the exceptions of those instances when a Federal holiday falls on a Friday or Monday, the Thanksgiving holiday, or a site closure due to weather or other safety or security related event, qualified designees will not conduct the daily inspections for more than a total of two days per week. When a Federal holiday falls on a Friday or Monday, qualified designees may perform the daily inspections for a total of three consecutive days. For the Thanksgiving holiday only, qualified designees may perform the daily inspections for a total of four consecutive days. When weather or other safety or security related event causes a site closure, a qualified designee, if available, will continue performing the daily inspections until the RSO or HPT can access the site after such an event. The licensee will also have the RSO or HPT available by telephone while a qualified designee is performing the daily inspections.
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> Reports generated by a qualified designee will be reviewed by the RSO or an HPT as soon as practicable, but not later than the close of business of the next work day following an absence (including site closure due to weather or other safety or security related event), weekend, or holiday. The RSO or HPT review shall be annotated with date and time on the report or other document that can be inspected upon request.

9.8 Cultural Resources. Before engaging in any developmental activity not previously assessed by the NRC, the licensee shall administer a cultural resource inventory if such survey has not been

previously conducted and submitted to the NRC. All disturbances associated with the proposed development will be completed in compliance with the National Historic Preservation Act (as amended) and its implementing regulations (36 CFR Part 800), and the Archaeological Resources Protection Act (as amended) and its implementing regulations (43 CFR Part 7) to the extent applicable.

In order 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 of the area shall occur until the licensee has received authorization from the NRC to proceed.

Prior to any development activity in the immediate vicinity of the six "potentially eligible" sites identified in Section 2.4 of the approved Crow Butte Project license application, the licensee shall provide documentation of its coordination with the Nebraska State Historical Society to NRC.

9.9 The licensee shall dispose of solid byproduct material from the Crow Butte Project and the MEA at a site that is authorized by NRC or an NRC Agreement State to receive byproduct material. A copy of the licensee's approved solid byproduct material disposal agreement must be maintained at both the Crow Butte Project and the MEA. If the agreement expires or is terminated, the licensee shall notify the NRC within seven working days after the date of expiration or termination, and shall submit a new agreement to the NRC within 90 days after expiration or termination. If the licensee does not submit a new agreement within 90 days, the licensee will be prohibited from further lixiviant injection until the licensee submits the new agreement to the NRC.

[Applicable amendment: 3]

9.10 The results of the following activities, operations, or actions shall be documented: sampling; analyses; surveys or monitoring; survey/monitoring equipment calibrations; reports on audits and inspections; all meetings and training courses; and any subsequent reviews, investigations, or corrective actions required by NRC regulation or this license. Unless otherwise specified in a license condition or applicable NRC regulation, all documentation required by this license shall be maintained until license termination, and is subject to NRC review and inspection.

9.11 The licensee is hereby exempted from the requirements of 10 CFR 20.1902(e) for areas within the Crow Butte Project and the MEA, provided that all entrances to each facility are conspicuously posted with the words "CAUTION: ANY AREA WITHIN THIS FACILITY MAY CONTAIN RADIOACTIVE MATERIAL."

9.12 [Deleted by Amendment 2]

9.13 Protection of Listed Species under the Endangered Species Act (ESA). In correspondence with the NRC during ESA Section 7 consultation (ADAMS Accession No. ML18078A057), the U.S. Fish and Wildlife Service indicated that the measures listed below are required for concurrence with the NRC's effects determinations in the Biological Evaluation for the MEA (ADAMS Accession No. ML18100A229).

The licensee shall comply with the following measures related to protection of threatened or endangered species at the MEA:

A) During the mating season for the northern long eared bat (June 1 to July 31 annually), the licensee shall avoid tree clearing activities.

B) If construction or decommissioning activities are taking place during the annual spring (March 6 to April 29) or fall (October 9 to November 15) migration seasons for the whooping crane, the licensee shall perform daily whooping crane surveys, following the protocol contained in Appendix C of the Biological Evaluation (ADAMS Accession No. ML18100A229). During those periods, if whooping cranes are spotted within 0.5 mile of areas where construction or decommissioning activities are taking place, work must cease until the birds move on, and the licensee must inform the NRC project manager by email within 24 hours of a sighting.

[Applicable amendment: 3]

10. Operations, Controls, Limits, and Restrictions

10.1 Standard Conditions (Crow Butte Project and Marsland Expansion Area)

10.1.1 The licensee shall use a lixiviant composed of native ground water, with added sodium carbonate/bicarbonate, carbon dioxide, oxygen and/or hydrogen peroxide, as described in the approved license application.

[Applicable amendment: 3]

10.1.2 The licensee shall ensure that written standard operating procedures (SOPs) exist that address: (1) all operational activities involving radioactive and non-radioactive materials associated with licensed activities that are handled, processed, stored, or transported by employees; (2) all non-operational activities involving radioactive materials including in-plant radiation protection and environmental monitoring; and (3) emergency procedures for potential accident/unusual occurrences including significant equipment or facility damage, pipe breaks and spills, loss or theft of yellowcake or sealed sources, significant fires, and other natural disasters. The SOPs shall include appropriate radiation safety practices to be followed in accordance with 10 CFR Part 20 SOPs for operational activities shall enumerate pertinent radiation safety practices to be followed. A copy of the current written procedures shall be kept in the area(s) of the production facility where they are utilized.

[Applicable amendment: 3]

10.1.3 Production zone monitor wells drilled after April 1999 shall be spaced no greater than 300 feet from a wellfield unit and no greater than 400 feet between the wells.

[Applicable amendment: 3]

10.1.4 Mechanical Integrity Tests. The licensee shall construct all wells in accordance with methods described in Section 3.1.2 of the approved license applications. Mechanical integrity tests shall be performed 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 each five (5) years it is in use. The integrity test shall pressurize the well to 125 pounds per square inch and shall maintain 90 percent of this pressure for 20 minutes to pass the test. A single point resistance test may be used only in conjunction with another approved well integrity testing method. If any well casing failing the integrity test cannot be repaired, the well shall be plugged and abandoned.

[Applicable amendment: 3]

10.1.5 Ground Water Restoration. The licensee shall conduct ground water restoration activities in accordance with the approved license applications. Permanent cessation of lixiviant injection in a well field would signify the licensee's intent to shift from the principal activity of uranium production to the initiation of ground water restoration. Prior to initiation of ground water restoration activities, the licensee shall determine the restoration schedule. If the licensee determines that these activities are expected to exceed 24 months, then the licensee shall submit an alternate schedule request that meets the requirements of 10 CFR 40.42.

Restoration Standards. Hazardous constituents in the ground water shall be restored to the numerical ground water protection standards as required by 10 CFR Part 40, Appendix A, Criterion 5B(5). In submitting any license amendment application requesting review of proposed alternate concentration limits (ACLs) pursuant to Criterion 5B(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).

Restoration Stability Monitoring. The licensee shall conduct sampling of all constituents of concern on a quarter year basis during restoration stability monitoring. The sampling shall include the specified ore zone aquifer wells. The applicant shall continue the stability monitoring until the data show the most recent four consecutive quarters indicate no statistically significant increasing trend for all constituents of concern which would lead to an exceedance above the respective Criterion 5B(5) standard.

Changes to ground water restoration or post-restoration monitoring plans shall be submitted to the NRC for review and approval at least 60 days prior to ground water restoration in a well field.

[Applicable amendment: 3]

10.1.6 The licensee shall maintain an overall inward hydraulic gradient within the perimeter monitor well ring starting when lixiviant is first injected into the production zone and continuing until the initiation of the stabilization period.

[Applicable amendment: 3]

10.1.7 The licensee shall conduct isotopic analyses for alpha- and beta-emitting radionuclides on airborne samples at each in-plant air particulate sampling location at a frequency of once every six months for the first two years and annually thereafter to ensure compliance with 10 CFR 20.1204(g). For any changes to operations, the licensee shall conduct an evaluation to determine if more frequent isotopic analyses are required for compliance with 10 CFR 20.1204(g).

The licensee is exempted from the requirement of 10 CFR 20.1204(g)(1) to use the total activity of a mixture of radionuclides in air in demonstrating compliance with the dose limits in 10 CFR 20.1201 as follows: the licensee may disregard the activities of thorium-234, lead-210, and bismuth-210, when assessing internal exposure for the purpose of demonstrating compliance with the dose limits in 10 CFR 20.1201 provided that the most recent results of periodic isotopic analyses of airborne samples, whether required by this license condition or for any other purpose, show that thorium-234, lead-210, and bismuth-210 (Class W) are individually present at less than 1 percent of their derived air concentration in Table 1 of Appendix B to 10 CFR Part 20.

[Applicable amendments: 1, 3]

10.1.8 Uranium compounds that have no assigned inhalation classification, or for which no site-specific data is available, such as uranium carbonates, shall be assigned to inhalation class W for radiation protection purposes.

[Applicable amendment: 3]

10.1.9 If hydrogen sulfide is used, the storage and handling procedures to prevent impacts to radiological and worker safety shall be provided to the NRC for review and approval.

[Applicable amendment: 3]

10.1.10 The licensee shall submit a detailed decommissioning plan to NRC for review and approval at least 12 months prior to the planned final shutdown of mine unit extraction operations.

[Applicable amendment: 3]

10.1.11 (formerly 10.12) [Deleted by Amendment 1]

10.1.12 Flow rates on each injection and recovery well, and manifold pressures on the entire system, shall be monitored and recorded daily. During well field operations, injection pressures shall not exceed 100 pounds per square inch at the injection well heads.

[Applicable amendment: 3]

10.2 Crow Butte Project

10.2.1 Emission Controls (Dryer). The licensee shall maintain effluent control systems as specified in Sections 4.1 and 5.8.1 of the approved license application, with the following exceptions:

A) If any of the yellowcake emission control equipment fails to operate within specifications set forth in the standard operating procedures, the drying and packaging room shall immediately be closed-in as an airborne radiation area and heating operations shall be switched to cooldown, or packaging operations shall be temporarily suspended. Packaging operations shall not be resumed until the vacuum system is operational to draw air into the system.

B) The licensee shall, during all periods of yellowcake drying operations, assure that the negative pressure specified in the standard operating procedures for the dryer heating chamber is maintained. This shall be accomplished by: (1) performing and documenting checks of air pressure differential approximately every four hours during operation; or (2) installing instrumentation which will signal an audible alarm if the water flow or air pressure differential falls below the recommended levels. If an audible alarm is used, its operation shall be checked and documented at the beginning and end of each drying cycle when the differential pressure is lowered.

10.2.2 The restoration schedule for Mine Units 2 through 6 shall be as described in the request dated April 3, 2018 (ADAMS Accession No. ML18102A539) and July 3, 2018 (ADAMS Accession No. ML18191B238) and as approved in NRC staff's letter dated December 14, 2018 (ADAMS Accession No. ML18268A211).

[Applicable amendment: 4]

10.2.3 Facility Throughput. The plant throughput shall not exceed a maximum flow rate of 9000 gallons per minute, excluding restoration flow. Annual yellowcake production shall not exceed 2 million pounds.

10.2.4 (formerly 10.15) [Deleted by Amendment 3]

10.2.5 Each of the research and development (R&D) evaporation ponds shall have at least 0.9 meters (3 feet) of freeboard. Each of the commercial solar evaporation ponds shall have at least 1.5 meters (5 feet) of freeboard. The licensee shall maintain at all times, except for the circumstances noted below, sufficient reserve capacity in the evaporation pond system to enable transferring the contents of a pond to the other ponds.

Liner Repair

In the event of a leak and subsequent transfer of liquid, freeboard requirements shall be suspended during the repair period.

Liner Replacement

In the event of a liner replacement, sufficient reserve capacity in the evaporation pond system to enable transferring the contents of a pond to the other ponds shall be suspended until the pond is returned to operation. The freeboard requirements shall not be suspended during this period.

Liner Repair and Liner Replacement

In the event a liner replacement and a liner repair becomes necessary at the same time, sufficient reserve capacity in the evaporation pond system to enable transferring the contents of a pond to the other ponds shall be suspended until the liner replacement is complete. The freeboard requirements shall be suspended only during the liner repair period.

[Applicable amendment: 2]

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10.2.6 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 solar evaporation ponds; disposed by land irrigation in accordance with the licensee's proposal submitted on August 3, 1988, as modified by its submittal on June 7, 1993; or deep well injected in accordance with the licensee's report submitted on August 24, 1993, as modified by submittals dated December 7, 1995, April 3, 1996, and September 12, 2000.

10.2.7 The licensee shall maintain an area within the restricted area boundary for temporary storage of contaminated materials. All contaminated wastes and evaporation pond residues shall be disposed at a radioactive waste disposal site licensed to accept 11e.(2) byproduct material.

10.2.8 The licensee shall construct solar evaporation ponds 2 and 5 in accordance with the engineering design report dated April 27, 1988, as modified by the submittals dated May 11, and July 16, 1992. In addition, the ponds shall be constructed as follows:

A) Fill material shall be classified as a silty sand material in accordance with the Unified Soil Classification System.

B) Quality control of the fill shall be performed in accordance with the guidance provided for radon barrier materials in the NRC "Staff Technical Position on Testing and Inspection Plans during Construction of DOE's Remedial Action at Inactive Uranium Mill Tailing Sites" (January 1989).

C) As-built drawings of the constructed ponds shall be-submitted to NRC within 3 months of the completion of construction of each pond.

10.3 Marsland Expansion Area

10.3.1 The applicant shall minimize potential damage to infrastructure from peak flows by avoiding well installation within 100-year flood plains and areas of moderate to high risk of erosion and concentrated water flow during storm runoff. If the installation of wells in such locations cannot be avoided, adequate wellhead protection will be required to protect the wells during flood conditions. Prior to such installation, a description of wellhead protection measures that will be used to protect the wells during flood conditions shall be submitted to the NRC for review and written verification.

[Applicable amendment: 3]

10.3.2 The licensee shall not construct a wellfield using either a staggered line drive or direct line drive design. (i.e., one line or multiple parallel lines of production wells with a line of injections wells located on either side of and parallel to each line of production wells).

[Applicable amendment: 3]

10.3.3 The MEA satellite building throughput shall not exceed a maximum flow rate of 5,400 gallons per minute, excluding restoration flow.

[Applicable amendment: 3]

10.3.4 Prior to commencing injection of lixiviant in the first wellfield at the MEA, the licensee shall obtain and submit to the NRC a copy of the Nebraska Department of Environmental Quality Underground Injection Control (UIC) permit authorizing construction of a minimum of two UIC deep disposal wells. The licensee shall ensure that the deep disposal wells have enough combined capacity to handle the disposal of the total liquid effluent generation at the MEA from both production and restoration phases of operation. Prior to constructing a land application system or surge/solar evaporation ponds for liquid waste disposal at the MEA, the licensee must request and obtain a license amendment allowing the construction and use of such a system at the MEA.

[Applicable amendment: 3]

11. Monitoring, Recording, and Bookkeeping Requirements

11.1 Standard Conditions (Crow Butte Project and Marsland Expansion Area)

11.1.1 In addition to reports required to be submitted to NRC or maintained on-site by Title 10 of the Code of Federal Regulations, the licensee shall prepare the following reports related to operations at the facility:

A) A quarterly report that includes a summary of the weekly excursion indicator parameter values, corrective actions taken, and the results obtained for all wells that were on excursion status during that quarter. This report shall be submitted to NRC within 60 days following completion of the reporting period.

B) A semi-annual report that discusses: status of well fields in operation (including last date of lixiviant injection), progress of well fields in restoration, status of any long term excursions and a summary of MITs during the reporting period. This report shall be submitted to NRC within 60 days following completion of the reporting period.

C) Quarterly report summarizing daily flow rates for each injection and production well and injection manifold pressures on the entire system. This report shall be made available for inspection upon request.

D) Consistent with Regulatory Position 2 of Regulatory Guide 4.14, a semiannual report that summarizes the results of the operational effluent and environmental monitoring program. The licensee shall submit this report consistent with the terms of Regulatory Guide 4.14.

[Applicable amendment: 3]

11.1.2 The licensee shall submit the results of the annual review of the radiation protection program content and implementation performed in accordance with 10 CFR 20.1101(c). These results shall include an analysis of dose to individual members of the public consistent with 10 CFR 20.1301 and 10 CFR 20.1302 and a land use survey.

[Applicable amendment: 3]

11.1.3 Establishment of Background Water Quality. Prior to injection of lixiviant for each mine unit, the licensee shall establish background ground water quality data for the ore zone and overlying aquifers. The background water quality will be used to define the background ground water protection standards required to be met in 10 CFR Part 40, Appendix A, Criterion 5B(5), for the ore zone aquifer and surrounding aquifers. Water quality sampling shall provide representative background ground water quality data and restoration criteria as described in Sections 5.8.8 and 6.1.3 of the approved Crow Butte Project license application and Sections 5.7.9 and 6.1.3 of the approved Marsland Expansion Area license application.

The data shall consist, at a minimum, of the following sampling and analyses:

A) Four samples shall be collected from production and injection wells at a minimum density of one production or injection well per four acres. These samples shall be collected at least 14 days apart.

B) Four samples shall be collected from each designated monitoring well at a minimum density of: 1) one upper aquifer monitoring well per five acres of mine unit area, and 2) all perimeter monitoring wells. These samples shall be collected at least 14 days apart. The results of these analyses shall constitute the baseline for each designated well.

C) The samples shall be analyzed for ammonia, arsenic, barium, cadmium, calcium, chloride, copper, fluoride, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, nitrate, pH, potassium, radium-226, selenium, sodium, sulfate, total carbonate, total dissolved solids, uranium, vanadium, zinc, and gross alpha.

D) Prior to operation of a mine unit, representative background concentrations shall be established on a parameter-by-parameter basis using either the mine unit or well-specific mean value or other NRC-approved statistically valid analysis.

[Applicable amendment: 3]

11.1.4 Establishment of UCLs. The licensee shall establish upper control limits (UCLs) in designated upper aquifer and perimeter monitoring wells before lixiviant is injected in each mine unit. The UCLs shall be established by collecting and analyzing groundwater samples from those designated wells according to the following criteria:

A) Four samples shall be collected from each designated monitoring well at a minimum density of: 1) one upper aquifer monitoring well per five acres of mine unit area, and 2) all perimeter monitoring wells. These samples shall be collected at least 14 days apart.

B) The samples shall be analyzed for the following indicator parameters: chloride, conductivity, and total alkalinity.

C) The UCLs shall be calculated for each indicator parameter, in each monitoring well, as equal to 20 percent above the maximum concentration measured for that parameter, among the four baseline samples. For those indicator parameters with baseline concentrations that average 50 mg/L or less, the UCL for that parameter may be calculated as equal to 20 percent above the

maximum baseline concentration, the baseline average plus five standard deviations, or the baseline average plus 15 mg/L.

[Applicable amendment: 3]

11.1.5 Excursion Monitoring. All designated perimeter and upper aquifer monitor wells shall be sampled and tested no more than 14 days apart, except in the event of the situations identified in the licensee's submittal dated March 19, 1998. If a designated monitor well is not sampled within 14 days of a previous sampling event, the reasons for the postponement of sampling shall be documented. Sampling shall not be postponed for greater than five days.

If two UCLs are exceeded in a well, or if a single UCL is exceeded by 20 percent, the licensee shall take a confirming water sample within 48 hours after the results of the first analyses are received and analyze the sample for the indicator parameters. If the second sample does not indicate an exceedance, a third sample shall be taken and analyzed in a similar manner within 48 hours after the second sample was acquired. If neither the second nor the third sample indicates an exceedance, the first sample shall be considered in error.

If either the second or third sample confirms that a UCL(s) has been exceeded, the well in question shall be placed on excursion status. Upon confirmation of an excursion, the licensee shall notify NRC in accordance with LC 11.1.6, as discussed below, implement corrective action, and increase the sampling frequency for the indicator parameters at the excursion well to once every seven (7) days. Corrective actions for confirmed excursions may be, but are not limited to, those described in Section 5.8.8 of the approved license application. An excursion is considered concluded when the concentrations of the indicator parameters are below the concentration levels defining an excursion for three (3) consecutive weekly samples.

For all mine units, if an excursion is not corrected within 60 days of confirmation, the licensee shall either: (a) terminate injection of lixiviant within the affected area of the mine unit containing the excursion until the excursion is corrected; or (b) increase the surety in an amount to cover the full third-party cost of correcting and cleaning up the excursion. The surety increase shall remain in force until the NRC has verified that the excursion has been corrected and cleaned up. The written 60-day excursion report shall identify which course of action the licensee is taking. Under no circumstances does this condition eliminate the requirement that the licensee must remediate the excursion to meet ground water protection standards as required by LC 10.1.5 for all constituents established per LC 11.1.3.

The licensee shall notify the NRC Project Manager (PM) by telephone or email within 24 hrs of confirming a lixiviant excursion, and by letter within 7 days from the time the excursion is confirmed, pursuant to LC 11.1.6. A written report describing the excursion event, corrective actions taken, and the corrective action results shall be submitted to the NRC within 60 days of the excursion confirmation. For all wells that remain on excursion after 60 days, the licensee shall submit a report as discussed in LC 11.1.1(A).

[Applicable amendment: 3]

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

The licensee shall have written procedures for evaluating consequences of the spill or incident/event against 10 CFR Part 20, Subpart M, and 10 CFR 40.60 reporting criteria. If the reporting criteria are met, the licensee shall report the spill or incident/event to the NRC Operations Center as required.

If the licensee is required to report any well field excursions and spills of source, byproduct material, and process chemicals that may have an impact on the environment, or any other incidents/events, to any State or other Federal agency, a report shall be made to the NRC Headquarters Project Manager by telephone or electronic mail (e-mail) within 24 hours. This notification shall be followed, within 30 days of the notification, by submittal of a written report to NRC Headquarters, as per LC 9.3, detailing the conditions leading to the spill or incident/event, corrective actions taken, and results achieved.

[Applicable amendment: 3]

11.1.7 Any time uranium in a worker's urine specimen exceeds 15 micrograms per liter (µg/l), the annual ALARA audit will indicate what corrective actions were considered or performed.

[Applicable amendment: 3]

11.1.8 Any time a uranium action level of 35 µg/l for two consecutive urine specimens or 130 µg/l for any one specimen is reached or exceeded, the licensee shall provide documentation, within 30 days, to the NRC, indicating what corrective actions have been performed.

[Applicable amendment: 3]

11.1.9 The licensee shall develop a survey program for beta/gamma contamination for personnel exiting from restricted areas, and beta/gamma contamination in unrestricted and restricted areas that will meet the requirements of 10 CFR Part 20, Subpart F and submit the program to NRC for review and written verification.

The licensee shall provide for NRC review and written verification the surface contamination detection capability (minimum detection 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 dpm per 100 cm^2.

[Applicable amendment: 3]

11.1.10 (formerly 11.11) [Deleted by Amendment 1]

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11.2 Crow Butte Project

11.2.1 The licensee shall perform and document inspections of the evaporation ponds in accordance with the May 22, 2017**,** revision to its Evaporation Pond Onsite Inspection Program (ML17142A383).

Any time 6 inches or more of fluid is detected in a commercial pond standpipe, it shall be analyzed for specific conductance. If the water quality is degraded beyond the action level, the water shall be further sampled and analyzed for chloride, alkalinity, sodium, and sulfate. Any time 6 inches or more of fluid is detected in an R&D pond standpipe, it shall be analyzed for specific conductance, chloride, alkalinity, sodium, and sulfate.

Liner Repair

Upon verification of a liner leak, the licensee shall notify NRC in accordance with LC 11.1.6, lower the fluid level sufficiently to eliminate the leak by transferring the pond's contents to an alternate cell or approved destination, and undertake repairs, as needed. Water quality in the affected standpipe shall be analyzed for the five parameters listed above once every 7 days during the leak period and once every 7 days for at least 14 days following repairs.

The licensee shall submit a corrective action plan within 30 days to NRC for review. The corrective action plan will document steps to adequately address the leak and procedures used to verify that the leak has been adequately addressed and permanently fixed. The corrective action plan should also evaluate how much and for how long the diminished waste disposal capacity will impact operations.

Liner Replacement

When it is determined that a liner replacement is necessary, the licensee shall notify NRC in accordance with LC 11.1.6, remove the fluids by transferring the pond's contents to an alternate cell or approved destination, and undertake the liner replacement. Once the transfer of fluids has been completed, measurement of the water level in the pond and the standpipes will be suspended until the liner is replaced and the pond is returned to operation.

The licensee shall submit a corrective action plan for the liner replacement within 30 days to NRC for review. The corrective action plan will document steps to adequately address the liner replacement, including a schedule for the liner replacement, and procedures used to verify that the liner replacement has been adequately addressed. The corrective action plan will also evaluate how much and for how long the diminished waste disposal capacity will impact operations. In addition, the licensee shall submit an update to the original corrective action plan, including any schedule changes and changes to waste disposal capacity, every 30 days until the pond is returned to operation.

[Applicable amendment: 2]

11.2.2 If an overlying aquifer monitoring well in Mine Unit 6 or Mine Unit 8 is placed on excursion status per LC 11.1.5, the licensee shall test it weekly for natural uranium in addition to the required indicators of alkalinity, conductivity, and chloride. The natural uranium data from wells on excursion status in the overlying aquifer in Mine Units 6 or 8 shall be maintained in the on-site records and shall be provided to the NRC within 60 days of the excursion confirmation in the written report specified in LC 11.1.5. If the natural uranium data are not available when the report is prepared, the data must be submitted as soon as they become available. In addition, if a well in these specific mine units remains on excursion for more than 60 days, the licensee shall provide the natural uranium data for the time period beyond 60 days in the quarterly report specified in LC 11.1.1(A).

[Applicable amendment: 2]

11.2.3 The licensee shall establish and conduct an effluent and environmental monitoring program in accordance with the program described in Sections 5.8.7 (Airborne Effluent and Environmental Monitoring Programs) and 5.8.8 (Groundwater/Surface Water Monitoring Program) of the approved application dated November 27, 2007 (ADAMS package ML073480264) as revised by verification submittals dated January 2, 2015, May 11, 2015, June 30, 2015, September 21, 2015, November 24, 2015, and December 4, 2015.

[Applicable amendment: 1]

11.2.4 (formerly 11.14) [Deleted by Amendment 1]

11.2.5 (formerly 11.15) [Deleted by Amendment 1]

11.2.6 (formerly 11.16) [Deleted by Amendment 1]

11.3 Marsland Expansion Area

11.3.1 The licensee shall identify (a) the location, screen depth, and estimated pumping rate of any new permitted groundwater wells, and (b) any permitted change to the use of an existing groundwater well, for all groundwater wells within the MEA license area or within two kilometers of any proposed MEA production area monitoring well ring. The licensee shall evaluate the impact of ISR operations on groundwater quality for all users of groundwater wells within these areas and recommend any additional monitoring or other measures to protect groundwater users. These evaluations shall be submitted semiannually as part of the licensee's semiannual effluent and environmental monitoring program report.

[Applicable amendment: 3]

11.3.2 Prior to the commencement of construction related to NRC-licensed activities at the MEA, the licensee shall resume monitoring to collect additional meteorological data on a continuous basis at a data recovery rate of at least 90 percent until the licensee submits sufficient data and analysis to the NRC, and the NRC staff has provided written verification that the data are representative of the long-term conditions at the MEA. The data collected shall include, at a minimum, wind speed, wind direction, and an annual wind rose. When the licensee believes it has representative data, the

licensee shall submit the data, a summary of the stability classification, and an analysis demonstrating that the data are representative of long-term conditions at the MEA.

[Applicable amendment: 3]

11.3.3 To ensure that the Basal Chadron Sandstone aquifer remains saturated during operations and restoration at the MEA, the licensee will monitor water levels semi-annually in dedicated, existing MEA monitoring wells 8 and 9 and in two additional monitoring wells to be installed in the Basal Chadron Sandstone aquifer. The two additional wells shall be located in NW ¼ of SW ¼ of Section 26, T30N, R51W and NW ¼ of SE ¼ of Section 26, T30N, R51W. At any time from the start of ISR operations at the MEA, if the overall average water level drawdown rate in any one of the four monitoring wells exceeds 10 ft/yr, or if the water level in any one of the four monitoring wells drops below 3539.0 ft above mean sea level, the licensee shall develop a corrective action plan addressing how compliance with these limits will be restored, and shall submit the plan to the NRC within 45 days for review and written approval. In addition, each year, as part of its semi-annual effluent and environmental monitoring program report that covers the third and fourth calendar quarters, the licensee shall document the semi-annual water level data in the four monitoring wells present calculations of cumulative total water level drawdown and average drawdown rates for the complete period of record, and provide a written assessment of the drawdown in the Basal Chadron Sandstone aquifer at the MEA.

[Applicable amendment: 3]

11.3.4 At least 90 days prior to the planned start date of lixiviant injection in a new MEA mine unit (wellfield), the licensee shall submit a wellfield package to the NRC for review and written verification. The Licensee must receive written NRC verification of the wellfield package prior to injecting lixiviant into the mine unit.

As part of developing its wellfield packages for new mine units at the MEA, the applicant shall perform an aquifer pumping test for each new mine unit. For mine units MU-D through MU-F, the licensee shall submit its plan for conducting the aquifer pumping test for NRC review and written verification at least 60 days prior to the planned date for performing the aquifer pumping test.

For all mine units, each wellfield package, shall include (1) the information identified in Section 3.1.3 (p. 3-12) of the 2016 Response to Open Issues - Marsland Expansion Area Technical Report (ADAMS Accession No. ML16155A283) and (2) a discussion of the aquifer pumping test results and conclusions incorporating identified boundary conditions, fault-related flow effects, drawdown maps (relative to mean sea level), drawdown match curves, potentiometric surface maps (relative to mean sea level), water level graphs, and, when appropriate, directional transmissivity data and graphs, and other relevant data and data illustrations.

[Applicable amendment: 3]

12. Marsland Expansion Area Pre-Operational

12.1 Prior to the commencement of construction related to NRC-licensed activities at the MEA, the licensee shall provide the results of analysis of water samples from the Niobrara River collected

quarterly at established sampling locations N-1 and N-2 for a period of one year and analyzed for the list of non-radiological constituents in Sections A, B and C of Table 2.7.3-1 of NUREG-1569. Analytical results for all samples shall be submitted to the NRC for review and written verification. Before implementing this sampling program, the licensee may submit to the NRC, for review and written approval, an alternate list of non-radiological constituents tailored to the MEA site, along with appropriate technical justification.

[Applicable amendment: 3]

12.2 At least 90 days prior to the commencement of construction related to NRC-licensed activities at the MEA, the licensee shall collect and submit the results of preoperational soil and crop samples as described in the licensee's submittal dated June 27, 2017 (ML17193A311) to the NRC staff for review and written verification. Following NRC verification, the results of the preoperational soil samples shall be added to Appendix BB of the Marsland Technical Report, and the results of the preoperational crop samples shall be added to Appendix Q of the Marsland Technical Report, as described in the licensee's submittal dated June 27, 2017 (ML17193A311).

[Applicable amendment: 3]

12.3 At least 60 days prior to the NRC staff's preoperational inspection for the MEA, the licensee shall submit a figure showing the air sampling locations of tank vents and general ventilation discharge points of the MEA satellite building to the NRC staff for review and written verification.

[Applicable amendment: 3]

12.4 At least 90 days prior to commencement of construction associated with NRC-licensed activities at the MEA, the applicant shall provide to the NRC for review and written approval an updated cost estimate that covers decommissioning and reclamation costs for the first MEA wellfield, along with a copy of the financial surety arrangement that covers those costs and that meets the requirements of Criterion 9 in 10 CFR Part 40, Appendix A. Updated cost estimates and financial assurance arrangements to cover the decommissioning and reclamation costs for subsequent wellfields at the MEA will be submitted in accordance with the update requirements in LC 9.5.

[Applicable amendment: 3]

12.5 Prior to commencement of operations in any production area, the licensee shall obtain all necessary permits, licenses, and approvals from the appropriate regulatory authorities. The licensee shall also submit a copy of all permits for its Class III underground injection wells to the NRC.

[Applicable amendment: 3]

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FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Dated: December 14, 2018

Bill Von Till, Branch Chief
Uranium Recovery and Materials
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Division of Decommissioning, Uranium Recovery
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