NRC FORM 374

U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE

Pursuant to the Atomic Energy Act [illegible] and the Energy Reorganization [illegible] Federal Regulations, Chapter I, Parts [illegible] 32, 33, 34, 35, 36, 39, 40 and [illegible] 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 purposes and at the places designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Parts. 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 laws, 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.	216 Sixteenth Street Mall, Suite 810 Denver, Colorado 80202	4. Expiration Date	February 28, 2008
		5. Docket or Reference No.	40-8943

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

SECTION 9: **Administrative Conditions**

9.1 Authorized place of use shall be the licensee's Crow Butte uranium recovery and processing facilities in Dawes County, Nebraska.

9.2 All written notices and reports to the NRC required under this license, with the exception of reports submitted in accordance with 10 CFR 40.65, shall be addressed to the Chief, Uranium Recovery Branch, Division of Waste Management, Office of Nuclear Material Safety and Safeguards, Mail Stop T 7-J-8, Nuclear Regulatory Commission, 11545 Rockville Pike, Rockville, MD 20850. Semiannual effluent monitoring reports required under 10 CFR 40.65 shall be addressed to Director, Division of Nuclear Material Safety, Region IV, Nuclear Regulatory Commission, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas, 76011.

Incident and event notifications that require telephone notification shall be made to the NRC Operations Center at (301) 816-5100.

9.3 The licensee shall conduct operations in accordance with the commitments, representations, and statements contained in the license application dated December 1995, as amended by submittals dated April 1, June 25, July 28, and October 31, 1997, which are hereby incorporated by reference, except where superseded by license conditions below. Whenever the word "will" or "shall" is used in the above referenced documents, it shall denote a requirement.

9.4 A. The licensee may, without prior NRC approval, and subject to the conditions specified in Part B of this condition:

(1) Make changes in the facility or process, as presented in the approved application.

(2) Make changes in the procedures presented in the approved application.

(3) Conduct tests or experiments not presented in the approved application.

B. The licensee shall file an application for an amendment to the license, unless the following conditions are satisfied:

(1) The change, test, or experiment does not conflict with any requirement specifically stated in this license (excluding information referenced in the approved license application), or impair the licensee's ability to meet all applicable NRC regulations.

(2) There is no degradation in the essential safety or environmental commitments in the license application, or provided by the approved reclamation plan.

(3) The change, test, or experiment is consistent with the conclusions of actions analyzed and selected in the Environmental Assessment dated February 1998.

C. The licensee's determinations concerning Part B of this condition shall be made by a "Safety and Environmental Review Panel" (SERP). The SERP shall consist of a minimum of three individuals employed by the licensee, and one of these shall be designated as the SERP chairman. One member of the SERP shall have expertise in management and shall be responsible for approval of managerial and financial 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 site Corporate Radiation Safety Officer or equivalent, with the responsibility for 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 health physics, groundwater hydrology, 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.

9.5 The licensee shall maintain an NRC-approved financial surety arrangement, consistent with 10 CFR 40, Appendix A, Criterion 9, adequate to cover the estimated reclamation and closure costs, if accomplished by a third party, for all existing operations and any planned expansions or operational changes for the upcoming year. Reclamation includes all cited activities and groundwater restoration, as well as off-site disposal of all 11e.(2) byproduct material.

Within three months of NRC approval of a revised closure plan and 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 site closure plan exceed the amount covered in the existing financial surety. The revised surety shall then be in effect within three months of written NRC approval.

Annual updates to the surety amount, required by 10 CFR 40, Appendix A, Criterion 9, shall be provided to NRC by October 1 of each year. If 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 of the surety, 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 NRC with copies of surety-related correspondence submitted to the State of Nebraska, a copy of the State's surety review, and the final approved surety arrangement. The licensee also must ensure that the surety, where authorized to be held by the State, identifies the NRC-related portion of the surety and covers the above-ground decommissioning and decontamination, the cost of offsite disposal, soil and water sample analyses, and groundwater 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/decommissioning plan, cost estimates, and annual updates should follow the outline in Appendix E to NUREG-1569 (NRC, 1997), entitled "Recommended Outline for Site-Specific *In Situ* Leach Facility Reclamation and Stabilization Cost Estimates."

Crow Butte Resources, Inc.'s currently approved surety instrument, an Irrevocable Standby Letter of Credit issued by the Royal Bank Of Canada (New York Branch), in favor of the State of Nebraska, shall be continuously maintained in the sum total amount of no less than $9,758,040 for the purpose of complying with 10 CFR 40, Appendix A, Criterion 9, until a replacement is authorized by both the State of Nebraska and NRC.

9.6 Written standard operating procedures (SOPs) shall be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored. SOPs for operational activities shall enumerate pertinent radiation safety practices to be followed. Additionally, written procedures shall be established 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 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 site Corporate Radiation Safety Officer (CRSO) before implementation and whenever a change in procedure is proposed to ensure that proper radiation protection principles are being applied. In addition, the CRSO shall perform a documented review of all existing SOPs at least annually.

9.7 The licensee shall dispose of 11e.(2) byproduct material from the Crow Butte facility at a site licensed by NRC or an NRC Agreement State to receive 11e.(2) byproduct material. The licensee shall identify the disposal facility to NRC in writing. The licensee's approved waste disposal agreement must be maintained on-site. In the event the agreement expires or is terminated, the licensee shall notify 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.

9.8 Release of equipment, materials, or packages from the restricted area shall be in accordance with the NRC guidance document entitled "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 May 1987, or suitable alternative procedures approved by NRC prior to any such release.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

9.9 Before engaging in any construction activity not previously assessed by NRC, the licensee shall complete a cultural resource inventory. All construction 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).

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 shall occur until the licensee has received authorization from NRC to proceed.

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

9.10 The licensee shall conduct operations within the permit area boundaries shown in Figure 1.3-1 of the approved license application, as amended by the submittal dated July 28, 1997.

9.11 The licensee is hereby exempted from the requirements of Section 20.1902(e) of 10 CFR Part 20 for areas within the facility, 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 Any corporate organization changes affecting the assignments or reporting responsibilities of the radiation safety staff as described in Section 5 of the approved license application shall conform to Regulatory Guide 8.31.

9.13 The licensee shall have a training program for all site employees as described in Regulatory Guide 8.31 and as detailed in the approved license application. The training program shall cover the topics identified in Section 2.5 of Regulatory Guide 8.31.

The CRSO, or their designee, shall have the education, training and experience as specified in Regulatory Guide 8.31. The CRSO shall also receive 40 hours of related health and safety refresher training every two (2) years.

Individuals designated as the Health Physics Technician (HPT) shall report directly to the CRSO on matters dealing with radiological safety. In addition, the CRSO shall be accessible to the HPT at all times. The HPT shall have the qualifications specified in Regulatory Guide 8.31, or equivalent. Any person newly hired as an HPT shall have all work reviewed and approved by the CRSO as part of a comprehensive training program until appropriate course training is completed, and at least for 6 months from the date of appointment.

9.14 DELETED by Amendment No. 4

SECTION 10: **Operations, Controls, Limits, and Restrictions**

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

10.2 The licensee shall construct all wells in accordance with methods described in Section 3.1.2 of the approved license application.

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 percent of the maximum operating pressure 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.

10.3 The licensee shall establish pre-operational baseline groundwater quality data for all mine units. Baseline water quality sampling shall provide representative pre-mining groundwater quality data and restoration criteria as described in the approved license application.

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

A. Three samples shall be collected from production and injection wells at a minimum density of one production or injection well per 4 acres. These samples shall be collected at least 14 days apart.

B. The samples shall be analyzed for alkalinity, ammonia, arsenic, barium, bicarbonate, boron, cadmium, calcium, carbonate, chloride, chromium, copper, fluoride, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, nitrate, nitrite, pH, potassium, radium-226, selenium, silica, sodium, specific conductivity, sulfate, temperature, total dissolved solids, uranium, vanadium, and zinc.

C. Groundwater restoration goals shall be established on a parameter-by-parameter basis, and the primary goal of restoration shall be to return the groundwater quality, on a mine unit average, to baseline conditions. The licensee shall conduct ground-water restoration activities in accordance with the groundwater restoration plan submitted by letter dated November 26, 1996.

10.4 Prior to mining in each mine unit, the licensee shall collect groundwater samples from and establish Upper Control Limits (UCLs) for designated upper aquifer and perimeter monitor wells. The data shall consist, at a minimum, of the following sampling and analyses:

A. Three samples shall be collected from the monitor wells at a minimum density of (1) one upper aquifer monitor well per 5 acres, and (2) all perimeter monitor wells. These samples shall be collected at least 14 days apart.

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

C. For each monitor well, UCLs shall be calculated for each indicator parameter as equal to 20 percent above the maximum concentration measured for that parameter among the three samples.

10.5 The plant throughput shall not exceed a maximum flow rate of 5000 gallons per minute, excluding restoration flow. Annual yellowcake production shall not exceed 2 million pounds.

10.6 Each of the R&D evaporation ponds shall have at least 0.9 meters (3 feet) of freeboard. Each of the commercial evaporation ponds shall have at least 1.5 meters (5 feet) of freeboard.

Additionally, the licensee shall maintain, at all times, sufficient reserve capacity in the evaporation pond system to enable transferring the contents of a pond to the other ponds. In the event of a leak and subsequent transfer of liquid, 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 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, and April 3, 1996.

10.8 The licensee shall maintain effluent control systems as specified in Sections 4.1 and 5.7.1.1 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 either (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.

10.9 The licensee shall be required to 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 an applicable area air sample. The RWP shall be issued by the CRSO, 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.

10.10 In-plant radiological monitoring for airborne uranium and radon daughters shall be conducted at the locations shown in Figure 5.7-1 in the approved license application.

10.11 Employees shall monitor themselves with an alpha survey instrument prior to exiting the restricted area. Should the results of monitoring exceed an action level of 1000 dpm/100 cm^2, employees shall decontaminate themselves to less than the action level. If decontamination cannot be accomplished, the employee shall report the incident to the CRSO for investigation.

10.12 In addition to the bioassay program discussed in Section 5.7.5 of the approved license application, the licensee also shall perform *in vivo* measurements in accordance with the recommendations contained in Revision 1 of Regulatory Guide 8.22.

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 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.

10.15 The licensee shall construct 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.

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

SECTION 11: Monitoring, Recording, and Bookkeeping Requirements

11.1 Flow rates on each injection and recovery well, and manifold pressures on the entire system, shall be measured and recorded daily. During well-field operations, injection pressures shall not exceed the integrity test pressure at the injection well heads.

11.2 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 UCLSs 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 with 48 hours after the second set of samples was acquired. If neither the second nor the third sample indicate 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 License Condition 12.2, 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 5.7.8.1 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.

11.3 The licensee shall establish and conduct an effluent and environmental monitoring program in accordance with the program submitted by letter dated March 18, 1999.

11.4 The licensee shall perform and document inspections in accordance with the February 5, 1996, revision to its Evaporation Pond Onsite Inspection Program.

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 an R&D pond standpipe, it shall be analyzed for specific conductance, chloride, alkalinity, sodium, and sulfate.

Upon verification of a liner leak, the licensee shall notify NRC in accordance with License Condition 12.3, lower the fluid level by transferring the pond's contents to an alternate cell, 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.

11.5 The licensee shall conduct the in-plant radiological inspection program described in Section 5.3 of the license renewal application, with the following modifications:

A. The licensee shall document problems observed during the daily visual walk-through inspections in writing; and

B. The CRSO and plant manager, or qualified designees, shall perform weekly inspections to observe general radiation control practices and to review required changes in procedures and equipment.

11.6 The results of the following activities, operations, or actions shall be documented: sampling; analyses; surveys and monitoring; survey/monitoring equipment calibration results; reports on audits and inspections; all meetings and training courses required by this license; and any subsequent reviews, investigations, or 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 maintain records of any changes made pursuant to License Condition 9.4 until license termination. These records shall include written safety and environmental evaluations, made by the Safety and Environmental Review Panel, that provide the basis for determining that changes are in compliance with the requirements referred to in Part B of License Condition 9.4.

SECTION 12.0: **Reporting Requirements**

12.1 Effluent and environmental monitoring program results submitted in accordance with 10 CFR 40.65 shall be reported in the format shown in Table 3 of Regulatory Guide 4.14, (Rev. 1) entitled, "Sample Format for Reporting Monitoring Data." These reports also shall include injection rates, recovery rates, and injection manifold pressures.

12.2 In the event a lixiviant excursion is confirmed by groundwater monitoring, NRC shall be notified by telephone within 24 hours and by letter within seven (7) days from the time the excursion is confirmed, in accordance with License Condition 9.2. In addition, a written report shall be submitted to NRC within 60 days of excursion confirmation. The report shall describe the excursion event, corrective actions taken, and results obtained. If the well(s) are still on excursion when the report is submitted, the report also must contain a schedule for the submittal of future reports to NRC which will provide an update of corrective actions taken and the results obtained. In addition, if the well(s) are still on excursion at the time the 60-day report is submitted, the licensee shall terminate injection of lixiviant into the wellfield on excursion until such time that aquifer cleanup is complete.

12.3 In the event evaporation pond standpipe water analyses indicate that a pond is leaking, NRC shall be notified by telephone within 48 hours of verification, in accordance with License Condition 9.2. In addition, a written report shall be submitted to NRC within 30 days of first notifying NRC that a leak exists. This report shall include analytical data, describe the mitigative action, and discuss the results of that action.

12.4 Until license termination, the licensee shall maintain documentation on all spills of source or 11e.(2) byproduct materials, and all spills of process chemicals. Documented information shall include: date, spill volume, total activity of each radionuclide released, radiological survey results, corrective actions, results of remediation surveys, and a map showing the spill location and impacted area.

The licensee shall notify NRC by telephone within 48 hours of any spill of source or 11e.(2) byproduct materials and all spills of process chemicals, that may have a radiological impact on the environment. This notification shall be followed, within seven (7) days, by submittal of a written report detailing the conditions leading to the spill, corrective actions taken, and results achieved. This requirement is in addition to the reporting requirements of 10 CFR Part 20 and 10 CFR 40.60.

12.5 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 mining operations.

12.6 An annual ALARA audit of the radiation safety program shall be performed in accordance with Regulatory Guide 8.31 and Section 5.3 of the approved license application. The CRSO shall accompany the audit team. A report of this audit shall be retained on-site for NRC inspection. The report also shall summarize the results of the daily walk-through inspections.

12.7 The licensee shall furnish, in an annual report to NRC, a description of changes, tests, or experiments made under License Condition 9.4, including a summary of the safety and environmental evaluation of each. In addition, the licensee shall annually submit to NRC page changes to the approved license application to reflect changes made under License Condition 9.4.

FOR THE NUCLEAR REGULATORY COMMISSION

King Stablein

Dated: 4/22/99

N. King Stablein, Acting Chief
Uranium Recovery and Low-Level Waste Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards