UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

May 4, 2001

Mr. Michael L. Griffin
Manager of Environmental and
Regulatory Affairs
Crow Butte Resources, Inc.
86 Crow Butte Road
Post Office Box 169
Crawford, NE 69339-0169

SUBJECT: NRC INSPECTION REPORT 040-08943/01-01

Dear Mr. Griffin:

This refers to the routine inspection conducted on April 2-5, 2001, at your in-situ uranium processing facility near Crawford, Nebraska. This inspection consisted of a review of site status, site operations, radiation protection, radioactive waste management, and environmental monitoring. The inspection determined that, overall, you have operated the uranium production facility in a safe and effective manner. The inspection findings were presented to you and other members of your staff at the conclusion of the onsite inspection. The enclosed report presents the results of that inspection.

No violations were identified during the inspection; therefore, no response to this letter is required.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available **electronically** for public inspection in the NRC Public Document Room **or** from the *Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from* the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room)."

Should you have any questions concerning this inspection, please contact Mrs. Judith Walker at (817) 860-8299 or the undersigned at (817) 860-8191.

Sincerely,

/LCCarson for/

D. Blair Spitzberg, Ph.D., Chief
Fuel Cycle & Decommissioning Branch

Docket No.: 040-08943
License No.: SUA-1534

Enclosure:
NRC Inspection Report
040-08943/01-01

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ENCLOSURE

U. S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.	040-08943
License No.	SUA-1534
Report No.	040-08943/01-01
Licensee:	Crow Butte Resources, Inc.
Facility:	Crow Butte Project
Location:	Crawford, Dawes County, Nebraska
Dates:	April 2-5, 2001
Inspector:	Judith Walker, Health Physicist (Inspector-in-Training) Fuel Cycle Decommissioning Branch
Accompanied By:	Jack E. Whitten, Chief Nuclear Materials Licensing Branch
Approved By:	D. Blair Spitzberg, Ph.D., Chief Fuel Cycle and Decommissioning Branch Division of Nuclear Materials Safety
Attachment:	Supplemental Information

EXECUTIVE SUMMARY

Crow Butte Project
NRC Inspection Report 040-08943/01-01

This inspection included a review of site status, management organization and controls, in-situ leach operations, radiation protection, radioactive waste management, environmental monitoring, and followup of open items. Also, several events involving the groundwater corrective action program were reviewed including excursions and pond liner leaks. Overall, the licensee was operating the facility in a safe and effective manner.

Management Organization and Controls

- The licensee continued to maintain a staff organization at the site that complied with the license. The radiation protection staff was filled with qualified individuals. The licensee had correctly implemented the requirements of the performance-based license (Section 2).

In-Situ Leach Operations

- Site activities were conducted in accordance with applicable license and regulatory requirements. Site operating parameters were within the respective license limits, and no health or safety hazard was identified (Section 3).

- The inspectors reviewed the licensee's investigation of a mechanical failure of the yellowcake dryer auger, and determined that the licensee had implemented appropriate corrective actions to resolve the problem (Section3).

Radiation Protection

- The licensee implemented a radiation protection program that satisfies the requirements established in 10 CFR Part 20 and the license. Surveys and personnel monitoring were being performed as required. Bioassay samples results did not exceed the prescribed action levels. During the interval of time covered by this inspection report occupational exposures were well below the dose limits specified in 10 CFR Part 20 (Section 4).

Radioactive Waste Management/Environmental Monitoring

- The licensee collected and reported all environmental and effluent monitoring samples as stipulated in the license. Sample results reviewed during the inspection did not exceed applicable NRC regulatory limits (Section 5).

- The licensee conducted operations in such a manner that doses to the nearest resident were below the NRC's annual limit (Section 5).

Report Details

1 Site Status

Crow Butte Resources' in-situ uranium mine was in full operation during the inspection with mining activities in Mine Units 4-7, restoration activities ongoing in Mine Units 2-3, and reclamation activities in Mine Unit 1. The licensee has submitted to the NRC an amendment request to release Mine Unit 1 from reclamation activities. The licensee stated that the State of Nebraska's Department of Environmental Control has released Mine Unit 1 from reclamation activities, and the licensee is currently waiting for approval from NRC to also release this mine unit.

Mine Unit 7 was placed into active service during July 1999, while Mine Unit 3 was removed from service at the same time to begin restoration activities. Development drilling was occurring in Mine Unit 8 during the inspection. The licensee recently placed Wellfield Houses 26 and 31 into service within Mine Unit 7.

The licensee continues the production of yellowcake material in the Central Processing Facility. Uranium-bearing leach solution was pumped from the wellfields to the process facility. Ion exchange columns were used to recover uranium from the leach solution. The end product of the in-situ leach process was dried in a dryer maintained under negative pressure. The yellowcake is then removed from the dryer and packaged into 55-gallon drums for shipment offsite.

2 Management Organization and Controls (88005)

2.1 Inspection Scope

The organizational structure was reviewed to ensure that the licensee had established and maintained an effective organization with defined responsibilities, functions, and controls in place to ensure compliance with NRC requirements.

2.2 Observations and Findings

a. Organization and Staff

The organizational structure requirements are provided in License Condition (LC) 9.3, which references the NRC-approved license renewal application dated December 1995. Additionally, staff assignments and reporting responsibilities are outlined in LC 9.12. At the time of the inspection, approximately 44 individuals were employed by Crow Butte Resources at the site, excluding 15 independent contract workers for well drilling.

During calender year (CY) 2000, the corporate organizational structure was revised to include a Senior Vice President/Manager of Operations. The Manager of Environmental and Regulatory Affairs reports to the President through this newly formed position. The inspectors determined that, overall, the licensee's site organizational structure was consistent with those in place during previous inspections. The licensee had provided an appropriate level of oversight for the current level of plant operations.

License Condition 9.13 delineates the responsibilities and qualifications for the corporate radiation safety officer (CRSO). All qualifications and required refresher training were completed and current as specified in the license and as prescribed in the May 1983 Regulatory Guide (RG) 8.31, "Information Relevant to Ensuring that Occupational Radiation Exposures at Uranium Mills will be As Low As is Reasonably Achievable."

b. Performance-Based License Review

The NRC issued Crow Butte Resources a performance-based license on March 4, 1998. License Condition 9.4 states that the licensee may, under certain conditions, and without prior NRC approval, make changes in the facility or processes, make changes to procedures, or conduct tests and experiments not presented in the license application. The licensee's implementation of the performance-based license provisions was reviewed to ensure that any changes made by the licensee under the provision of License Condition 9.4 did not negatively impact the licensing basis of the site. In CY 2000, the licensee conducted eight safety and environmental review panel (SERP) meetings addressing the following subject areas:

- Review of spill events for the period January 1 through May 31, 1999,
- Organizational Change Evaluation,
- Review and approval of Well House 26,
- Wellfield Oxygen Injection Test,
- External Beta Radiation Survey, change to meet recommendations in Regulatory Guide 8.30, Section 1.4,
- Review and approval of Well House 29,
- Change of Dosimetry Technology from Thermoluminescent (TLDs) to Optically Stimulated Luminescence (OSL),
- Review of spill events for the period of January 1 through October 6, 2000.

The inspectors reviewed the minutes of the eight meetings conducted by the SERP panel and determined that the conclusions made at these meetings were technically and administratively adequate. Changes made to licensed activities that resulted from the SERP panel recommendations did not negatively impact the licensing basis of the site.

2.3 Conclusions

The licensee continued to maintain a staff organization at the site that complied with the license. The radiation protection staff was filled with qualified individuals. The licensee correctly implemented the requirements of the performance-based license.

3 In-Situ Leach Facilities (89001)

3.1 Inspection Scope

The objective of this portion of the inspection was to verify that the licensee had conducted site activities in accordance with applicable regulations and conditions of the license. Additionally, the scope of the inspection was to ensure that operational controls were adequate to protect the health and safety of workers and members of the public.

3.2 Observations and Findings

a. Site Tour

Site tours were performed by the inspectors to verify that licensed activities were being conducted in accordance with applicable regulations and specific license conditions. During the site tour the inspectors visited major buildings, waste storage areas that included the deep storage well, and mining and processing equipment. The inspectors examined fences, and gates and noted that they were in good condition. Site fences were also properly posted in accordance with License Condition 9.11. The facility and related processing equipment appeared in good condition and operated properly. Equipment misalignments that could have resulted in loss of uranium bearing materials and could result in potential contamination were not identified. Process flow, level, or pressure parameters were not found outside of their required ranges. Yellowcake product contamination was not observed on the floor or in the general area of the central processing plant.

License Condition 10.5 specifies that the annual throughput for the licensed operation shall not exceed a flow rate of 5,000 gallons per minute (gpm), not including restoration flow. The current production flowrate was estimated by the licensee as approximately 4,400 gpm. At the time of the site tour, a production flowrate of 3,410 gpm was observed while the injection flowrate was 3,181 gpm. The 229 gpm difference was attributed mainly to the process bleed flow used to maintain a negative groundwater gradient in the wellfields to prevent the migration of lixiviant and dissolved uranium outside the recovery zone. Restoration flow was noted by the inspectors as 426 gpm at the time of the site tour. In summary, actual flow rates were well below the 5,000 gpm limitation established in the license.

License Condition 11.1 states, in part, that during wellfield operations, injection pressures shall not exceed the integrity test pressure of 100 pounds per square inch (psi) at the injection well heads. The inspectors noted that the well injection fluid pressure in the pipe exiting the Central Processing Facility was 86 psi. The NRC inspectors also confirmed that the licensee was obtaining and recording process flows and pressures in accordance with License Condition 11.1.

The inspectors performed independent radiological surveys using an NRC-issued Ludlum Model 19 microRoentgen meter (Serial Number 36514, calibration due date of August 16, 2001) that was calibrated to radium-226. Areas surveyed included the Central Processing Facility, the Reverse Osmosis Building, Yellowcake Dryer Room,

Yellowcake Drum Storage Area, and Well House 31. The individual areas surveyed by the inspectors did not identify a radiation area (exposure rate of greater than or equal to 5 millirems per hour) that was not currently designated and labeled as a radiation area by the licensee.

b. Evaporation Ponds

License Condition 10.6 states that the research & development ponds shall have at least 0.9 meters (3 feet) of freeboard, and the commercial evaporation ponds shall have at least 1.5 meters (5 feet) of freeboard. License Condition 10.6 also requires the licensee to keep a sufficient reserve capacity in each pond to enable the transfer of contents from one pond to the other ponds. A visual inspection of the ponds was conducted by the inspectors. The inspectors noted that the freeboard limits and reserve capacity were in compliance with the license requirements. Through conversation with the licensee and a records review, the inspectors determined that the licensee was relying less on the ponds and more on the deep disposal well to handle liquid waste disposals. Due to the availability and capacity of the deep disposal well the licensee did not routinely maintain the ponds at full capacity.

License Condition 11.4 requires the licensee to perform and document pond inspections. An onsite observation of the licensee's routine weekly pond inspection procedures using operating Procedure C-1, "Waste Pond Inspection," was made by the inspectors. Procedure C-1 outlined a step-by-step process for making a determination of a potential liner leak by first measuring the amount of water in a leak detection standpipe (the pipe running in between the liners beneath the pond). If it was determined that more than 6 inches of fluid existed, a measurement of specific conductance was made. If the conductivity measurement indicates a reading higher than 50 percent of the conductivity of the pond water, then the standpipe water was sampled for excursion parameters. No readings were noted during the site tour of Pond 3 that would indicate that its liner was leaking.

During the last NRC inspection, the inspectors noted that the licensee's operating procedures were unclear in determining when a liner leak occurs; after the licensee determines that the conductivity was at least 50 percent of the pond water or after the excursion parameters were determined. During this inspection, the inspectors reviewed the revised Waste Pond Inspection Procedure. The Waste Pond Inspection Procedure required an immediate liner inspection if there was an abrupt increase in previous measurements taken of the vertical fluid depth with an abrupt increase in the specific conductance of the fluid in the standpipe. Abnormal increases in both of these two indicators confirms a liner leak.

After observing the licensee's staff conduct level and conductance measurements, inspect the ponds for abnormal conditions, and complete pond inspection records, the inspectors concluded that the license conditions and internal operating procedures were followed. The licensee's inspections were deemed technically adequate.

c. Management of Spills

License Condition 12.4 states that until license termination, the licensee shall maintain documentation on all spills of source or 11e.(2) byproduct materials. Also, the licensee is required to notify the NRC of any spill that may have a radiological impact on the environment. The maintenance of the spill records is required, in part, by the decommissioning record-keeping requirements of 10 CFR 40.36(f). Onsite records for CY 2000-2001 spills were reviewed to determine if the licensee reported significant spills to the NRC.

The licensee maintained extensive spill records for all solution releases. Records indicated that the licensee experienced 30 spills during CY 2000, a decrease from 46 spills in year 1999, and 2 spills to date in CY 2001. Most spills were caused by piping component wear or failure, stuck or leaking pressure relief valves, human error, and open or leaking bleed valves. The licensee's SERP reviewed the CY 2000 spills as part of the performance-based licensing process to ascertain whether any trends existed. In summary, a review of the licensee's site procedure guidance and spill records did not identify any mis-classified incidents or spills that were not correctly reported to the NRC.

d. Yellowcake Dryer Operations

The licensee dried yellowcake product using a vacuum chamber dryer. The yellowcake dryer is required by the NRC to be operated and maintained in accordance with the requirements listed in LC 10.8. License Condition 10.8 requires that the yellowcake dyer be maintained at a negative pressure during system operation. The licensee's SOP P-19 "Yellowcake Dryer Operation and Maintenance," was used by the operations staff when operating the dryer. During the inspection, the licensee demonstrated the yellowcake dryer alarm functions from the control room computer. The inspectors concluded that the negative pressure system for the yellowcake dryer was fully operational.

On December 18, 2000, the yellowcake dryer experienced an upset when heating oil was introduced into the yellowcake. Due to this condition, there was a partial loss of dryer vacuum when the yellowcake in the dryer apparently underwent an exothermic reaction. Immediate corrective actions were taken, including shutting off the dryer heat due to low vacuum as required by operating procedure. The yellowcake dryer room was sealed and remained posted as an airborne radioactivity area as required by the operating procedure. Although the negative pressure was significantly reduced, the dryer continued to maintain negative pressure throughout the period. To ensure that airborne radioactivity areas did not exist in the vicinity of the yellowcake dryer, air samples were later taken in the dryer room and throughout the plant. Results of the air samples taken revealed that the maximum airborne uranium concentration was 32 percent of a DAC for natural uranium in one location of the dryer room.

Dryer repair and maintenance was later performed on the dryer auger shell and scrapper. The incident resulted because the scrapper was misaligned and had worn through the auger shell. As a long-term corrective action, the licensee was considering a retrofit to the existing system by adding fittings on the oil heater to circulate cool oil in

the dryer to remove heat from the yellowcake. This incident was the subject of an NRC Information Notice, 99-03, Exothermic Reactions Involving Dried Uranium Oxide Powder (Yellowcake).

3.3 Conclusions

Plant process parameters were within the licensed limits, site fences were in good condition, and perimeter postings were appropriate. Radiation areas were properly posted. The inspectors reviewed the licensee's implementation of yellowcake dryer maintenance and operations, and concluded that the licensee was performing appropriate corrective actions. In conclusion, site activities were conducted in accordance with applicable license and regulatory requirements.

4 Radiation Protection (83822)

4.1 Inspection Scope

The scope of this part of the inspection was to determine if the licensee's radiation protection program was in compliance with the requirements established in the license and 10 CFR Part 20 regulations.

4.2 Observations and Findings

a. Occupational Exposure Monitoring

The licensee's exposure monitoring program was reviewed to ensure that no worker exceeded the occupational dose limits specified in 10 CFR 20.1201. The program consisted of the issuance of thermoluminescent dosimeters (TLDs), or optically stimulated luminescent dosimeters (OSLs) to site workers and collection of air particulate samples for natural uranium and radon daughters. TLDs were used for the first three quarters of CY 2000 and OSL dosimeters for the last quarter of CY 2000. In October of 2000, the licensee's vendor changed dosimetry technology from TLDs to OSL dosimeters. The SERP approved this change of dosimetry on October 13, 2000. The inspectors reviewed the licensee's dosimetry records and concluded that no individual exceeded the NRC's annual occupational dose limits.

The licensee monitored a total of 29 individuals during CY 2000, primarily workers in the central processing facility. TLDs were issued to these site workers for monitoring of external exposures. The licensee's records indicated that the highest external exposure for CY 2000, was 258 millirems with an overall employee average of 81 millirems.

The licensee performed air sampling for uranium on a monthly basis. No sample result in the general plant area exceeded the action level, and the average sample result for CY 2000 was less than 1 percent of the derived air concentration value listed in 10 CFR Part 20, Appendix B, Table 1, "Occupational Values." Air samples were also obtained during yellowcake packaging operations. These sample results occasionally exceeded the action level; however, respirators were required and used during these operations.

Radon daughter sampling was conducted monthly unless the action level established by the licensee was exceeded, then the sampling frequency was weekly. The average concentration in CY 2000 was 0.023 working levels (WL), or 7 percent of the derived air concentration value of 0.33 WL. During CY 2000, the lowest action level (0.08 working levels) was exceeded on different occasions and corrective actions were taken in each instance.

The licensee used the TLD and OSL monitoring results for determination of external exposures and the radon daughter and natural uranium results from air sampling for determination of internal exposures. The licensee conservatively calculated the total effective dose equivalent (TEDE) values assuming a 100 percent occupancy factor for workers. In CY 2000, the highest TEDE was determined to be 0.658 rems, below the NRC‘s annual TEDE dose limit of 5 rems listed in 10 CFR 20.1201. The occupational TEDEs were primarily the result of exposure of individuals to radon daughters.

b. Contamination Control Program Review

The contamination program requirements are provided in Table 5.7-18, ”Radiological Monitoring Program Summary,” of the NRC-approved license renewal application as well as License Conditions 9.3, 9.8, 10.11, and 10.12. The contamination control program consisted of surface contamination surveys, skin and personnel clothing surveys, equipment release surveys, and bioassay sampling.

Table 5.7-18 specifies that eating rooms, change rooms, and office areas shall be surveyed for alpha contamination on a weekly basis. The licensee surveyed the restricted and unrestricted areas using hand-held instruments for detection of total alpha contamination (fixed and removable). Also, in the unrestricted areas, smear tests for removable alpha contamination were performed monthly. All CY 2000 sample results were below the respective license and action limits. The licensee continued to maintain control over surface contamination in all areas of the facility.

License Condition 10.11 states that employees shall monitor themselves with an alpha survey instrument prior to exiting the restricted area. Should the results of monitoring exceed the action level, employees shall decontaminate themselves to less than the action level. Also, Table 5.7-18 states that the licensee shall perform and document unannounced quarterly spot checks of the skin and personal clothing of employees exiting the controlled areas. The licensee’s records of these spot checks were reviewed. The licensee found that on one occasion during CY 2000, that an individual failed a spot check. The contamination was removed from the individual prior to exiting the controlled area. The radiation safety staff reinforced the instructions on frisking requirements and techniques.

In accordance with License Condition 9.8, the release of equipment 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 or Source Materials.” The licensee’s equipment release records were reviewed during the inspection. The licensee’s records indicated that no items were released with contamination in excess of

the fixed surface and removable contamination limits that are specified in the NRC guidance document.

The bioassay program requirements are listed in License Conditions 9.3 and 10.12. The sample frequency varied depending on work assignment. Initial baseline, termination, and annual sampling was performed for all employees at the site. Quarterly sampling was performed for all workers including laboratory personnel. Monthly sampling was performed for all workers with the potential for exposure to dried yellowcake material, and special bioassays were taken for workers under an radiation work permit (RWP). The licensee collected approximately 225 samples from site workers during CY 2000 through March 2001. All routine and non-routine bioassay samples collected had results that were less than the detection limit of 5 ug/l.

c. Radiation Work Permits

License Condition 10.9 states that where the potential for exposure to radioactive materials exists, and for which no standard operating procedure (SOP) exists, a RWP shall be required. The licensee issued 23 radiation work permits during CY 2000. Selected radiation work permits were reviewed and the documents were determined to meet the intent of the license.

d. Respiratory Protection

The respiratory program was reviewed during the inspection. Six site employees were fully qualified to wear respirators; four employees involved with the yellow packaging operations and two safety personnel. Annual respirator refresher training was performed on December 13, 2000. Contract workers also received respiratory training before performing work at the site.

Table 5.7-20 requires the licensee to perform surveys for alpha contamination on all respirators after cleaning and before packaging for reuse. The inspectors noted that all survey results were less than 20 dpm/100 cm^2 with an action level of 100 dpm/100 cm^2. A records review by the inspectors indicated that the licensee's respirator cleaning activities were effective in removing loose or fixed contamination.

e. Instrument Calibrations

License Condition 10.13 states, in part, that all radiation, environmental monitoring, sampling, and detection equipment shall be calibrated after repair and as recommended by the manufacturer or at least annually, whichever is more frequent. The inspectors reviewed calibration records for all the equipment used. The licensee maintained calibrated equipment available for use, and had records indicating all equipment was routinely calibrated against a known standard and was daily checked for proper operation with a radiation source. During the site tour, the inspectors observed that radiation detection equipment used in the plant was calibrated and daily operational checks were made on each survey instrument.

f. Annual Program Review

License Condition 12.6 specifies that an annual as low as is reasonably achievable (ALARA) audit of the radiation safety program shall be performed in accordance with Regulatory Guide 8.31 and Section 5.3 of the license application. The CY 2000 annual ALARA audit was completed on March 2001.

The audit identified two areas where recommendations were made: (1) the frequency of spot checks on site vehicles should be reviewed to determine whether each site vehicle should be checked on a more frequent basis to adequately control contamination of site vehicles and (2) consideration of discontinuing the routine determination of internal exposure to airborne uranium based upon historic levels, however, this determination would continue for dryer operators and workers requiring an RWP and respirator. Due to commitments made in the license renewal application, this change may require a license amendment. The inspectors concluded that the licensee's annual program review, summarized the radiation protection program and provided information key to radiation protection.

4.3 Conclusions

The licensee implemented a radiation protection program that met the requirements established in 10 CFR Part 20 and the license. Surveys and personnel monitoring were being performed as required. Bioassay samples results did not exceed the prescribed action levels. Occupational exposures were well below the 10 CFR Part 20 limits.

5 Environmental Monitoring (88045)
Radioactive Waste Management (88035)

5.1 Inspection Scope

The environmental monitoring and groundwater corrective action programs were reviewed to assess the effectiveness of the licensee's programs and to evaluate the impact, if any, of site activities on the local environment.

5.2 Observations and Findings

a. Environmental Monitoring

License Condition 11.3 states, in part, that the licensee shall establish and then conduct an effluent and environmental monitoring program in accordance with the program submitted by letter dated March 18, 1999. License Condition 12.1 states, in part, that the effluent and environmental monitoring program results shall be reported to the NRC in accordance with the provisions of 10 CFR 40.65. The inspectors reviewed the licensee's semi-annual effluent and environmental monitoring reports. The inspectors also reviewed the original laboratory data used in the development of these reports. The inspectors noted that the semi-annual reports were submitted to the NRC in a timely manner and provided all the relevant data.

b. Environmental Air Sampling

The licensee performed air particulate, radon, surface water, sediment, water supply well, and ambient gamma radiation monitoring. The licensee utilized seven sample stations including one background (control) and three nearest resident stations. Air particulate sampling was performed at each station for a minimum of 2 weeks per month when the dryer was in use. The filters were composited on a quarterly basis and analyzed for natural uranium, radium-226, and lead-210 concentrations. All air particulate sample results were less than 3.4 percent of the applicable limits specified in 10 CFR Part 20, Appendix B, Table 2, "Effluent Concentrations."

Radon-222 was monitored at the seven sample stations with track-etch canisters which were exchanged on a semi-annual basis. The highest sample result was obtained at the fenceline monitoring station No. 5 during the second half of CY 2000. This sample result was 16 percent of the applicable effluent concentration limit (with daughters removed).

c. Environmental Exposure Rates

Environmental thermoluminescent dosimeters (ETLDs) were located at the sample stations to monitor the ambient gamma exposures. The ETLDs were exchanged on a quarterly basis. The highest annual exposure was measured at fenceline monitoring Station 8. This exposure was 12.2 millirems, with background subtracted.

d. Surface Water Sampling

Surface water samples were collected quarterly from each water impoundment in the wellfield area and each stream passing through the wellfield area. Grab samples were analyzed for natural uranium and radium-226 concentrations. All sample results taken by the licensee in CY 2000 were 7.3 percent or less of the applicable effluent concentration limit specified in 10 CFR Part 20, Appendix B, Table 2.

e. Sediment Samples

Sediment samples were required by the license to be collected annually from two local streams (Squaw and English Creeks). These samples were collected twice during CY 2000, and analyzed for natural uranium, radium-226, and lead-210 concentrations. No adverse trends were identified for any sample location and radioisotope.

f. Public Dose Assessment

The inspectors evaluated the public dose to ensure that site operations did not result in a total effective dose equivalent to individual members of the public in excess of 100 millirems per year, the annual limit specified in 10 CFR 20.1301. The evaluation included environmental monitoring data for CY 2000, and data at the background station and three nearest resident stations. Based on the highest dose measured for CY 2000, the dose to the public was well below the NRC's annual limit.

g. Groundwater Monitoring Program

License Condition 11.2 requires the licensee to sample all perimeter and upper aquifer monitor wells on a frequency of no more than 14 days apart (postponement requires documentation), specifies excursion criteria, and references corrective action procedures for excursions. License Condition 12.2 requires the licensee to notify the NRC in the event of an excursion. Procedure E-5, “Routine Monitor Well Sampling,” was reviewed. Following the review of the sampling records and after observing licensee staff implement the sampling procedures, the inspectors concluded that the groundwater sampling program was technically adequate and in compliance with the license condition and the licensee’s procedures.

Water supply wells within 1-kilometer of the wellfields were grab sampled quarterly for natural uranium and radium-226 concentrations. Fifteen wells were sampled during CY 2000. The sample results were at or under 3.8 percent of the applicable effluent concentration limit listed in 10 CFR Part 20, Appendix B, Table 2.

5.3 Conclusions

The licensee collected and reported all environmental and effluent monitoring samples that was required by the license. No sample result exceeded the applicable NRC regulatory limits. Environmental and effluent monitoring programs confirmed that the licensee conducted operations in such a manner that the doses to the nearest resident were below the NRC ‘s annual limit. The licensee had effectively implemented the environmental and effluent monitoring programs, and the site did not have an adverse impact on the local environment.

6 Followup (92701)

6.1 (Closed) Unresolved Item 040-8943/9902-02: NRC Review of Criteria For Reporting Significant Spills

During the September 1999 inspection, the NRC performed a review of the licensee’s spill records for year 1999. The inspectors identified two spills that may have met the criteria for reportability, although the licensee did not report these two incidents, in part, based on the licensee’s interpretation of what constitutes a reportable spill. At the conclusion of the March 2000 inspection, the subject of reportability was still under review by the NRC.

The finalized NRC reporting criteria will be presented in the new standardized uranium recovery licenses. The licensee will receive new guidance on spill reportability in the next license amendment submitted. This item is closed.

6.2 (Closed) Licensee Event Report March 1, 2001, (NRC Event No. 37801): Excursion of SM6-13

On March 1, 2001, during routine bi-weekly water sampling of well SM6-13, the single parameter for sulfate was exceeded. The licensee stated that a similar exceedence of the sulfate and chloride UCLs occurred in March 2000 for the same well. The licensee

attributed the exceedence to the natural fluctuations in groundwater quality. In accordance with License Condition 11.2, sampling frequency was increased from bi-weekly to weekly sampling.

On August 23, 2000, the licensee requested an license amendment to propose alternate methods of calculations of UCLs for shallow monitoring wells with good water quality. The NRC approved these changes by license Amendment 8. The licensee's SERP approved these changes, including a new sulfate UCL for SM6-13. Based upon the new sulfate UCL, SM6-13 is no longer on excursion status and has been returned to normal status. This event is closed.

6.3 (Open) Licensee Event Report (NRC Event No. 36940): Well SM7-23 Excursion

On April 27, 2000, during routine bi-weekly water sampling of SM-723, the single UCL for sulfate was exceeded. The NRC was notified on April 28, 2000. The licensee increased the sampling frequency to weekly as required by License Condition 11.2, from December 26, 2000, to present.

The licensee stated that the increase of sulfate was not due to the migration of mining solutions since this well is located in a new area of Mine Unit 7 in which activities have not begun. The licensee supported this determination by noting that the other parameters (alkalinity, chloride, specific conductance, and sodium) did not show an increasing trend. Trending graphs show that sulfate concentrations in the SM7-23 appear stable at the current levels. The licensee stated that it may be necessary to propose new multiple and single UCLs for sulfate in SM7-23. The licensee will continue to sample this well on a weekly basis until three consecutive samples are below the exceeded UCL.

6.4 (Closed) Licensee Event Report (NRC Event No. 37014): Pond 4 Liner Leak

On May 19, 2000, during a routine pond inspection, increased conductivity had been detected in the underdrain system. The licensee pumped down the pond for a liner inspection. Liner repairs and mitigative measures were successful in returning the underdrain to a condition that would allow reliable detection of potential future leaks in the Pond 4 liner system. This event was closed by NRC letter dated December 18, 2000.

6.5 (Closed) Licensee Event Report (NRC Event No. 37039): Well SM6-13 exceeded the sulfate limits and Well SM6-28 exceeded the sulfate and chloride limits

On May 25, 2000, during routing bi-weekly water sampling, Well SM6-13 exceeded the single parameter UCL for sulfate and Well SM6-18 exceeded the single parameter UCL for chloride and sulfate. After sampling the wells for a period of time, the concentrations decreased below the UCL for three consecutive weekly sampling periods, therefore, ending the excursion status. This event is closed.

6.6 (Closed) Licensee Event Report June 9, 2000 (NRC Event No. 37073): Pond 1 Liner Leak

On June 9, 2000, during a routine pond inspection, increased conductivity had been detected in the underdrain system. The licensee pumped down the pond for a liner inspection. Liner repairs and mitigative measures were successful in returning the underdrain to a condition that would allow reliable detection of potential future leaks in the Pond 1 liner system. This event was closed by NRC letter dated December 18, 2000.

6.7 (Closed) Licensee Event Report: Pond 3 Liner Leak

On August 25, 2000, during a routine pond inspection, increased conductivity had been detected in the underdrain system. The licensee pumped down the pond for a liner inspection. Liner repairs and mitigative measures were successful in returning the underdrain to a condition that would allow reliable detection of potential future leaks in the Pond 3 liner system. This event was closed by NRC letter dated October 25, 2000.

6.8 (Closed) Licensee Event Report (NRC Event No. 37301): Well SM6-12 exceeded four parameter UCLs

On September 8, 2000, during bi-weekly sampling of Well SM6-12, the single parameter UCL was exceeded for sodium, sulfate, chloride and conductivity. Based on results, Well SM6-12 was placed on excursion status and sampling increased from bi-weekly to weekly. The final three samples taken were at or below the applicable UCL for each parameter, based on this criteria the excursion status was concluded and the well was returned to normal status. This issue was closed by NRC letter dated December 18, 2000.

6.9 (Closed) Licensee Event Report (NRC Event No. 36770): Well SM6-18 in Excursion

On March 6, 2000, during bi-weekly sampling of Well SM6-18, the single parameter upper control limit was exceeded form chloride. Well SM6-18 was placed on excursions status and sampling increased from bi-weekly to weekly. On August 23, 2000, the licensee requested a license amendment to propose alternate methods of calculations of UCLs for shallow monitoring wells with good water quality. The NRC approved these changes by license Amendment 8. The licensee's SERP approved these changes, including a new chloride UCL for SM6-18. Based upon the new chloride UCL, SM6-18, is no longer on excursion status and has been returned to normal status. The event is closed.

7.0 (Open) Licensee Event Report (NRC Event No. 37945): Pond Liner Leak

On June 26, 2001, during a routine pond inspection, increased conductivity was detected between the inner and outer liner system. The licensee plans to pump down the pond for liner inspections and repairs. Also, the licensee will submit a final report to the NRC when all repairs and mitigative measures are completed.

7 Exit Meeting Summary

The inspectors presented the inspection results to representatives of the licensee at the conclusion of the inspection on April 5, 2000. Licensee representatives acknowledged the findings as presented. The licensee did not identify anything reviewed by the inspector as proprietary.

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

M. Griffin, Manager of Environmental/Regulatory Affairs
R. Grantham, Radiation Safety Officer
C. Miller, Plant Superintendent

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None

Closed

040-08943/9901-02	URI	NRC Review of Criteria For Reporting Significant Spills.

Discussed
None

LIST OF ACRONYMS USED

ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
CY	calender year
ETLD	environmental thermoluminescent dosimeter
gpm	gallons per minute
NMED	Nuclear Materials Event Database
PDR	Public Document Room
psi	pounds per square inch
RWP	radiation work permits
SERP	Safety and Environmental Review Panel
TEDE	total effective dose equivalent
TLD	thermoluminescent dosimeter
UCL	upper control limit