



40-8943
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001
February 28, 1996



Crow Butte Resources, Inc.
ATTN: Mr. Stephen P. Collings, President
216 Sixteenth Street Mall, Suite 810
Denver, Colorado 80202

SUBJECT: AMENDMENT 33 TO SOURCE MATERIAL LICENSE SUA-1534, CROW BUTTE
RESOURCES, INC. IN SITU MINE, DAWES COUNTY, NEBRASKA

Dear Mr. Collings:

The U.S. Nuclear Regulatory Commission staff has completed its review of Crow Butte Resources Inc.'s (Crow Butte's) submittals of October 5, 1995, December 7, 1995, and February 5, 1996, to modify Source Material License SUA-1534. In those submittals, Crow Butte requested amendments related to: (1) its evaporation pond inspection program; (2) its radiological in-plant operational monitoring program; and (3) the inclusion of an additional deep well disposal injection zone.

The specific amendment requests are discussed in detail in the staff's Technical Evaluation Report (TER). The TER documents the basis for the NRC staff's evaluation of these amendment requests and is provided as Enclosure 1. Based on its review, the NRC staff has found the proposed amendments to be acceptable.

In addition to amending Source Material License SUA-1534 to reflect NRC acceptance of these proposed amendments, the NRC staff is making an editorial change to reflect recent organizational changes within the NRC. Notifications and submittals should now be addressed to the Chief, Uranium Recovery Branch, Division of Waste Management, Office of Nuclear Material Safety and Safeguards.

Therefore, pursuant to Title 10 of the Code of Federal Regulations, Part 40, Source Material License SUA-1534 is hereby amended by revising License Condition Nos. 10, 25, 30, 40, 42, and 56, and by deleting License Condition Nos. 53 and 55. All other conditions of this license shall remain the same. The license is being reissued to incorporate the above modifications (Enclosure 2). An environmental review was not performed since these actions are categorically excluded under 10 CFR 51.22(c)(11).

S. Collings

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These changes to your license were discussed and agreed to in a telephone conversation on February 14, 1996, between yourself and Mr. James Park of my staff. If you have any questions regarding this letter or the enclosures, please contact Mr. Park at (301) 415-6699.

Sincerely,
(Original signed by Daniel M. Gillen for)

Joseph J. Holonich, Chief
Uranium Recovery Branch
Division of Waste Management
Office of Nuclear Material
Safety and Safeguards

Docket No. 40-8943
SUA-1534, Amendment No. 33
Cases Closed: L51330, L51343

Enclosures: As stated (2)

cc: R. Knodel, Crow Butte
H. Borchert, RCPD, NE
NDEQ
PDR, NE

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TECHNICAL EVALUATION REPORT

DATE: February 14, 1996

DOCKET NO. 40-8943

LICENSE NO. SUA-1534

LICENSEE: Crow Butte Resources, Inc.

FACILITY: Crow Butte In Situ Leach Mine

PROJECT MANAGER: James Park

TECHNICAL REVIEWER(S): Daniel Rom
Christopher McKenney

Modification to Evaporation Pond Onsite Inspection Program (L51343)

SUMMARY AND CONCLUSIONS:

By letter dated October 5, 1995, Crow Butte Resources, Inc. (Crow Butte) requested NRC approval of modifications to its Evaporation Pond Onsite Inspection Program. The licensee requested that weekly, rather than daily, measurements of the evaporation pond underdrain levels be taken. Approval of this change would allow Crow Butte to incorporate requirements of the NRC and the State of Nebraska into a single monitoring program document.

By letter dated February 5, 1996, Crow Butte submitted a revised Evaporation Pond Onsite Inspection Program in response to an NRC staff recommendation arising from the staff's review of the October 5, 1995, version of the program. This revised program provides for daily underdrain measurements in the case of extreme natural events (e.g., flooding, seismicity) or other events which could cause the pond to leak.

Based on its review, the NRC staff finds Crow Butte's requested modification to this program to be acceptable.

DESCRIPTION OF LICENSEE'S AMENDMENT REQUEST:

By letter dated October 5, 1995, Crow Butte requested NRC approval of modifications to the Crow Butte Mine Evaporation Pond Onsite Inspection Program. The licensee is seeking to conduct weekly measurements of underdrain levels, rather than the currently required daily measurements. Tables for commercial ponds 1, 3, and 4 were also updated in the revised program. The modification in underdrain level measurements would allow Crow Butte to incorporate NRC license requirements and State of Nebraska Department of Environmental Quality permit requirements into a single document.

By letter dated February 5, 1996, Crow Butte submitted a revised Evaporation Pond Onsite Inspection Program. This revised program provides for weekly underdrain measurements under normal operating conditions, but requires daily measurements during periods of seismicity, flooding, severe rainfall, or any other event which could cause the ponds to leak. This modification was made at the recommendation of the NRC staff.

TECHNICAL EVALUATION:

Underdrain leak detection systems are employed for the two R&D and three commercial evaporation ponds currently in use at the Crow Butte facility. The licensee's currently approved evaporation pond inspection program provides for daily measurements of the underdrain fluid levels as part of the leak detection program. The NRC staff's review determined that weekly measurements of the underdrain levels were adequate to provide continuing oversight of evaporation pond operation under normal operating conditions. However, the NRC staff recommended that Crow Butte conduct immediate measurements of the underdrain levels in the case of extreme events (e.g., flooding, seismic activity), or if there is reason to suspect that these levels have changed suddenly.

The NRC staff's recommendation was discussed in a telephone call with the licensee on February 5, 1996. Crow Butte provided a revised program by letter dated February 5, 1996. The revised program requires daily underdrain measurements during periods of seismicity, flooding, severe rainfall, or any other event which could cause the ponds to leak. The NRC staff has reviewed the proposed modification and finds it to be acceptable.

ENVIRONMENTAL IMPACT EVALUATION:

This action is considered a change in process operations which, in accordance with 10 CFR Part 51.22(c)(11), does not result in (i) significant change in the types or significant increase in the amounts of any effluent that may be released offsite, (ii) significant increase in individual or cumulative occupational radiation exposure, (iii) significant construction impact, (iv) significant increase in the potential for or consequences from radiological accidents, due to the implementation of this amendment. Therefore, the requirements for a categorical exclusion have been met and no further environmental action is required.

Modification to Radiological In-Plant Operational Monitoring Program (L51343)

SUMMARY AND CONCLUSIONS:

By letter dated October 5, 1995, Crow Butte requested NRC approval of modifications to its Radiological In-Plant Operational Monitoring Program. Crow Butte requested that the dryer room be eliminated as a radon daughter survey location, because it believes that survey results from the dryer room are not representative of most plant employees' exposure.

DESCRIPTION OF LICENSEE'S AMENDMENT REQUEST:

By letter dated October 5, 1995, Crow Butte requested an amendment to Table 5.0 of its Radiological In-Plant Operational Monitoring Program. The amended table would eliminate the dryer room as a radon daughter survey location. Crow Butte currently surveys the dryer room weekly, and monitors eight additional locations in the processing plant on a monthly basis. The licensee reports that the 1994 radon daughter survey data show that the processing plant annual average was 0.032 Working Level (WL), while the dryer room

averaged only 0.020 WL. Because the dryer room data are relatively low, they are not currently included in the monthly calculation of plant employee exposures since they would tend to skew exposure results downward and therefore, not be representative of most employees' exposure.

TECHNICAL EVALUATION:

Under 10 CFR 20.1501, licensees are required to perform surveys that are reasonable under the circumstances to evaluate the extent of radiation levels, concentrations or quantities of radioactive material and the potential radiological hazards that could be present. Based on the information provided by the licensee, removal of the requirement to monitor the dryer room for radon daughters will not hinder the licensee's ability to evaluate worker dose. Crow Butte will continue to survey the eight monitor locations in the processing plant, where the potential for radon daughter buildup is more likely due the use of upflow ion exchange columns. Employee exposure calculations will continue to be based on survey data collected from these eight locations. Therefore, the NRC staff finds the licensee's request to discontinue monitoring for radon daughters in the dryer room to be acceptable.

ENVIRONMENTAL IMPACT EVALUATION:

This action is considered a change in process operations which, in accordance with 10 CFR Part 51.22(c)(11), does not result in (i) significant change in the types or significant increase in the amounts of any effluent that may be released offsite, (ii) significant increase in individual or cumulative occupational radiation exposure, (iii) significant construction impact, (iv) significant increase in the potential for or consequences from radiological accidents, due to the implementation of this amendment. Therefore, the requirements for a categorical exclusion have been met and no further environmental action is required.

Deep Well Disposal Amendment (L51330)

SUMMARY AND CONCLUSIONS:

By letter dated December 7, 1995, Crow Butte requested that a second deep well disposal injection zone, the Morrison Formation, be approved for disposal of process fluids from its in-situ leach operations. Crow Butte requested this amendment, because the capacity of the currently approved injection zone, the Sundance Formation, is insufficient to meet the needs of the facility.

The NRC staff determined that the chemical composition (i.e., the average concentration limits) of the process fluids to be injected is independent of the geologic formation (e.g., the Morrison Formation) into which they will be injected. Previously, the NRC staff has found these average concentration limits to be acceptable. Therefore, the NRC staff finds Crow Butte's amendment request to be acceptable. The NRC staff's analysis was limited to a review of the radiological aspects of the amendment request, in accordance with 10 CFR Part 20.2002. The staff will rely on the State of Nebraska's analysis of the suitability of the Morrison Formation as an injection zone.

DESCRIPTION OF LICENSEE'S AMENDMENT REQUEST:

By letter dated December 7, 1995, Crow Butte requested the inclusion of the Morrison Formation as an approved injection zone for deep well disposal of process fluids. Since August of 1995, Crow Butte has been operating a deep disposal well at its Crow Butte in-situ leach uranium facility in Dawes County, Nebraska. Based on operational data, the capacity of the currently approved injection zone, the Sundance Formation, is approximately 20 gallons per minute (gpm), which is insufficient to meet the needs of the facility. Therefore, Crow Butte is requesting an amendment to License Condition 55 of SUA-1534, to include the overlying Morrison Formation, which the licensee estimates to have a capacity of 30 to 40 gpm, as an approved injection zone.

Concurrently, Crow Butte is seeking to modify its Class I underground injection permit with the State of Nebraska, to allow injection of process fluids into the Morrison Formation. The licensee enclosed with its NRC amendment request, an engineering report prepared in support of its application to the State for the necessary permit modification.

TECHNICAL EVALUATION:

By Amendment 24 to SUA-1534 (issued October 6, 1994), the NRC staff approved deep well disposal of process fluids as an alternate waste disposal option at the Crow Butte in-situ mine. License Condition No. 55 authorizes Crow Butte to inject process fluids into the basal unit of the Sundance Formation, provided that the State of Nebraska: (1) issues the necessary underground injection permit for the deep well disposal process; and (2) finds that the potential for contamination of other usable aquifers by deep well injection is minimal. On June 20, 1995, the State approved a Class I injection well for operation at the Crow Butte in-situ leach mine, and issued the necessary permit for operation of the well. The permit includes provisions for regular mechanical integrity testing of the well to assure that process fluids are not injected into an unauthorized injection zone and thus pose a threat to fresh and/or usable waters of the State.

In issuing Amendment 24 to SUA-1534, the NRC staff determined that the average concentration limits of the process fluids to be injected were comparable to levels allowed by the staff at other sites approved for deep well injection as a waste disposal method. For that review, the NRC staff limited its analysis to a review of the alternative method of waste disposal in accordance with 10 CFR 20.2002, and, to avoid duplication of review efforts with the State of Nebraska, relied on the State's analysis of the suitability of the Sundance Formation as an injection zone. For the current review, the staff again relied on the State's technical review, in assessing the suitability of the Morrison Formation as an injection zone.

The NRC staff's review finds that the chemical composition (i.e., the average concentration limits) of the process fluids to be injected is independent of the geologic formation (in this case, the Morrison Formation) into which they will be injected. Therefore, because the approved concentration limits will not change, the NRC staff finds Crow Butte's amendment request to be acceptable.

ENVIRONMENTAL IMPACT EVALUATION:

This action is considered a change in process operations which, in accordance with 10 CFR Part 51.22(c)(11), does not result in (i) significant change in the types or significant increase in the amounts of any effluent that may be released offsite, (ii) significant increase in individual or cumulative occupational radiation exposure, (iii) significant construction impact, (iv) significant increase in the potential for or consequences from radiological accidents, due to the implementation of this amendment. Therefore, the requirements for a categorical exclusion have been met and no further environmental action is required.

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Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 39, 40 and 70, 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. [Applicable Amendment: 24]	3. License number	SUA-1534, Amendment No. 33
2.	216 Sixteenth Street Mall, Suite 810 Denver, Colorado 80202	4. Expiration date	January 1, 1996
		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. 454,545 kg
b.	Byproduct material as defined in §11e(2) of Atomic Energy Act of 1954, as amended.		b. Quantity generated under operations authorized by this license.
9.	Authorized place of use shall be the licensee's Crow Butte facilities in Dawes County, Nebraska.		
10.	For use in accordance with statements, descriptions, and representations contained in Sections 3.0, 4.0, 5.0, and 6.0 of the licensee's Environmental Report submitted by cover letter dated October 7, 1987; as revised by page changes submitted on December 14, 1987; January 22, March 28, and May 18, 1988; November 20, 1991; November 30, 1992; and October 5, 1995. In addition, the licensee shall conduct its activities in accordance with the provisions in the following:		
<u>Submittal Date</u>		<u>Description</u>	
May 23, 1988		Enclosed errata sheet, replacement pages, and engineering design report dated April 27, 1988.	
March 12, 1991		Cover letter submitting proposed restricted area and processing flow chart for commercial operations, as amended by letters dated February 26, 1993; July 27, and September 27, 1994.	
May 11, 1992		Cover letter submitting Supplement No. 2 to the Evaporation Pond Engineering Design Report addressing synthetic liners.	

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Notwithstanding the above, the following conditions shall override any conflicting statements contained in the licensee's application and supplements.

[Applicable Amendments: 1, 2, 3, 4, 6, 10, 11, 15, 17, 20, 21, 27, 33]

11. The licensee is authorized to dispose of waste byproduct material from the Crow Butte facility at the Energy Fuels Nuclear, Inc. White Mesa Mill in Blanding, Utah. The licensee's agreement with EFN constitutes an approved waste disposal plan, and the licensee shall be required to maintain the agreement for inspection at its corporate office and onsite. In the event the agreement expires or is terminated, the licensee is required to notify the Nuclear Regulatory Commission within seven (7) working days of the expiration date. A new agreement must be submitted for NRC approval within ninety (90) days of expiration, or the licensee will be prohibited from further lixiviant injection.

[Applicable Amendments: 5, 24, 26]

12. The annual throughput shall not exceed a flow rate of 3500 gallons per minute, excluding restoration flow. [Applicable Amendments: 20].

13. The licensee shall not possess more than an equivalent of 454,545 kilograms dry U₃O₈ at one time. [Applicable Amendments: 1]

14. The Crow Butte production rate shall not exceed 1,000,000 pounds of U₃O₈ per year.

15. Any significant changes in the process circuit as shown in Figure 3.1-1 of the October 7, 1987, application revised by a submittal dated March 12, 1991, shall require approval by the NRC in the form of a license amendment. [Applicable Amendments: 11, 24]

16. Release of equipment or packages from the restricted area shall be in accordance with the attachment to this license entitled, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct or Source Materials," dated September 1984.

17. The licensee is hereby exempted from the requirements of Section 20.1902(e) of 10 CFR 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."

[Applicable Amendments: 26]

18. The licensee shall be required to ensure that a Corporate Radiation Safety Officer (CRSO) or an alternate individual meeting the minimum education and experience requirements of a CRSO, shall be assigned full-time to the Crow Butte facility. Documentation of the individuals' training and experience shall be maintained onsite by the licensee. The Health Physics Technician (HPT) shall have four (4) months experience with the CRSO in installation or production operations and a course in respiratory protection, prior to any temporary assignment to the CRSO's duties. In accordance with the recommendations of NRC

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Regulatory Guide 8.31, the CRSO shall be required to receive biannual refresher training in health physics. [Applicable Amendments: 1, 4]

19. The results of the sampling, analyses, surveys and monitoring, the results of calibration of equipment, reports on audits and inspections, all meetings and training courses required by this license and any subsequent reviews, investigations and corrective actions, shall be documented. Unless otherwise specified in the NRC regulations, all such documentation shall be maintained for a period of at least 5 years.
20. Standard operating procedures (SOPs) shall be established for all operational process activities involving radioactive materials that are handled, processed or stored. Standard operating procedures for operational activities shall enumerate pertinent radiation safety practices to be followed. Additionally, written procedures shall be established for nonoperational activities to include in-plant and environmental monitoring, bioassay analyses and instrument calibrations. An approved, current copy of each written procedure shall be kept in the process area to which it applies.

All written procedures for both operation and nonoperational activities shall be reviewed and approved in writing by the CRSO before implementation, whenever a change in a procedure is proposed and at least annually, to ensure that proper radiation protection principles are being applied.

21. The licensee shall be required to use a Radiation Work Permit (RWP) for all work or nonroutine 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 Crow Butte site Health Physics Technician (HPT) or designate, qualified by way of specialized radiation protection training, except when the work to be performed is in the drying and packaging areas. The RWP for these areas shall be issued by the CRSO or designate, qualified by way of specialized radiation protection training equivalent to the CRSO, and shall at least describe the following:

- A. The scope of the work to be performed.
- B. Any precautions necessary to reduce exposure to uranium and its daughters.
- C. The supplemental radiological monitoring and sampling necessary prior to, during and following completion of the work.

In addition, the CRSO's quarterly review of all nonroutine activities shall be documented.

22. The licensee shall maintain effluent control systems as specified in Section 4.1 of the license application dated October 7, 1987, 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

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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 air pressure differential falls below the minimum level. 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.

[Applicable Amendments: 26]

23. Occupational exposure calculations shall be performed and documented within 1 week of the end of each regulatory compliance period as specified in 10 CFR 20.1201. Routine radon daughter and particulate samples shall be analyzed in a timely manner to allow exposure calculations to be performed in accordance with this condition. Nonroutine samples shall be analyzed and the results reviewed by the CRSO within two (2) working days after sample collection.

Applicable Amendments: 26]

24. The licensee shall submit a detailed decommissioning plan to the NRC for review and approval at least 12 months prior to planned final shutdown of mining operations. [Applicable Amendments: 24]

25. The licensee shall perform and document inspections in accordance with the Evaporation Pond Onsite Inspection Program submitted December 18, 1992, and modified by submittals dated February 26, 1993, August 30, 1993, and February 5, 1996:

- A. For the R&D ponds, a minimum freeboard of 3 feet is allowed. Any time 6 inches or more of fluid is detected in the standpipes, it shall be analyzed for specific conductance, chloride, alkalinity, sodium and sulfate.
- B. For the commercial ponds, a minimum freeboard of 5 feet is allowed. Any time six inches or more of fluid is detected in the standpipes, it shall be analyzed for specific conductance. If water quality is degraded beyond the action level, the water shall be further sampled and analyzed for chloride, alkalinity, sodium, and sulfate.

At all times, the licensee shall maintain 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 repairs.

Upon verification of a liner leak, the fluid level shall be lowered by transferring the pond's contents to an alternate cell. Water quality in the

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affected standpipes 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 2 weeks following repairs. The NRC shall be notified by telephone within 48 hours of leak verification, followed within 30 days by a written report. This report shall include analytical data, describe the cause of the leak and mitigative action, and the results of that action.

[Applicable Amendments: 15, 24, 26, 33]

26. The licensee shall maintain an area within the restricted area boundary for storage of contaminated materials prior to their disposal. All contaminated wastes and evaporation pond residues shall be disposed at a licensed radioactive waste disposal site.
27. The licensee shall maintain an NRC-approved financial surety arrangement, consistent with 10 CFR 40, Appendix A, Criterion 9, adequate to cover the estimated costs, if accomplished by a third party, for completion of the NRC-approved site closure plan including: above ground decommissioning and decontamination, the cost of offsite disposal of radioactive solid process or evaporation pond residues, soil and water analyses and ground-water restoration as warranted. Within 3 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 3 months of written NRC approval.

Annual updates to the surety amount, required by 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 surety arrangement, the licensee shall extend the existing arrangement, prior to expiration, for 1 year. Along with each proposed revision or annual update, the licensee shall submit supporting documentation showing a breakdown of the costs and 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. Since the NRC has authorized the surety instrument to be held by the State of Nebraska, the licensee shall also provide the NRC with copies of surety related correspondence submitted to the State, a copy of the State's surety review, and the final approved surety arrangement. The licensee must also ensure that the NRC related portion of the surety is expressly identified and covers the above ground decommissioning and decontamination, the cost of the offsite disposal, soil and water sample analyses, and ground-water restoration associated with the site. The basis for the site closure cost estimate is the NRC-approved site closure plan or NRC-approved revisions to the plan. Annual updates and revised site closure plan cost estimates should follow the format in the attachment to this license entitled, "Recommended Outline for Site Specific Reclamation and Stabilization Cost Estimates."

Crow Butte Resources, Inc.'s currently approved surety instrument, Irrevocable Standby Letter of Credit No. 74504 issued by First Bank, N.A. in favor of the

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State of Nebraska, shall be maintained in an amount no less than \$5,352,552 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 the NRC.

[Applicable Amendments: 7, 16, 28, 32]

28. In addition to the inspection and audit program described in Section 5.3 of the application, dated October 7, 1987, the Health Physics Technician (HPT) or designate shall document a daily walkthrough of the facility to determine if radiation control practices are being implemented.
29. The licensee shall submit to the NRC, a copy of the ALARA report as specified in Section 5.3.4 of the application dated October 7, 1987, within 2 months of the end of the reporting period. The report shall also include a summary of the daily walkthrough inspections. [Applicable Amendments: 1, 24]
30. The licensee shall perform monthly surveys for airborne natural uranium in the restricted area. Monitoring shall be done at locations specified in the licensee's submittal dated January 4, 1991, except one monitor location shall be added in the IX column area. Any area meeting the definition of an "airborne radioactive area" as described in 20.1003, shall be surveyed weekly and the cause of the elevated uranium levels shall be investigated. Results of these investigations shall be furnished to the NRC in the annual ALARA report.

The licensee shall perform monthly surveys for radon or radon progeny in the restricted area inhabited by workers, with the exception that radon or radon progeny surveys shall be increased to weekly if concentrations are found to exceed 8 pCi/l or 0.08 WL (Working Levels), respectively. Such weekly sampling shall be maintained until four consecutive weekly samples exhibit less than 8 pCi/l or 0.08 WL. Monitoring shall be done at locations specified in the licensee's submittal dated January 4, 1991, as amended by the submittal dated October 5, 1995.

The calculation of internal exposure to radon progeny or natural uranium shall be based on a Time Weighted Exposure (TWE) calculation, considering both occupancy times and average airborne concentrations.

If average occupancy times are established for each category of worker, the licensee shall conduct a semiannual time study to establish the basis for averaging occupancy periods.

If any worker reaches or exceeds 25 percent of the maximum permissible exposure limits as specified in 10 CFR Part 20, based upon a calculated TWE for the week or the calendar quarter, dependent on the solubility of the material, the Health Physics Technician (HPT) shall initiate an investigation of the employee's work record and exposure history to identify the source of the exposure.

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Necessary corrective measures shall be taken to ensure reduction of future exposures to as low as is reasonably achievable. Records shall be maintained of these investigations and results furnished to the NRC in the annual reports.

[Applicable Amendments: 10, 12, 24, 26, 33]

31. In addition to the bioassay program discussed in Section 5.7.5 of the application, dated October 7, 1987, the licensee shall comply with the following:

- A. Anytime an action level of 15 ug/l uranium for urinalysis is reached or exceeded, the licensee shall document the corrective actions which have been performed in accordance with Revision 1 of Regulatory Guide 8.22, dated January 1987. This documentation shall be submitted to the NRC as part of the semiannual report required by 10 CFR Part 40.65.
- B. Anytime an action level of 35 ug/l for two consecutive specimens or 130 ug/l uranium for one specimen for urinalysis or 16 nCi uranium for an in vivo measurement is reached or exceeded, the licensee shall document the corrective actions which have been performed in accordance with Revision 1 of Regulatory Guide 8.22. This documentation shall be submitted to the NRC, within 30 days of exceeding the action level.
- C. All in vivo measurements shall be performed in accordance with the recommendations contained in Revision 1 of Regulatory Guide 8.22.

[Applicable Amendments: 24]

32. 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 cm², 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. Additionally, the CRSO shall perform and document unannounced quarterly spot checks of employees leaving the process area.
33. The licensee shall implement a surface contamination monitoring and control program in compliance with the licensee's application, as updated by the submittal dated November 20, 1991. This program shall be revised by the licensee, and reviewed and approved by NRC in the event the licensee installs and operates a yellowcake dryer. Notwithstanding these submittals, the licensee shall initiate and document cleanup efforts within 24 hours in the event that action levels are exceeded. [Applicable Amendments: 10, 15]
34. All radiation and environmental monitoring, sampling and detection equipment shall be recalibrated after each repair and as recommended by the manufacturer or at least semiannually, whichever is more frequent. In addition, all radiation survey instruments shall be operationally checked with a radiation source before each day's use.

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35. Any corporate organizational change affecting the assignments or reporting responsibilities of the radiation safety staff as described in the submittal dated September 8, 1994, shall conform to Regulatory Guide 8.31.

[Applicable Amendments: 26]
36. ~~DELETED by Amendment No. 12.~~
37. ~~DELETED by Amendment No. 15.~~
38. Any changes to the permit area described in the license application dated October 7, 1987, as amended by letters dated June 7, and December 2, 1994, shall require approval by the NRC in the form of a license amendment.
[Applicable Amendments: 24, 29]
39. ~~DELETED by Amendment No. 9.~~
40. The results of effluent and environmental monitoring described in Table 5.7-5 of the license application, as amended by the submittals dated November 20, 1991, and October 5, 1995, shall be reported in accordance with 10 CFR 40, Part 40.65, to the NRC. The report shall also include injection rates, recovery rates and injection manifold pressures. [Applicable Amendments: 15, 24, 33]
41. Before engaging in any activity not previously assessed by the NRC, the licensee shall prepare and record an environmental evaluation of such activity. When the evaluation indicates that such activity may result in a significant adverse environmental impact that was not previously assessed or that is greater than that previously assessed, the licensee shall provide a written evaluation of such activities and obtain prior approval of the NRC in the form of a license amendment.
42. 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; land-disposed in accordance with the July 27, 1988, wastewater irrigation proposal, submitted on August 3, 1988, and modified by cover letter and enclosed waste water irrigation proposal submitted on June 7, 1993; or deep well injected in accordance with the August 19, 1993 report entitled "Hydrogeologic Review and Engineering Design for the Proposed Injection Well, Crow Butte Project, Dawes County, Nebraska," submitted on August 24, 1993, and modified by cover letter and enclosed engineering report submitted on December 7, 1995.

[Applicable Amendments: 1, 25, 33]
43. ~~DELETED by Amendment No. 13.~~
44. At least 2 months prior to mining in each mine unit, the licensee shall submit baseline ground-water quality data to the NRC. The data shall be established in each mine unit at the following minimal density:

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- A. one production or injection well per 4 acres,
- B. one upper aquifer monitor well per 5 acres, and
- C. all perimeter monitor wells.

The data shall consist, at a minimum, of the sample analyses indicated in Appendix 2.9(a) of the October 7, 1987, license application. The baseline data shall support a request for a license amendment establishing upper control limits (UCLs) and restoration standards for each mine unit.

Current UCLs and monitor well locations are designated in:

<u>Submittal Date</u>	<u>Mine Unit No.</u>
December 31, 1990, and March 21, 1994	1
January 23, 1992	2
November 19, 1992	3
February 7, 1994, and March 16, 1995	4
September 12, 1995	5

[Applicable Amendments: 13, 19, 23, 24, 29, 30, 31]

45. All designated monitor wells shall be sampled and tested on a biweekly basis. If two UCLs are exceeded in a well or if a single UCL value is exceeded by 20 percent, the licensee shall take a confirming water sample within 48 hours and analyze it for the excursion indicators. If the second sample does not indicate exceedance, a third sample shall be taken within 48 hours. If neither the second or third indicate exceedance, the first sample shall be considered in error.

If the second or third sample indicates an exceedance, the well in question shall be placed on excursion status, and the NRC shall be notified by telephone within 24 hours and within 7 days in writing from the time the confirmation sample was taken. Upon confirmation of an excursion, the licensee shall implement a corrective action and increase the sampling frequency for the excursion indicators to once every 7 days. An excursion is considered concluded when the concentrations of excursion indicators are below the concentration levels defining an excursion for three consecutive 1-week samples.

[Applicable Amendments: 10, 13, 19, 23]

46. A written report shall be submitted to the NRC within two (2) months of excursion confirmation. The report shall describe the excursion event, corrective actions taken and results obtained. If the wells are still on excursion at the time the report is submitted, injection of lixiviant within the well field on excursion shall be terminated until such time that aquifer cleanup is complete.

[Applicable Amendments: 24]

47. The licensee shall construct all wells in accordance with methods described in the October 7, 1987, application, as amended by letter dated November 20, 1991. 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. The

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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. At the licensee's option, a single point resistance test may be utilized. If any well casing failing the integrity test cannot be repaired, the well shall be plugged and abandoned.

Additionally, 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.

[Applicable Amendments: 14]

48. The licensee shall utilize sodium carbonate/bicarbonate as the lixiviant with an oxygen or hydrogen peroxide oxidant. Any variation from this combination shall require a license amendment.
49. DELETED by Amendment No. 15.
50. The licensee shall maintain a log of all significant solution spills and notify the NRC by telephone within 48 hours of any failure which may have a radiological impact on the environment. Such notification shall be followed, within 7 days, by submittal of a written report detailing the conditions leading to the failure or potential failure, corrective actions taken and results achieved. This requirement is in addition to the requirements of 10 CFR Part 20.

[Applicable Amendments: 24]

51. Ground-water restoration and post-restoration monitoring shall be conducted in each mine unit consistent with the provisions in the licensee's application and Environmental Report dated October 7, 1987, as amended by its submittal dated November 1, 1993. Notwithstanding the above references, the licensee shall include sodium in its restoration monitoring and demonstration program. The goal of restoration shall be returning ground-water quality, on a mine unit average, to baseline conditions. [Applicable Amendments: 22]
52. The licensee is authorized to use respiratory protection equipment and implement protection factors for the purpose of assigning an exposure to airborne radionuclides provided that the respiratory protection program specified in the licensee's submittal dated May 14, 1991, is implemented. The Radiation Safety Officer shall implement the program in accordance with Subpart H to 10 CFR 20, and the program shall follow the guidelines provided in NRC Regulatory Guide 8.15, "Acceptable Programs for Respiratory Protection." [Applicable Amendments: 12, 26]
53. DELETED by Amendment No. 33.

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54. The licensee shall construct ponds 1, 2, and 5 in accordance with their submittal dated May 23, 1988, as modified by their July 16, 1992, submittal. In addition, the ponds shall be constructed as follows:
- Fill material shall be classified as a SM material in accordance with the Unified Soil Classification System.
 - Quality control of the fill shall be performed in accordance with the guidance provided for radon barrier materials in the Staff Technical Position on Testing and Inspection, 1989.
 - As-built drawings shall be submitted to NRC within 3 months of completion of construction of each pond.

[Applicable Amendments: 18]

55. DELETED by Amendment No. 33.

56. All notices or submittals to the NRC required under this license shall be addressed to the Chief, Uranium Recovery Branch, Division of Waste Management, Office of Nuclear Material Safety and Safeguards.

[Applicable Amendments: 24, 33]

FOR THE NUCLEAR REGULATORY COMMISSION

Joseph J. Holonich, Chief
Uranium Recovery Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Dated: 2/28/96