



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
611 RYAN PLAZA DRIVE, SUITE 400  
ARLINGTON, TEXAS 76011-4005

March 6, 2007

John H. Ellis, President  
Sequoyah Fuels Corporation  
P.O. Box 610  
Gore, Oklahoma 74435

SUBJECT: NRC INSPECTION REPORT 040-08027/07-001

Dear Mr. Ellis:

This refers to the inspection conducted on February 12, 14, and 15, 2007, at the Sequoyah Fuels Corporation site in Gore, Oklahoma. The inspection findings were discussed with you and members of your staff during the exit briefing conducted at the conclusion of the onsite inspection. The enclosed report presents the scope and results of the inspection.

This 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 with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel. The inspection determined that you have conducted licensed activities at your former uranium conversion facility in a safe and effective manner and in compliance with regulatory and license requirements.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) 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 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 Mr. Robert Evans at (817) 860-8234, or the undersigned at (817) 860-8191.

Sincerely,

/RA/

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

Docket No.: 040-08027  
License No.: SUB-1010

Enclosure:  
NRC Inspection Report 040-08027/07-001

Sequoyah Fuels Corp.

-2-

cc w/Enclosure:

Alvin H. Gutterman  
Morgan, Lewis, Bockius LLP  
1111 Pennsylvania Avenue, NW  
Washington, DC 20004

Rita Ware, RCRA Enforcement Branch  
Compliance Assurance & Enforcement Div.  
U.S. EPA, Region VI  
1445 Ross Avenue, Mail Stop 6EN-HX  
Dallas, Texas 75202-2733

Ann-Charlotte Engstrom, Vice President,  
General Counsel & Secretary  
General Atomics  
P.O. Box 85608  
San Diego, California 92186-5608

William Andrews, Supervisory Hydrologist  
U.S. Geological Survey  
202 N.W. 66<sup>th</sup> Street  
Oklahoma City, Oklahoma 73116

J. Trevor Hammons  
Environmental Protection Unit  
Office of Attorney General  
4545 North Lincoln Boulevard, Suite 260  
Oklahoma City, Oklahoma 73105-3498

Jim Harris  
U. S. Army Corps of Engineers  
1645 South 101<sup>st</sup> East Avenue  
Tulsa, Oklahoma 74128-4629

Jeanine Hale  
Cherokee Nation  
P.O. Box 948  
Tahlequah, Oklahoma 74465

Mike Broderick, Administrator  
Oklahoma Department of  
Environmental Quality  
Waste Management Division  
Radiation Management Section  
P.O. Box 1677  
Oklahoma City, Oklahoma 73101-1677

bcc w/Enclosure (via ADAMS e-mail):

LDWert

DBSpitzberg

MHFliegel, FSME/DWMEP/DURLD

RJEvans

LMGersey

RITS Coordinator

FCDB

RIV Materials Docket Files - 5th Floor

SUNSI Review Completed: LMG ADAMS: ☒ Yes ☐ No Initials: LMG  
☒ Publicly Available ☐ Non-Publicly Available ☐ Sensitive ☒ Non-Sensitive

DOCUMENT NAME: C:\FileNet\ML070650555.wpd final r:\\_dnms

| RIV:DNMS:NMIB | RIV:DNMS:FCDB | C:FCDB      |
|---------------|---------------|-------------|
| LMGersey      | RJEvans       | DBSpitzberg |
| /RA/          | /RA/          | /RA/        |
| 02/23/07      | 02/23/07      | 03/06/07    |

OFFICIAL RECORD COPY

T=Telephone E=E-mail

F=Fax

**ENCLOSURE**

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket No.: 040-08027

License No.: SUB-1010

Report No.: 040-08027/07-001

Licensee: Sequoyah Fuels Corporation

Location: P.O. Box 610  
Gore, Oklahoma

Date: February 12, 14 & 15, 2007

Inspectors: Robert Evans, P.E., C.H.P., Senior Health Physicist  
Fuel Cycle & Decommissioning Branch

Linda M. Gersey, Health Physicist  
Nuclear Material Inspection Branch

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

Attachment: Supplemental Inspection Information

## **EXECUTIVE SUMMARY**

### Sequoyah Fuels Uranium Conversion Facility NRC Inspection Report 040-08027/07-001

The inspection included a review of facility status, radiation protection, transportation activities, management organization and controls, maintenance and surveillance testing, training, radioactive waste management, environmental protection, and emergency preparedness. Overall, the licensee's limited decommissioning activities were being conducted in accordance with license and regulatory requirements.

#### Radiation Protection

- The licensee conducted its radiation protection program in accordance with the requirements of 10 CFR Part 20 and the license. Occupational exposures were well below regulatory limits (Section 1).
- Two bioassay sample results from one individual exceeded the lowest action level. Although no regulatory limit was exceeded, the licensee's investigation and corrective actions were determined to be appropriate (Section 1).

#### Inspection of Transportation Activities

- Overall, the licensee had effectively implemented the regulatory and license requirements for shipment of licensed radioactive material (Section 2).

#### Management Organization and Controls

- The organizational structure was in agreement with license requirements. Sufficient management-level staff were available for decommissioning activities in progress. The licensee also had a functioning As Low As Reasonably Achievable program as required by the license (Section 3).

#### Maintenance and Surveillance Testing

- The licensee was conducting daily inspections in accordance with license requirements. Surveillances were being used to monitor critical work activities. The licensee was effectively using condition reports to document problems that may impact quality (Section 4).

#### Operator Training/Retraining

- The licensee's training program was implemented in accordance with license requirements (Section 5).

### Radioactive Waste Management

- The licensee had effectively maintained and implemented a program for monitoring and securing solid waste storage and retention pond areas as required by the license (Section 6).

### Environmental Protection

- The effluent and environmental monitoring programs were conducted in accordance with license and regulatory requirements. The licensee collected all required samples, with one minor exception. The sample results indicated that offsite releases were less than regulatory limits (Section 7).
- Elevated concentrations of radioactive material continued to be identified in selected groundwater monitoring wells. In response, the licensee implemented an interim groundwater corrective action program (Section 7).
- The licensee continued to utilize ammonium nitrate solution as a fertilizer on land used to produce hay. The licensee implemented the fertilizer distribution program during 2005 in accordance with license application requirements (Section 7).

### Emergency Preparedness

- The licensee maintained an emergency preparedness program that included instructions and equipment for responding to contamination spills and injured contaminated individuals (Section 8).

## **Report Details**

### **Summary of Site Status**

Sequoyah Fuels Corporation operated its uranium conversion facility near Gore, Oklahoma, between 1970 and 1993. The license currently authorizes the possession of up to 20 million metric tons of 11e.(2) byproduct material. The site also contains residual, low-level radioactive contamination in buildings, plant equipment, and plant debris. The licensee did not have yellowcake or uranium hexafluoride material remaining onsite with the possible exception of residual material that may remain inside of plant processing equipment.

By letter dated November 3, 2003, the licensee requested NRC approval to dewater the raffinate sludge. Raffinate sludge is the precipitated metals and clay that resulted from neutralization of raffinate with anhydrous ammonia during plant operations. The NRC approved the licensee's request through Amendment 30 of the license. Full-scale raffinate sludge dewatering operations commenced in April 2005 and were completed in September 2005. The licensee bagged over 11,000 2-ton super-sacks totaling about 21 million pounds of sludge material. The licensee also collected 31 bags of non-sludge debris from in and around the clarifier ponds. The super-sacks were being temporarily staged on the former yellowcake ore storage pad.

Residual raffinate sludge remains in selected clarifier ponds. The licensee will continue removing and dewatering this material from ponds 1A and 3A in the near future. The raffinate sludge will remain stored on site until the licensee determines disposal plan for the material. Following completion of clarifier pond cleanup, the licensee then plans to complete work on the waste water treatment system.

Other work recently completed included the disassembly, decontamination, and free-release of the dewatering equipment such as the filter presses. The licensee was also decontaminating and free-releasing specialty metals. To help support groundwater monitoring and cleanup efforts, the licensee recently installed 10 additional monitoring wells and 7 recovery wells. The licensee recently transferred possession and responsibility of the depleted uranium tetrafluoride (DUF<sub>4</sub>) to the U.S. Army via the NRC/Department of Energy Form 741 process. The material was stored in 1031 drums. The Army began shipping the drummed DUF<sub>4</sub> to the Nevada Test Site for disposal. A recent transportation accident resulted in temporary suspension of the DUF<sub>4</sub> shipments. At the close of the onsite inspection, all but 162 drums had been shipped offsite. The Army was about to commence with shipment of the remaining containers of DUF<sub>4</sub> material.

## **1      Radiation Protection (83822)**

### **1.1    Inspection Scope**

The inspectors examined the licensee's radiation protection program for compliance with the license and 10 CFR Part 20 requirements.

## 1.2 Observations and Findings

Personnel monitoring records for 2006 were reviewed. Exposure monitoring included both internal and external exposures of occupational workers to radioactive material. Thermoluminescent dosimeters were assigned to 19 workers, including 17 contractors, on a quarterly basis for monitoring external exposures. During 2006, the maximum external exposure to an individual was 19 millirems deep dose equivalent.

Internal doses were assigned to workers based on air sample results. Six individuals were monitored with lapel monitors. The highest internal dose was 2.38 derived air concentration-hours, or 5.95 millirems.

Total effective dose equivalents, the combination of internal and external doses, were tabulated by the licensee. No individual exceeded the annual regulatory limit of 5000 millirems per person. The internal and external exposures for 2006 were significantly lower than the previous year due to the cessation of raffinate sludge dewatering and bagging operations that occurred during mid-2005.

During 2006, the licensee conducted urine bioassay sampling to determine if any worker had received an intake of soluble uranium. One individual had two consecutive samples greater than 20 micrograms of detectable uranium per liter of urine (19.7 and 25.9 micrograms per liter consecutively). These sample results were above the lowest action level of 15 micrograms per liter. The third bioassay, taken at 33 days post-intake, showed no detectable uranium. This individual was a new contractor working in the Main Plant Building, cleaning and disassembling fluorine heaters externally contaminated with uranium. The licensee's investigation found the cause of this minor intake was a lack of experience with contaminated material and insufficient supervision and on-the-job training to develop good ALARA practices. Corrective actions included increased supervision and instruction on contamination control and practices. In accordance with License Condition No. 42, this event was included in the annual As Low As Reasonably Achievable (ALARA) audit.

The hazardous work permit requirements are described in Section 3.2.1 of the license application. The licensee utilized hazardous work permits to control hazardous work activities and work with radioactive material where a significant potential for personnel exposures existed. The inspectors reviewed the permits issued during 2006 through January 2007. Thirteen permits were issued in 2006, pertaining mostly to recovery of scrap metal and cutting of pipes on the primary cold traps. Six permits were issued in early 2007, including some pertaining to the opening and cleaning of a damaged Sea-Land shipping container of DUF<sub>4</sub> drums. The Sea-Land container had been involved in a shipping accident (see Section 2). The hazardous work permits provided personnel protective equipment requirements for both radiological and non-radiological hazards. The inspectors concluded that the licensee's hazardous work permit program was effectively incorporated into the site decontamination and decommissioning work.

The inspectors conducted a review of the licensee's swipe survey program for detection of removable contamination. The licensee maintained detailed records of swipe samples. The inspectors reviewed the licensee's sample results for offices, break



rooms, restrooms, and equipment being free-released. All sample results were below the licensee's respective action levels.

During the inspection, the licensee was actively decontaminating and free-releasing specialty metals for recycling. The inspectors conducted a review of the licensee's radiation protection records in this area, including free-release records. Further, the inspectors conducted a confirmatory survey of metal staged for free-release using a Ludlum Model 2401-P survey meter (NRC No. 21190G, calibration due date of 9/25/07). The survey results were indistinguishable from background, indicating the absence of contamination.

### 1.3 Conclusion

The licensee conducted its radiation protection program in accordance with the requirements of 10 CFR Part 20 and the license. Occupational exposures were well below regulatory limits.

Two bioassay sample results for one individual exceeded the lowest action level. Although no regulatory limit was exceeded, the licensee's investigation and corrective actions were determined to be appropriate.

## 2 **Inspection of Transportation Activities (86740)**

### 2.1 Inspection Scope

The inspectors reviewed the transportation of licensed materials to verify compliance with the license and applicable NRC and U.S. Department of Transportation (DOT) regulations.

### 2.2 Observations and Findings

The licensee made two shipments of radioactive material to the Honeywell facility in Metropolis, Illinois, during 2006. One shipment contained cylinder wash stations, and the second contained three primary cold traps. The inspectors noted that the company president had signed the shipping papers for both shipments. In response to the NRC's requests for training records, the licensee determined that the individual's hazardous material refresher training, required by 49 CFR 172.704, had expired. The licensee issued a condition report to investigate the issue. The inspectors reviewed the shipping papers for both shipments, and confirmed that the papers were in compliance with DOT requirements. The inspectors concluded that the out-of-date training was an isolated occurrence of minor significance.

In early-February 2007, the licensee transferred possession of the DUF<sub>4</sub> at the site to the U.S. Army, Arberdeen Proving Grounds, License Number SMB-141, using Department of Energy/NRC Form Number 741. The U.S. Army subsequently transferred the material to the Department of Energy. Under the Army license, the Army

packaged the drummed DUF<sub>4</sub> material into 39 Sea-Land containers for shipment. The Army began shipping the containers to Nevada Test Site for disposal.

On February 6, 2007, the truck transporting one of the containers was involved in a traffic accident in Oklahoma. Although the container was damaged and dented, there was no release of radioactive material from the transport package. The container was returned to the licensee's site for opening and inspection. Under the control of a hazardous work permit, the licensee opened the container and began removing the drummed material for repacking and transport in a second container. The Army temporarily suspended shipments after the transportation incident but plans to recommence with shipping the remaining containers in the near future.

### 2.3 Conclusions

Overall, the licensee had effectively implemented the regulatory and license requirements for shipment of licensed radioactive material.

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

### 3.1 Inspection Scope

The licensee's management organization and controls were reviewed to determine compliance with license requirements.

### 3.2 Observation and Findings

The organizational structure is described in Section 11.1 and Figure 2-1 of the license application. At the time of the inspection, the plant staff consisted of six individuals; the president, director of regulatory affairs, environmental manager, health and safety supervisor, decommissioning and decontamination project supervisor, and administrative assistant. These were the same staff members that were present during the previous inspection. Contract laborers provided miscellaneous site support as needed. In addition, a security guard provided facility oversight during nights, weekends, and holidays. The inspectors concluded that the licensee had sufficient staff to ensure compliance with license and regulatory requirements.

The requirements for the ALARA committee are provided in Section 3.2.2 of the license application. The ALARA committee met in September 2006. The committee meeting included the corporate health physicist. Trends were discussed including decreases in occupational exposures, onsite air sampling results, and selected fence line air sample results. These declining trends were a direct result of the conclusion of the work for the raffinate sludge dewatering operations. The status of the ALARA goals for 2006 were also discussed. No new ALARA goals for 2007 were identified.

### 3.3 Conclusions

The organizational structure was in agreement with license requirements. Sufficient management-level staff were available for decommissioning activities in progress. The licensee also had a functioning ALARA program as required by the license.

## 4 **Maintenance and Surveillance Testing (88025)**

### 4.1 Inspection Scope

The inspectors determined whether general maintenance operations, surveillance tests and instrument calibrations were being conducted in accordance with license requirements and approved procedures.

### 4.2 Observations and Findings

License Condition 46 states that the licensee shall perform and document daily inspections of clarifier ponds and waste retention systems during normally scheduled workdays. The licensee maintained extensive logbook entries of daily inspections of the clarifier ponds and emergency basin, the areas considered to be tailings and waste retention systems. No degradation of the retention systems have been identified by the licensee in recent years.

In recent weeks, the licensee identified that the freeboard level in one clarifier pond was less than the State limit of 2 vertical feet. In response, the water in this pond was pumped out to other ponds to reduce the volume of fluid in the pond. Daily inspections confirmed that pond integrity remained intact during this time frame. At the time of the inspection, all site ponds were below the procedural (NRC licensed) limit of 1-foot vertical freeboard.

Quality Assurance surveillances were conducted in accordance with Facility Operating Procedure QA-102, Revision 4, "Surveillance Performance." Surveillances were conducted and documented at quarterly intervals. No findings or other serious deficiencies were identified during the quarterly surveillances. In general, the surveillances confirmed that the raffinate sludge dewatering work had been conducted in compliance with program requirements.

The temporary storage of the bagged raffinate sludge, located on the yellowcake storage pad, was being inspected quarterly for cell integrity and monthly for water accumulation. No water accumulation was being noted. During site tours, the inspectors confirmed that cell integrity was being maintained by the licensee.

The licensee used condition reports to document and ensure follow up of unusual conditions. In 2006, four condition reports were generated. As discussed earlier, one condition report involved the high bioassay results of a contractor. The condition reports included corrective actions to prevent recurrence. The condition reports were effective

mechanisms for documenting and resolving issues that may impact quality. At the time of the inspection, three of the four condition reports were closed, and the fourth was open pending closure.

License application Section 3.3.3 requires that instrumentation be calibrated at least every six months. The inspectors observed several of the licensee's radiological survey meters, and all meters were fully functional. No out-of-calibration meter was observed in use by the licensee during the plant tour.

#### 4.3 Conclusions

The licensee was conducting daily inspections in accordance with license requirements. Surveillances were being used to monitor critical work activities. The licensee was effectively using condition reports to document problems that may impact quality.

### **5 Operator Training/Retraining (88010)**

#### 5.1 Inspection Scope

The inspectors reviewed training records and interviewed personnel to determine whether the licensee was complying with regulatory and license requirements for training of site personnel.

#### 5.2 Observations and Findings

The training program requirements are provided in Sections 2.6 and 11.4 of the license application. Annual refresher training was conducted for all permanent plant personnel in December 2006. One new full time contractor was hired in 2006. The contractor's new employee training was reviewed and was found to meet license requirements. In July 2006, visitor orientation training was conducted for contractors and included radiation and occupational hazard awareness. Current hazardous waste operations and emergency response training records were on file.

#### 5.3 Conclusions

The licensee's training program was implemented in accordance with license requirements.

### **6 Radioactive Waste Management (88035)**

#### 6.1 Inspection Scope

The inspectors interviewed cognizant licensee representatives, toured the site, and reviewed applicable records to determine if the licensee had established and maintained an effective program for management of wastes.

## 6.2 Observations and Findings

Site tours were conducted, in part, to observe the licensee's handling and storage of radioactive waste material. The restricted area entrance was posted as a radioactive materials area in accordance with license application Section 1.8, "Posting Exception." Site security was adequate with fences and gates in good working order.

During site tours, the inspectors conducted ambient gamma surveys using a Ludlum Model 2401-P meter. Most areas of the plant were measured at background levels (0.01 millirems per hour). The DUF<sub>4</sub> Sea-Land container that was involved in the shipping accident was staged in the main process building and measured up to 5 millirems per hour at 1-foot. This area was posted as a Radiation Area. The temporarily staged bags of dewatered raffinate sludge measured 1-3 millirems per hour at 1-foot, and DUF<sub>4</sub> barrels measured 1-2 millirems per hour at 1-foot.

## 6.3 Conclusions

The licensee had effectively maintained and implemented a program for monitoring and securing solid waste storage and retention pond areas as required by the license.

# 7 **Environmental Protection (88045)**

## 7.1 Inspection Scope

The inspectors reviewed the licensee's effluent, groundwater, and environmental monitoring activities to determine compliance with applicable regulatory and license requirements.

## 7.2 Observations and Findings

### a. Effluent Monitoring Program

The liquid effluent monitoring program requirements are provided in Section 5.1 of the license application. The licensee monitored two release points, the combination stream outfall 001 and the storm water outfall 008. The combination stream was sampled on a continuous basis, while the storm water outfall was sampled during rain events. The outfalls were sampled for several chemical constituents as well as uranium, radium-226 and thorium-230 concentrations.

The inspectors reviewed the licensee's 2006 effluent data and toured the two outfalls. The inspectors observed the sampling equipment in service, and the equipment appeared to be operable at both locations.

Storm water discharges were sampled at outfall 008 during rain events. During 2006, there were 28 rain events, including 12 events in November-December 2006. Nitrates and uranium concentrations trended upward during the latter part of 2006 because of the increased surface water runoff. Uranium concentrations ranged from 5 to 136

micrograms per liter ( $\mu\text{g/L}$ ) during 2006, with an action level of 225  $\mu\text{g/L}$ . Nitrates ranged from 0.4 milligrams per liter in January 2006 to 11.2 milligrams per liter in December 2006, with an action level of 20 milligrams per liter. Since no action level was exceeded, no specific action was required by the licensee in response to these upward trends.

The data for 2006 indicated a slight upward trend in uranium concentrations at outfall 001 as a result of heavy rains that occurred late in the year. The uranium concentrations in outfall 001 varied between 0 to 30  $\mu\text{g/L}$  with an action level of 225  $\mu\text{g/L}$ ; therefore, no specific action was required to be taken by the licensee.

The licensee normally collects over 150 samples a year from outfall 001. The licensee self-identified that it missed one sample during April 2006. Corrective actions taken included issuance of a condition report to investigate the incident. No other samples were missed since April 2006, suggesting that corrective actions taken in response to the incident were effective to prevent recurrence.

b. Groundwater Monitoring Program

License Condition 49 provides the groundwater compliance monitoring program requirements. The sampling and analysis schedules were provided in Table 4 of the groundwater monitoring plan dated February 25, 2005. The program consisted of sampling 86 locations including background wells, point-of-compliance wells, intercept trenches and surface waters.

Ten new monitoring wells were installed during 2005-2006. In addition, seven new groundwater recovery wells were installed during 2006. The licensee has placed one of these new recovery wells into service, and the remaining six wells will be placed into service at a later date.

The sample results for 2006 were submitted to the NRC in the annual groundwater report dated January 30, 2007. The sample results were compared to the groundwater protection standards provided in License Condition 49.B. The primary chemical constituents of concern included arsenic, fluoride, nitrate, and uranium. During 2006, these constituents continued to be identified in a selected number of wells. Barium was also a constituent of concern but was limited to a small area of the site.

Seepage and drainage samples were collected from six areas situated in the western portion of the facility. The sample results indicated that several chemical constituents, including uranium, exceeded the respective limits in certain samples. In response, the licensee has implemented a groundwater corrective action program that currently includes collection trenches, french drains, and recovery wells.

Four surface water samples were collected annually from two local rivers. The samples were analyzed for uranium concentrations. Uranium was detected in one upstream sample at 8.64  $\mu\text{g/L}$ , but the concentration was less than the maximum contaminant level of 30  $\mu\text{g/L}$ .

c. Environmental Monitoring Program

The licensee conducted air sampling, sediment sampling, and impoundment leak detection. Air samples were continuously collected at four fenceline locations around the site. The filter media was collected and counted weekly for gross alpha concentrations. Quarterly composite samples were analyzed for uranium, radium-226, and thorium-230 concentrations. The highest weekly fenceline gross alpha sample result, collected during March 2006, was 2.3 E-14 microcuries per milliliter. This sample result remained below the NRC-approved action level of 4.5 E-14 microcuries per milliliter.

The air sample results for the first three quarters of 2006 were reviewed. [The sample results for the fourth quarter of 2006 were not available during the inspection.] The sample results for uranium were less than 3-percent of the effluent concentration limit. The sample results for radium-226 were less than 1-percent of the limit, while the sample results for thorium-230 were less than 11-percent of the limit.

Sediment samples were collected annually at three river locations. The samples were analyzed for uranium, radium-226, and thorium-230 concentrations. The thorium-230 and radium-226 concentrations were less than 2 picocuries per gram of sediment and were comparable to background levels. Uranium concentrations ranged from less than 1 to 2.31 micrograms per gram of soil with an action level of 40 micrograms per gram.

The licensee collected quarterly radon samples at selected onsite and fenceline locations, although radon sampling was not required by the license. The sample results increased slightly concurrently with raffinate sludge dewatering operations. The highest sample result was measured during the third quarter of 2006 at the yellowcake storage pad. This was the location where bagged raffinate sludge was being stored. This sample result was 3.3 picocuries per liter with an effluent concentration limit of 30 picocuries per liter.

The licensee collected monthly samples from the under-drain areas of the lined impoundments. Liquids collected from the under-drains were sampled for uranium and nitrates. No release criteria has been established, but the licensee used the information for trending purposes.

d. Ammonium Nitrate Fertilizer Distribution Program

Section 1.8 of the license application allows the licensee to use ammonium nitrate solution generated from onsite dewatering activities as fertilizer, subject to a number of limitations. For example, the solution can only be used as a fertilizer on crops grown for animal food or seed production. The licensee is required to submit an annual completion report to the NRC. The most recent report was submitted on May 1, 2006. This report discussed the results of the 2005 growing season. During 2005, the licensee applied 7.8 million gallons of solution on three tracts of land totaling 81 acres.

The license application specifies a limit of 700 pounds of nitrogen per acre. The application rate ranged from 148 to 296 pounds of nitrogen per acre of land. The license application also specifies a radium-226 concentration limit of 2 picocuries per liter of solution and uranium concentration limit of 0.1 milligrams (100 micrograms) per liter of solution. The composite sample results indicated a radium-226 concentration of less than 1 picocurie per liter and a uranium concentration of 3.58 micrograms per liter.

The license application also specifies that the licensee will collect soil and vegetation samples from the fertilized areas. The sample results are reviewed by an agronomist who subsequently provides recommendations for the nitrogen application rates. Similar to previous years, the 2005 vegetation samples continued to contain elevated molybdenum concentrations. The vegetation (hay) could still be consumed by animals but with certain dietary restrictions.

### 7.3 Conclusions

The effluent and environmental monitoring programs were conducted in accordance with license and regulatory requirements. The licensee collected all required samples, with one minor exception. The sample results indicated that offsite releases were less than regulatory limits.

Elevated concentrations of radioactive material continued to be identified in selected groundwater monitoring wells. In response, the licensee implemented an interim groundwater corrective action program.

The licensee continued to utilize ammonium nitrate solution as a fertilizer on land used to produce hay. The licensee implemented the fertilizer distribution program during 2005 in accordance with license application requirements.

## 8 **Emergency Preparedness (88050)**

### 8.1 Inspection Scope

The inspectors reviewed the licensee's emergency preparedness program to determine whether it was being maintained in a state of operational readiness.

### 8.2 Observations and Findings

The licensee maintained emergency response capabilities for two classes of incidents, spills of dry uranium and injury of personnel. The licensee's spill response activities were provided in Facility Operating Procedure E-105, Revision 9, "Spill of Dry Uranium Compound." Actions planned included area evacuation, isolation of the spill, decontamination of the spill area, and collection of bioassays. The inspectors confirmed during site tours that the licensee had equipment available for responding to an emergency situation.



The actions required to be taken in response to injuries are specified in Facility Operating Procedure E-202, Revision 16, "Injury." The procedure included guidance for injuries of radiologically contaminated individuals. The licensee also maintained a reporting requirements procedure, Facility Operating Procedure G-004, Revision 24, "Reporting Requirements for Abnormal Events," that includes the regulatory and license reporting requirements.

### 8.3 Conclusions

The license maintained an emergency preparedness program that included instructions and equipment for responding to contamination spills and injured contaminated individuals.

## 9 **Exit Meeting**

The inspectors reviewed the scope and findings of the inspection during an exit meeting that was conducted at the conclusion of the onsite inspection on February 15, 2007. The licensee did not identify as proprietary any information provided to, or reviewed, by the inspectors.

## **ATTACHMENT**

### **SUPPLEMENTAL INFORMATION**

#### **PARTIAL LIST OF PERSONS CONTACTED**

##### **Licensee**

J. Ellis, President  
C. Harlin, Radiation Safety Officer, Director of Regulatory Affairs  
C. Mooneyham, D&D Supervisor  
S. Munson, Environmental Manager  
K. Simeroth, Health and Safety Supervisor

#### **INSPECTION PROCEDURES USED**

|          |   |
|----------|---|
| IP 83822 | Radiation Protection                    |
| IP 86740 | Inspection of Transportation Activities |
| IP 88005 | Management Organization and Controls    |
| IP 88010 | Operator Training/Retraining            |
| IP 88035 | Radioactive Waste Management            |
| IP 88045 | Environmental Protection                |
| IP 88050 | Emergency Preparedness                  |

#### **ITEMS OPENED, CLOSED, AND DISCUSSED**

##### **Open**

None

##### **Closed**

None

##### **Discussed**

None

#### **LIST OF ACRONYMS USED**

|                  |                                   |
|------------------|-----------------------------------|
| ALARA            | As Low As Reasonably Achievable   |
| CFR              | Code of Federal Regulations       |
| DOT              | U.S. Department of Transportation |
| DUF <sub>4</sub> | depleted uranium tetrafluoride    |
| IP               | Inspection Procedure              |
| µg/l             | micrograms per liter              |