



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION IV  
612 EAST LAMAR BLVD, SUITE 400  
ARLINGTON, TEXAS 76011-4125

July 13, 2012

Larry L. Teahon  
Manager, Safety, Health,  
Environment and Quality  
Crow Butte Resources, Inc.  
86 Crow Butte Road  
Post Office Box 169  
Crawford, Nebraska 69339-0169

SUBJECT: NRC INSPECTION REPORT 040-08943/12-001

Dear Mr. Teahon:

This refers to the announced, routine inspection conducted on June 11-14, 2012, at the Crow Butte Resources facility in Crawford, Nebraska. The inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and the conditions of your license. Within these areas, the inspection consisted of selected examinations of procedures and representative records, observations of activities, and interviews with personnel. The inspection findings were discussed with you at the exit briefing conducted at the conclusion of the onsite inspection. No violations were identified, and no response to this letter is required.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response, if you choose to make one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC's Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact Ms. Linda M. Gersey, Health Physicist, at (817) 200-1299, or the undersigned at (817) 200-1191.

Sincerely,

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D. Blair Spitzberg, Ph.D., Chief  
Repository and Spent Fuel Safety Branch  
Division of Nuclear Materials Safety

Docket: 040-08943  
License: SUA-1534

Crow Butte Resources, Inc.

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Enclosure:

NRC Inspection Report 040-08943/12-001

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U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket: 040-08943

License: SUA-1534

Report: 040-08943/12-001

Licensee: Crow Butte Resources, Inc.

Facility: Crow Butte Facility

Location: Dawes County, Nebraska

Dates: June 11-14, 2012

Lead Inspector: Linda M. Gersey, Health Physicist  
Repository and Spent Fuel Safety Branch  
Division of Nuclear Materials Safety

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Management Programs

Approved by: D. Blair Spitzberg, Ph.D., Chief  
Repository and Spent Fuel Safety Branch  
Division of Nuclear Materials Safety

Attachment: Supplemental Inspection Information

Enclosure

## EXECUTIVE SUMMARY

Crow Butte Resources, Inc.  
NRC Inspection Report 040-08943/12-001

This inspection included a review of site status, management organization and controls, site tours, radiation protection, environmental protection, effluent controls, transportation, radioactive waste management activities, and emergency preparedness. In summary, the licensee was conducting operations in accordance with regulatory and license requirements.

### Management Organization and Controls

- The organizational structure and staffing levels maintained by the licensee during the inspection period met the requirements specified in the license and were sufficient for the work in progress (Section 1.2a).
- The licensee's Safety and Environmental Review Panel evaluations reviewed by the inspectors were conducted in accordance with requirements of the performance-based license (Section 1.2b).
- The licensee was conducting audits and inspections as required by regulatory requirements and the license (Section 1.2c).

### In-Situ Leach Facilities

- Site operations were being conducted in accordance with applicable license conditions and regulatory requirements (Section 2).
- The licensee was in the process of installing a second yellowcake dryer (Section 2).
- The licensee had identified a tear in the Pond 1 liner and was in the process of repairing it (Section 2).

### Radiation Protection

- The licensee implemented a radiation protection program that met the requirements of 10 CFR Part 20 and the license (Section 3).
- The annual doses to employees were below occupational dose limits (Section 3.2a).

### Effluent Control and Environmental Protection and Maintaining Effluents from Materials Facilities As Low As Reasonably Achievable

- The licensee conducted environmental monitoring in accordance with license requirements. Effluents were below the regulatory limits specified in 10 CFR Parts 20 and 40 (Section 4a).
- The annual dose to members of the public was below regulatory limits (Section 4a).

- Mechanical integrity testing of wells was being conducted in accordance with approved procedures (Section 4b).

#### Inspection of Transportation Activities and Radioactive Waste Management

- The licensee was conducting radioactive waste disposal operations in accordance with license and regulatory requirements (Section 5).
- The licensee was conducting yellowcake shipments in accordance with U.S. Department of Transportation and NRC requirements (Section 5).

#### Emergency Preparedness

- The licensee was maintaining an emergency preparedness program which met license requirements (Section 6).

## Report Details

### **Site Status**

The Crow Butte Resources, Inc. facility started commercial operations in April 1991. At the time of the inspection, the licensee continued to recover uranium through in-situ recovery operations. Uranium processing and drying operations were in progress at the Central Processing Plant (CPP). Restoration of groundwater in mined wellfield units continued to be performed via reverse osmosis in the Restoration Building. The current operational status of the mine units is as follows:

- Groundwater in Mine Unit 1 has been restored and wells and wellhouses were decommissioned
- Mine Units 2, 3, 4, 5, and 6 were undergoing groundwater restoration
- Mine Units 7, 8, 9, 10, and 11 were in production

Facility records indicate that the average operating flow observed during the first calendar quarter of 2012 was 6,572 gallons per minute. The amount of CPP process waste effluent diverted to the facility commercial ponds was reduced over the past year due in part to a second deep disposal well that was put online in November 2011. The portion of the commercial ponds' working capacity (i.e., 36,700 gallons) containing process waste reduced from approximately 55 percent to approximately 30 percent over the past year.

An additional 5,000 square feet was added onto the Restoration Building to allow for additional ion-exchange (IX) and reverse osmosis (RO) capacity for the mine units in restoration. Within the Restoration Building, the licensee was in the process of hooking up two new IX columns and expects to add two new 250-gallon per minute RO units to the Remediation Building by the end of the August 2012. Additionally, the licensee completed the installation of Mine Unit (MU) 11 wells in November 2011 and expects to activate a second yellowcake dryer in August, 2012.

The proposed Crow Butte Marsland Expansion Area (MEA) was toured by inspectors. The area was devoid of perennial streams. Within the northern half of MEA, several ephemeral drainage pathways were littered with dead tree material (tree trunks and limbs) that were apparently transported and deposited by a previous drainage pathway flood event(s). Half-center-pivot and side-roll irrigation are located in several areas around the southern half of MEA. An occupied house is located immediately outside of the western MEA boundary and a new house (potentially occupied) is located immediately southwest of the MEA boundary. Air monitoring stations are located west of MEA and within the western and southern portions of the MEA.

Facility records for the proposed North Trend Expansion Area (NTEA) were reviewed and compared to records for the currently licensed Crow Butte facility. Analytical results of baseline groundwater samples from Basal Chadron wells CPW-2 and COW 1 to 6 and indicated background radionuclide and non-radionuclide concentrations within the NTEA ore zone were similar to the background groundwater concentrations of the ore zone of the currently licensed Crow Butte facility. The inspectors also reviewed the licensee's documentation on its bioremediation study at MU 4 that was completed on April 6, 2011.

NRC staff is continuing its review of the license renewal application and the North Trend expansion amendment. Hearing requests were submitted and subsequently granted for both of these licensing actions. In August 2010, the licensee submitted an application for a satellite operation at the Three Crow site located south of Crawford, Nebraska. In April 2011, the licensee requested NRC staff to suspend the review of this licensing action so that they could supplement their application with operational process changes. The licensee stated they were also performing exploration drilling at another potential satellite identified as the Marsland site, which is approximately 30 miles southeast of the current facility. The application for this site was submitted to the NRC by letter dated May 16, 2012. The licensee commented that meteorological towers will be installed at both the Three Crow and Marsland sites to derive relevant wind information for licensing decisions.

## **1 Management Organization and Controls (88005)**

### **1.1 Inspection Scope**

Ensure that the licensee had established an organization to administer the technical programs and to perform internal reviews, self-assessments, and audits.

### **1.2 Observations and Findings**

#### **a. Organizational Structure**

The licensee's corporate organizational structure is illustrated in Figure 5.1-1 of the license application. At the time of the inspection, the licensee had 66 full time employees, which had not changed since the previous inspection. The licensee has one Radiation Safety Officer (RSO) and one full-time health physics technician (HPT). The licensee continues to train another HPT who was formerly a plant operator for the licensee. The licensee also employed contractors for all drilling operations and other work, as needed. Since the previous inspection, there has been a turnover of three employees including one geologist, a plant operator, and a Mechanical Integrity Test (MIT) operator. The inspectors determined that the licensee had sufficient staff to implement the radiation protection, groundwater monitoring, and environmental programs at its current operating level.

The licensee had approved a change in the corporate organizational structure outlined in Section 5.1 of the approved license application dated November 8, 2010. SERP 12-01, dated May 29, 2012, eliminated the Director of Radiation Safety and Licensing and Vice President of Operations. The change has the General Manager reporting directly to the President, and the RSO reports directly to the General Manager. The inspectors concluded that the licensee had implemented the SERP determination in accordance with the performance-based license conditions.

#### **b. Safety and Environmental Review Panel**

License Condition (LC) 9.4 of the performance-based license requires, in part, that the licensee establish a Safety and Environmental Review Panel (SERP) to evaluate if program changes require an NRC license amendment prior to implementation. The

inspectors reviewed eight SERP evaluations that were performed by the licensee since the previous inspection (SERPs 11-05 to 11-09 and 12-01 to 12-03). SERP 11-05, dated August 11, 2011, was a technical review to operate Wellhouse 60 in MU-11. SERP 11-07, dated November 18, 2011, approved an additional restoration well for MUs 3 and 4. SERP 11-08, dated June 1, 2012, approved the operation of Deep Disposal Well (DDW) #2. SERP 11-09, dated December 9, 2011, approved operation of Wellhouse 62, and SERP 12-03, dated June 1, 2012, approved Wellhouse 56. The inspectors concluded that the licensee had implemented the SERP determination in accordance with the performance-based license conditions.

The inspectors reviewed SERP 11-06, dated September 26, 2011, pertaining to the release of area south of the Restoration Building. The licensee had performed gamma surveys and taken soil samples from a restricted area adjacent to the Restoration Building to enable the area to be a temporary unrestricted area while work was performed to expand the building. After the licensee provided additional detail regarding survey techniques, the inspectors concluded that the licensee had implemented the SERP determination in accordance with the performance-based license conditions.

The inspectors reviewed SERP 12-02, dated Jun 1, 2012, related to an HPT meeting the education, training, and experience requirements in NRC Regulatory Guide (RG) 8.31 and LC 9.12. The inspectors noted that the qualifications were reviewed during the previous inspection and found to meet requirements. The licensee stated that they generated the SERP review for documentation purposes only.

c. Audits and Inspections

The inspectors reviewed the audits and inspections being generated by the licensee in accordance with LC 9.12 and RG 8.31. The licensee was conducting and documenting a daily walk-through of all work and storage areas of the facility to ensure good radiation practices were being followed. The HPTs performed the daily walk-through, except on weekends or holidays, when a trained plant operator performed them. The RSO, or an HPT, when the RSO was not available, was performing a weekly inspection of all facility areas to observe general radiation control practices and review required changes in procedures and equipment. Also, the RSO was generating a monthly report that summarized the results of the daily and weekly inspections and monitoring and radiation exposure data. The inspectors found that the audits and inspections met requirements contained in the license.

The licensee had hired contractors to perform the annual audit of the radiation safety program as required by 10 CFR 20.1101(c). The inspectors reviewed the 2010 annual audit dated August 10, 2011. The audit included a review of occupational exposures, radiation survey results, and compliance with license and regulatory requirements. The inspectors found the audit to be adequate. The annual audit report for 2011 was not finalized at the time of the inspection and will be reviewed during a future inspection.

1.3 Conclusions

The organizational structure and staffing levels maintained by the licensee during the inspection period met the requirements specified in the license and were sufficient for the work in progress. The licensee's Safety and Environmental Review Panel

evaluations reviewed by the inspectors were conducted in accordance with requirements of the performance-based license. The licensee was conducting audits and inspections as required by the regulatory requirements and the license.

## **2 In-Situ Leach Facilities (89001)**

### **2.1 Inspection Scope**

Determine if in-situ recovery activities were being conducted by the licensee in accordance with the NRC's regulatory requirements and the license.

### **2.2 Observations and Findings**

Site tours were conducted to observe in-situ recovery operations in progress. Areas toured included the CPP, restoration building, selected wellfields, selected header houses, and the evaporation ponds. The proposed Crow Butte Marsland Expansion Area was toured by inspectors and it was noted that the licensee had installed three air monitoring stations. The inspectors observed an MIT conducted in Well I3187 in MU 8 and a well work-over in an adjacent well. The inspectors observed the condition of plant equipment, fences, postings, and gates. Plant operating parameters (flow, pressure) were compared to licensed limits. The new pressurized downflow ion-exchange columns and a new resin trap downstream of the ion-exchange columns in the CPP appeared to be functioning as designed. New well houses installed since the previous inspection were constructed with a concrete containment under the floor.

The inspectors observed a dryer operator wash down filled yellowcake drums, weigh on a scale, and place them into storage. The operator was performing the work in accordance with site procedures.

The licensee continued installation of a second dryer located adjacent to the first dryer. Work on the new dryer is conducted during times when the first dryer is not in use. The inspectors entered the dryer area, after the area was released as a non-airborne radioactive area, to observe the status of the new dryer. The licensee continued to work on the new dryer electrical components. After the dryer is operational, the NRC will conduct an inspection to ensure all license and regulatory requirements are being implemented. The current license permits the licensee to put the new dryer into operation when they determine it is operational. The licensee stated that they anticipate the second dryer will be operational by August 2012.

A new DDW #2 was installed approximately one mile from the CPP and placed online in November 2011. DDW #2 is perforated to accept waste process fluids in the Morrison Formation at 3424 to 3540 feet below the ground surface (bgs) and the Sundance Formation at 3584 to 3738 feet bgs. During the second calendar quarter of 2012, DDW #2 was injecting process waste fluids at a rate of approximately 40 gallons per minute. Immediately upstream within the process waste effluent piping to each of the two deep disposal wells and the commercial ponds at the facility, three tanks (with multiple feeder lines) appeared to be functioning with adequate surge capacity. In summary, operations appeared to be conducted in accordance with license requirements and established procedures.

The inspectors observed the three commercial ponds (Ponds 1, 3, and 4) and the two research and development (R & D) ponds (East and West Ponds) to assess the condition of the pond liners, condition of the side slopes, and the manner in which the ponds were being operated. The R & D ponds and the commercial ponds receive well development water and CPP process waste effluent, respectively. Although the licensee is authorized to construct a total of five ponds, Ponds 2 and 5 were never constructed. The inspectors observed that the licensee was maintaining the proper amount of freeboard on the respective ponds.

License Condition 11.4 and Section 5.8.8.3 of the approved license application specify, in part, that the licensee must perform and document inspections of its onsite evaporation ponds. The inspectors reviewed recent pond inspection documentation to determine whether inspection results were being appropriately reported and that inspections were being performed properly. The inspectors observed both a daily and weekly pond inspection and verified that both daily and weekly pond inspections were performed in accordance with inspection procedures outlined in Crow Butte Project Environmental Manual Volume VI, Chapter 8, dated August 27, 2009. The inspectors determined that the licensee was properly performing and documenting the pond inspections.

The licensee submitted correspondence to the NRC on June 28, 2011, indicating a primary liner leak potentially existed in Ponds 1. This correspondence provided analytical data, monitoring results, mitigative actions, and the results of those actions as required by LC 11.4. The potential primary liner leak in Pond 1 was based on water level readings and similar concentrations of indicator analytes in samples from Pond 1 and its affected underdrain. At the time of the inspection, the licensee was repairing the liner leaks of Pond 1. Water sampling results from nearby monitoring wells showed that fluid in the commercial ponds had not leaked into the surrounding groundwater. The licensee is currently initiating the decommissioning of Pond 4. The licensee expects to replace liquids and solids in Pond 4 with clean water within the next 2 years.

## 2.3 Conclusions

Site operations were being conducted in accordance with applicable license conditions and regulatory requirements. The licensee was in the process of installing a second yellowcake dryer. The licensee had identified a tear in the Pond 1 liner and was in the process of repairing it.

## **3 Radiation Protection (83822)**

### 3.1 Inspection Scope

Determine if the licensee's radiation protection program was in compliance with the license and 10 CFR Part 20 requirements.

### 3.2 Observations and Findings

#### a. Occupational Exposures

The licensee's occupational dose monitoring program was reviewed to ensure that no worker had exceeded the occupational dose limits specified in 10 CFR 20.1201. In

calendar year (CY) 2011, 55 employees were monitored for occupational exposure. The licensee's exposure records for 2011 through the first quarter 2012 were reviewed by the inspectors. Occupational doses are based on a summation of airborne uranium, radon progeny, and optical stimulated luminescence dosimetry reported doses.

The occupational exposure records indicated that the average and highest total effective dose equivalent for CY 2011 were 314 millirems (3.14 milliSieverts) and 842 millirems (8.42 milliSieverts), respectively. There were no total effective dose equivalent measurements to personnel exceeding the regulatory limit of 5000 millirems (50 milliSieverts) per year. There was no fetal monitoring for the period of July 2011, to March 2012.

Urine bioassays are taken to ensure that the respiratory protection program and engineering controls for airborne uranium are being utilized appropriately. The licensee submits bioassays to an outside analytical laboratory for analysis on a monthly basis for the yellowcake dryer operators and quarterly for plant operators and others in the bioassay program. The inspectors reviewed the bioassay program to verify compliance with LCs 11.8 and 11.9. Since the previous inspection in June 2011, no bioassay results exceeded the action level of 15 micrograms uranium per liter of urine.

The licensee also monitors for soluble uranium intake in compliance with 10 CFR 20.1201e. The highest soluble intake of uranium for CY 2011 was calculated to be 6.2 milligrams of uranium, which was received by a wellfield operator who was chipping pipe under a Radiation Work Permit. The operator was wearing a personal breathing zone air sampler while chipping the pipe. The operator had a reactive bioassay and the result was less than 5 micrograms uranium per liter of urine. The operator was required to wear a respirator to perform future chipping work. All employees received less than the regulatory limit of 10 milligrams of soluble uranium.

Beginning the first quarter of 2012, the licensee discontinued use of dosimetry for drilling operators. The licensee provided the inspectors with data showing that drillers have never received greater than 10 percent of the occupational dose limits, and thus, the licensee is not required to monitor for radiation exposure, as allowed by 10 CFR 20.1502(a)(1). The licensee stated that they will continue to perform bioassays on the driller operators at the end of each job assignment.

b. Training

The licensee is required to conduct training in accordance with LC 9.12 for its contractors and new employees and provide annual refresher training for current employees. The inspectors reviewed radiation safety training records for two current employees and two new employees. All training activities and records were in accordance with the requirements of the license. A total of 32 employees received refresher training in December 2011. The inspectors identified 13 employees that were medically evaluated for respirator use and had respirator training from July 2011 to April 2012.

c. Instrumentation

The inspectors reviewed the licensee's operability, calibration, and maintenance records for portable radiation survey instruments. On an annual basis, the licensee sends all

portable survey instruments to an outside vendor for calibration. The inspectors reviewed instrument calibration certificates for several portable survey instruments and found the calibration certificates to be adequate and the instruments currently calibrated. The inspectors observed survey meters being used by the licensee's employees when exiting restricted areas. The survey instruments examined by the inspectors were found to be in calibration and were being used appropriately by the licensee's staff.

d. Radiation Protection Surveys

In addition to occupational exposure records, the inspectors reviewed selected records from July 2011 through June 2012 for in-plant radiological surveys (which includes radiation exposure surveys, fixed and loose surface contamination for unrestricted and restricted areas, and in-plant air uranium and radon progeny), material release surveys, and radiation work permits. The inspectors reviewed the survey results and found them to meet the requirements of the license.

During the site tours, the inspectors performed independent radiological surveys using two NRC-issued survey meters, a Ludlum Model 19 microRoentgen survey meter (NRC 015525, calibration due date of 05/14/2013), and a Ludlum Model 2401-EC survey meter (NRC 21176G, calibration due date of 01/10/2013). The average background reading was approximately 15 microRoentgens per hour ( $\mu\text{R/hr}$ ) in the unrestricted areas. The inspectors measured 3000  $\mu\text{R/hr}$  at the boundary of the radiation area posting to the demister in the plant. Inspectors observed that a lead shield was wrapped around the demister. The inspectors did not measure any areas greater than 5000 ( $\mu\text{R/hr}$ ) which the licensee had not previously identified and posted as radiation areas. The inspectors determined that the licensee identified and posted radiation areas as required in 10 CFR 20.1902.

3.3 Conclusions

The licensee implemented a radiation protection program that met the requirements of 10 CFR Part 20 and the license. The annual doses to employees were below occupational dose limits.

**4 Effluent Control and Environmental Protection and Maintaining Effluents from Materials Facilities ALARA (88045, 87102)**

4.1 Inspection Scope

Determine if the environmental and effluent monitoring programs were effective to monitor the impacts of site activities on the local environment.

4.2 Observations and Findings

a. Environmental Monitoring

The effluent and environmental monitoring program requirements are specified in LC 11.3 and the approved license application and the reporting requirements are specified in LC 12.1. The two Semi-annual Radiological Effluent and Environmental

Monitoring Reports (semiannual reports) for CY 2011 were reviewed during the inspection. The semiannual reports were submitted to the NRC in a timely manner and provided relevant data for the facility.

The environmental monitoring program consisted of air particulate, radon, surface water, sediment, and ambient gamma exposure rate sampling. The licensee has seven monitoring stations at various locations around the licensed property, including one background station. The licensee had replaced all air monitoring stations in April 2012. The inspectors observed the newly installed air monitoring stations AM-4 (permit area boundary) and AM-2 (nearest downwind residence). The inspectors observed the biweekly exchange of filters in these two air monitoring stations. Calibration of these new air monitoring stations will be performed in-house on a semiannual basis.

The seven monitoring stations were used to measure natural uranium, radium-226, and lead-210 concentrations in air. Radon-222 was also measured using track-etch detectors. Uranium, radium, and lead-210 are analyzed on a quarterly basis and radon-222 is analyzed on a semiannual basis. The sample results reported by the licensee for natural uranium, radium-226, and lead-210 were less than the respective effluent concentration limits specified in 10 CFR Part 20, Appendix B, Table 2, for air release. The sample results for radon-222 was less than the effluent concentration approved in the license application.

The licensee measured ambient gamma radiation levels at the seven sample stations using dosimeters that were exchanged quarterly. The annual ambient gamma radiation levels ranged from 28 - 44 millirems (0.28 - 0.44 milliSieverts) and were comparable to a background level of 30 millirems (0.3 milliSieverts).

Surface water was collected quarterly from streams and water impoundments in the wellfield areas. The licensee collected water samples from five streams (unless they were dry) and three impoundments during 2011. The samples were analyzed for natural uranium and radium-226 concentrations. The sample results were less than the effluent concentration limits specified in 10 CFR Part 20 for water.

Stream sediment samples were also collected annually from three locations in Squaw Creek, two locations on English Creek, and three impoundments on English Creek consistent with the water sample locations. The samples were analyzed for natural uranium, radium-226, and lead-210 concentrations. No specific limit has been established for sediment samples, but the data is used by the licensee for trending purposes.

The 2011 semiannual reports also contained water supply well data. Water supply wells located within 1 kilometer of the wellfields were sampled quarterly. A total of 19 wells and a drinking water well were sampled in 2011. Results presented in the semiannual reports are consistent with previously collected data.

In accordance with the environmental assessment for the renewal of the licensee's license, dated February 1998, the NRC staff found the following changes to the environmental and effluent monitoring program acceptable: (1) sampling of thorium-230 has ended, (2) the vegetation monitoring program was discontinued, and (3) exchange frequency of radon detectors was changed from quarterly to semiannually.

The licensee's evaluation of the annual dose to the public was submitted with the semiannual report for the third and fourth quarters of 2011. The licensee showed compliance by demonstrating that the annual average concentrations of natural uranium, radium-226, and lead-210 effluents released at the restricted area boundary did not exceed the values in Table 2 of Appendix B to 10 CFR Part 20, or exceed the radon-222 limit as specified in the license application, and that the external dose to an individual continuously present in an unrestricted area would not exceed 2 millirems (0.02 milliSieverts) in an hour and 50 millirems (0.5 milliSieverts) in a year. The licensee showed that the dose to the public from operations was 19.2 millirems (0.192 milliSieverts) for CY 2011, which is under the 100 millirems (1.0 milliSieverts) per year dose limit specified by 10 CFR 20.1301.

b. Wellfield and Excursion Monitoring

License Condition 11.2 specifies, in part, the monitoring well sampling requirements and the criteria for placing a well on excursion status. The licensee's groundwater sampling program requirements include biweekly monitoring of well sampling in active mine units, weekly sampling of wells in excursion status, and lower-frequency well sampling in mine units under restoration. The inspectors reviewed groundwater sampling records from June 2011 to June 2012, to determine whether the licensee was collecting samples at the required frequency and whether excursions were properly identified. The inspectors selected monitoring data at random and examined the reports to confirm the licensee's automated excursion reporting system was functioning properly. Data from known excursions was also reviewed to ensure that the monitoring frequency had been increased according to LC 11.2 requirements. The inspectors concluded that the licensee was implementing the groundwater monitoring program in accordance with the license.

The inspectors reviewed the spill records for the past 12 months. According to the licensee's records, six spills occurred resulting in a total of 3,722 gallons of unrecovered fluids. Of the total unrecovered volume, no production fluid was released and only one human-error spill occurred since the previous inspection.

The inspectors reviewed recent MIT documentation to determine whether test results were being appropriately reported and that tests were being properly performed. The inspectors observed a MIT at Well I-3187 and verified that the test was performed in accordance with test procedures outlined in Standard Operating Procedure P-23 of the facility's operating manual. The inspectors determined that the licensee was properly performing and documenting the MITs.

4.3 Conclusions

The licensee conducted environmental monitoring in accordance with license requirements. The annual dose to members of the public was below regulatory limits. Mechanical integrity testing of wells was being conducted in accordance with approved procedures.

## **5 Inspection of Transportation Activities and Radioactive Waste Management (86740, 88035)**

### **5.1 Inspection Scope**

Determine whether transportation and radioactive waste disposal activities were being conducted in compliance with license requirements.

### **5.2 Observations and Findings**

License Condition 9.7 specifies, in part, that the licensee dispose of 11e.(2) byproduct material at a site licensed to receive such material. The licensee's waste disposal agreement with a licensed facility was valid through June 30, 2015. The licensee had made 23 byproduct waste shipments since the previous inspection. The inspectors reviewed the waste disposal shipments and found them to be in compliance with U.S. Department of Transportation and NRC requirements.

License condition 10.14 states, in part, that the licensee shall store 11e.(2) byproduct material in a restricted area. The inspectors observed that the licensee had two restricted areas for the storage bins.

The licensee maintained records of 22 yellowcake shipments that occurred between June 2011 and June 14, 2012. The shipping papers were compared to the requirements of 49 CFR 172, Subpart C. All required information was presented on the shipping papers.

### **5.3 Conclusions**

The licensee was conducting waste disposal operations in accordance with license and regulatory requirements. The licensee was conducting yellowcake shipments in accordance with DOT and NRC requirements.

## **6 Emergency Preparedness (88050)**

### **6.1 Inspection Scope**

Determine whether the licensee's emergency preparedness program was being maintained in a state of readiness.

### **6.2 Observations and Findings**

The licensee maintains emergency procedures in Volume VIII of the Procedure Manual. The medical emergency response procedures include the ability to use Flight for Life to evacuate an employee with a serious injury and how to handle contaminated injured personnel. The RSO indicated that most serious injuries would be transported to Chadron Hospital in Chadron, Nebraska, approximately 15 miles from the site by an ambulance. The Chadron Hospital provides 24 emergency services. The town of Crawford medical clinic can accommodate minor injuries. The RSO indicated that there is no certified emergency medical technician on site. Other procedures included how to respond to fires and explosions, chemical emergencies, natural disasters, security threats, radiological emergencies, transportation emergencies, evacuations, and

emergency reporting. In Chapter 11, Chemical Emergency Response Guide, the licensee identifies the type of chemicals used on site, the storage capacity in tanks, and its chemical hazard.

Since the previous inspection, the licensee had moved the main entry gate into the facility closer to the entrance from the main road and installed a camera that is viewed by the control room operators in the CPP. There 10 cameras total linked to the control room that show the main entry points into the controlled area. The CPP is manned 24/7 during active operations.

The RSO indicated that there was no scheduled emergency exercise since the previous inspection, although, the licensee had held an emergency preparedness refresher course. The course reviewed how to respond to emergencies such as a spill involving radioactive material and handling medical emergencies.

### 6.3 Conclusions

The licensee was maintaining an emergency preparedness program which met license requirements.

#### **Exit Meeting Summary**

The inspectors presented the inspection results to the licensee's representatives at the conclusion of the onsite inspection on June 14, 2012. Representatives of the licensee acknowledged the findings as presented. During the inspection, the licensee did not identify any information reviewed by the inspectors as proprietary.

## **SUPPLEMENTAL INSPECTION INFORMATION**

### **Partial List of Persons Contacted**

#### Licensee

R. Grantham, Radiation Safety Officer  
J. Stokey, Mine Manager  
L. Teahon, Manager, Health Safety and Environmental Affairs

### **Items Opened, Closed, and Discussed**

#### Open

None

#### Closed

None

#### Discussed

None

### **Inspection Procedures Used**

IP 88005	Management Organization and Controls
IP 89001	In-Situ Leach Facilities
IP 83822	Radiation Protection
IP 88045	Effluent Control and Environmental Protection
IP 87102	Maintaining Effluents from Materials Facilities ALARA
IP 86740	Inspection of Transportation Activities
IP 88035	Radioactive Waste Management
IP 88050	Emergency Preparedness

## List of Acronyms Used

ALARA	As Low As Reasonably Achievable
bgs	below the ground surface
CY	calendar year
CFR	<i>Code of Federal Regulations</i>
CPP	Central Processing Plant
HPT	health physics technician
IP	inspection procedure
LC	license condition
MIT	mechanical integrity test
NRC	Nuclear Regulatory Commission
RG	NRC Regulatory Guide
RSO	Radiation Safety Officer
SERP	Safety and Environmental Review Panel
μR/hr	microRoentgen per hour