

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
URANIUM RECOVERY FIELD OFFICE
REGION IV

Inspection Report: 40-8943/94-01

Operating License: SUA-1534

Licensee: Ferret Exploration Company of Nebraska, Inc.
216 Sixteenth St. Mall, Suite 810
Denver, Colorado 80202

Facility Name: Crow Butte In Situ Leach Facility

Inspection At: Crawford, Nebraska

Inspection Conducted: March 18, 1994

Inspector: J. Grimm, Project Manager

Accompanying Personnel: M. Layton, Project Manager
Office of Nuclear Material
Safety and Safeguards

Approved: _____

Edward F. Hawkins
Edward F. Hawkins, Deputy Director
Uranium Recovery Field Office
Region IV

5/15/94
Date

Inspection Summary

Areas Inspected: Routine, announced inspection of in situ leach uranium recovery operations including Management Organization and Controls; Operations Review; Maintenance/Surveillance Testing; Radioactive Waste Management, and Radiation Protection.

Results:

- The licensee had responded adequately to previous inspection findings addressing standard procedures related to process system alarms and the plant ventilation system (Section 2).
- The newly installed yellowcake drying system is adequately operated and maintained. Dryer operations are electronically controlled and monitored by the processing plant's computerized monitoring system (Section 3).
- Well drilling, pipeline installation, and other related construction in mine unit No. 4 was in progress. Construction and testing records should be reviewed during a subsequent inspection (Section 4).

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- The dryer system appears to operated efficiently and safely, and includes design and procedural elements maintaining radiation exposures as low as reasonably achievable (Section 6).

Summary of Inspection Findings:

The inspection resulted in no violations or deviations.

Attachment:

Persons Contacted and Exit Meeting

DETAILS

1 SITE STATUS

The Crow Butte in situ leach (ISL) facility was in operation at the time of the inspection. Mine Unit Nos. 2 and 3 were in full production status. Mine Unit No. 1 was shut in awaiting restoration procedures. Mine Unit No. 4 was being completed, and the initial manifold building and injection and production wells were in use.

Since the previous inspection, the licensee had completed constructing the housing for and installing a yellowcake dryer. This inspection was scheduled specifically to address operating the new dryer. The dryer had been operating on a batch basis for several months.

2 MANAGEMENT ORGANIZATION AND CONTROLS (88005)

At the time of the inspection, operations at the Crow Butte ISL were being conducted 24 hours per day in three shifts. There were two operators per shift plus a two-person day crew. The licensee also employs a drilling contractor who utilizes three drilling rigs and crews to install new well fields. The inspector noted that yellowcake production and process flow rates remained below limits specified in the license.

The Vice President is the highest ranking corporate official onsite. The Vice President reports to the President, who is located in the Denver, Colorado corporate office. The Plant Superintendent, Senior Geologist, and Radiation Safety Officer (RSO) all report to the Vice President. The RSO, who is responsible for all aspects of the site radiation safety and environmental monitoring programs, is assisted by one radiation safety technician. The Vice President serves as acting RSO during periods when the RSO is absent from the site.

The inspector reviewed a new Standard Operating Procedure (SOP) addressing dryer operations. The SOP was comprehensive, describing the dryer system and addressing preoperational checks, loading, drum preparation, and yellowcake packaging. Precautionary information described access-control areas, protective clothing and respirator requirements, and times when suspended yellowcake could be present in the dryer area.

The inspector reviewed an SOP that was revised to address findings of an earlier inspection. Procedures for preparing yellowcake or other radioactive material shipments were formerly addressed in a transportation manual, but were not specifically addressed in an SOP. The licensee had created a new SOP outlining transportation procedures, and referring to the manual. The SOP includes material loading instructions, truck wash-down procedures, surveying instructions, release criteria, and accident instructions.

Two additional SOPs were created since the previous inspection. The first provided formal instructions for responding to processing-plant alarms. It provided a run down of plant components connected to the alarm system, and specified required responses for alarms in the well fields and inside the

processing plant. Another SOP addressed the plant ventilation system. Most importantly, this SOP addressed required actions to assure that circuit breakers providing power to the plant ventilation system are reactivated following a power failure. The licensee added that the local electric power cooperative was installing a new substation nearby, and power failures were expected to become less frequent.

The inspector determined that licensee activities in this area were conducted in accordance with license requirements. Additionally, the inspector found that the licensee had responded adequately to previous inspection findings regarding appropriate SOPs.

3 OPERATIONS REVIEW (88020)

The yellowcake dryer uses vacuum technology. Even though a heating element is used to elevate the system's internal temperature, the system more accurately should be called a dehydrator. The heating element uses heated oil in a closed loop. Neither the heating source nor any heating exhaust come into direct contact with the yellowcake being dried. A vacuum pump provides negative pressure exceeding minus 10 inches of mercury in the dryer vessel, drawing water vapor off the yellowcake, through a bag filter and a condenser. All condensate is captured in a pressure vessel. The pressure vessel is periodically and automatically purged, returning condensate and any escaping particulates to the plant yellowcake processing system. The dryer has no vent stack exiting the building.

Operations at the site are electronically monitored. Since the previous inspection, the dryer was added to the computerized monitoring system. The system is displayed schematically on a monitor found in the processing plant's control room. Color components indicate the status of all operating systems associated with the dryer. These included the heating-cooling system, vacuum-pump operation, temperature and vacuum-pressure monitoring, condensate accumulation and removal monitoring, and status of motors and moving parts. The monitoring system was capable of displaying temperature and pressure data graphically providing both an instantaneous and continuous record for the entire batch process.

The inspector observed yellowcake packaging activities for a batch dried during the inspection. The dryer room was closed and placarded as an airborne radiation area at the start of the procedure. The operators donned protective gear, and the RSO started area samplers for airborne particulates both inside and outside the dryer room. These procedures will be described in more detail in Section 6 of the is report.

The packaging operation required elevating a drum into the dryer's discharge chute. The operators equilibrated the drum's internal pressure with the drying chamber to prevent excessive yellowcake suspension, and opened the chute. Loading was monitored manually by tapping the drum to detect the level of yellowcake contents. Each drum was manually agitated using a heavy mallet and a pneumatic vibrator to promote yellowcake settling. When the chute was closed, it was vibrated with the drum to dislodge any yellowcake failing to clear the chute. The drum was carefully lowered so the level inside the drum

could be inspected visually. Then the drum was lowered and covered. The dryer batch filled 8 drums.

When the yellowcake batch was completed, the operators clamped each drum closed and vacuumed each drum lid. Before the room was opened, the operators washed down the dryer support structure, the drums, and the packaging area. Wash water was swept to floor drains leading to the processing plant's sump system.

The inspector concluded that the licensee conducted yellowcake drying and packaging operations in accordance with license requirements.

4 MAINTENANCE/SURVEILLANCE TESTING (88025)

The inspector toured the main processing plant and well fields during the course of the inspection. Restricted areas were observed to be posted in accordance with license requirements.

The licensee had completed connecting well house No. 9 to the main plant. Lixiviant injection had been started in a limited number of new wells, and flow rates were being adjusted. The inspector observed that the licensee was using high density polyethylene (HDPE) pipe for its trunk lixiviant pipelines. This represented a switch from polyvinyl chloride (PVC) used in earlier mine units. The licensee had experienced some pipeline leaks in the past, stemming largely from connecting pipeline sections using sleeve connections. The HDPE pipes are welded together and should provide improved performance.

Pipeline and manifold building construction in mine unit No. 4 was slated to continue for several months. Construction records and pipeline pressure testing results should be reviewed during a subsequent inspection.

5 RADIOACTIVE WASTE MANAGEMENT (88035)

The inspector observed embankments, liners, and diversion ditches of Pond Nos. 1, 3, and 4. The purpose of the observations was to follow-up on maintenance issues raised during a previous inspection. The inspectors noted that minor erosion continues on the steepest portion of the pond embankments. The licensee, however, continues to regrade and fill areas experiencing excessive erosion. Additionally, the vegetative cover on Pond No. 1 was still being established and should help stabilize the soil.

The licensee continues to monitor electrical conductivity in water found in leak detection standpipes on a weekly basis. Typically, the water found there is relatively clean condensation. Previous inspections determined that selected standpipes in the monitoring system have exhibited fluctuating and elevated electrical conductivity, but did not exceed the 50 percent action level cited in the licensee's standard operating procedures. Additionally, the standpipe fluid levels remained steady throughout the monitoring period.

To address potential standpipe contamination, the inspector observed that the licensee had resealed the annular space separating the standpipes from the

pond liner. This situation had been identified as a potential source of standpipe contamination from windblown dirt and other debris.

The inspector's observations indicate that several areas of pond embankment maintenance will continue to require routine attention by the licensee.

6 RADIATION PROTECTION (83822)

6.1 Internal Exposure Control

The inspector observed the batch yellowcake packaging process and associated radiation protection measures. The dryer is located in a specially-built enclosure inside the main processing plant's restricted area. It is assessable only from the interior of the plant through two standard doorways and one cargo door. Prior to packaging, the RSO loaded four area particulate samplers with filters and started the pumps. The RSO then closed and posted each entrance as an "airborne radioactivity" area.

Two plant operators conducted the packaging. They each wore protective clothing consisting of (1) plastic coveralls and hoods, (2) knee-high rubber boots, (3) full-face respirators with high-efficiency particulate filters, (4) surgeons gloves, and (5) hard hats. Closed containers were provided outside the dryer room to hold contaminated equipment for washing.

The licensee has an approved respiratory protection program. The RSO issues full face air purifying respirators for no credit during RWPs and yellowcake drying. The program was carefully reviewed during an earlier inspection less than one year previous, and was not addressed further during this inspection.

6.2 Conclusion

The inspector concluded that the licensee's radiation protection program specifically addressing yellowcake drying was adequate and appropriate for the facility. The results of air sampling and personal exposures related to yellowcake handling will be reviewed during the next routine inspection, and while reviewing the licensee's annual ALARA audit.

ATTACHMENT

1 PERSONS CONTACTED

1.1 Licensee Personnel

- *R. Knode, Vice President
- C. Miller, Plant Superintendent
- *R. Grantham, Radiation Safety Officer
- *R. Herrick, Health Physics Technician

1.2 NRC Personnel

- *J. Grimm, Project Manager
- *M. Layton, Hydrogeologist

In addition to the personnel listed above, the inspectors contacted other personnel during this inspection.

*Denotes personnel that attended the exit meeting.

2 EXIT MEETING

An exit meeting was conducted on March 18, 1994. During this meeting, the inspectors reviewed the scope and findings of the inspection. The licensee did not identify as proprietary any information provided to, or reviewed by, the inspectors.

IFS Data Entry Form

Reviewed By: _____

Date: / /

Site/Name: CROW BUTTE ISL

Report Transmittal Date: 5/13/94

Lead Inspector: 0126 Responsible Org. Code: 430R

Report End Date: / / Region: 4

Reactor/Vendor Inspection (IFS Option 1) Docket Related/P21 Items (IFS Option 4)
 Items Opened (Y/N): _____ Enter Log Number: _____
 Material Inspection (IFS Option 2) LER Items (IFS Option 5)
 SR1 (Y/N): _____ Enter LER Number: _____
 Lemer (Y/N): _____ Non-Docket Related Items (IFS Option 6)
 Clear (Y/N): _____

	Report NBR	Docket NBR
A	<u>94-01</u>	<u>40-8943</u>
B	_____	_____
C	_____	_____

Materials Only
License NBR
<u>544453Y</u>
<u>SO</u>

*Docket Name _____

Update? (Y/N): _____ Opened IR/LEP/P21 LOG/IFS Number: _____

***Sequence NBR: 01 Item Type: _____ **Severity: _____ **Supplement: _____

Status	*UPD I/R	*Proj. Closeout	*Actual Closeout
A	_____	<u> / / </u>	<u> / / </u>
B	_____	<u> / / </u>	<u> / / </u>
C	_____	<u> / / </u>	<u> / / </u>

Materials Only		
10 CFR	License Cond.	Tie Down
_____	_____	_____
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Title: _____ (55 character width)

*Closeout Org: _____ *Closeout EMP: _____ *Contact EMP: _____ *Procedure: _____ *Functl Area: _____
 *Cause CD: _____ **EA Number: _____ **NOV/NNC Issue Date: / /

Text: _____

Update? (Y/N): _____ Opened IR/LEP/P21 LOG/IFS Number: _____

***Sequence NBR: 02 Item Type: _____ **Severity: _____ **Supplement: _____

Status	*UPD I/R	*Proj. Closeout	*Actual Closeout
A	_____	<u> / / </u>	<u> / / </u>
B	_____	<u> / / </u>	<u> / / </u>
C	_____	<u> / / </u>	<u> / / </u>

Materials Only		
10 CFR	License Cond.	Tie Down
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Title: _____ (55 character width)

*Closeout Org: _____ *Closeout EMP: _____ *Contact EMP: _____ *Procedure: _____ *Functl Area: _____
 *Cause CD: _____ **EA Number: _____ **NOV/NNC Issue Date: / /

Text: _____

* Optional Fields.

** Severity, Supplement, and NOV/NCC only applicable for Violations; EA Number only applicable for Apparent Violations.

*** Sequence NBR is not applicable for docket related/P21, LER, or non-docket related items.

ITEMS CONTINUED? (Y/N): N