



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
612 EAST LAMAR BLVD, SUITE 400  
ARLINGTON, TEXAS 76011-4125

January 12, 2010

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

SUBJECT: NRC INSPECTION REPORT 040-08027/09-002

Dear Mr. Ellis:

This refers to the inspection conducted on November 9-10, 2009, at the Sequoyah Fuels Corporation site located near Gore, Oklahoma. 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 preliminary inspection results were presented to you at the conclusion of the onsite inspection, and the final inspection results were presented to your staff by telephone on January 4, 2010, following receipt of soil and concrete sample results on December 31, 2009. The enclosed report presents the results of this inspection. In summary, the inspector determined that you were conducting decommissioning activities in compliance with regulatory and license requirements.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if you choose to provide 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 Mr. Robert Evans, Senior Health Physicist, at (817) 860-8234 or the undersigned at (817) 860-8191.

Sincerely,

*/RA/*

D. Blair Spitzberg, PhD, Chief  
Repository and Spent Fuel Safety Branch

Docket: 040-08027  
License: SUB-1010

Enclosure:

NRC Inspection Report 040-08027/09-002

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U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket: 040-08027

License: SUB-1010

Report: 040-08027/09-002

Licensee: Sequoyah Fuels Corporation

Location: P.O. Box 610  
Gore, Oklahoma

Dates: November 9-10, 2009

Inspector: Robert Evans, PE, CHP, Senior Health Physicist  
Repository and Spent Fuel Safety Branch

Accompanied By: Michelle Varbel, Environmental Programs Specialist  
Land Protection Division  
Radiation Management Section  
Oklahoma Department of Environmental Quality

Approved by: D. Blair Spitzberg, PhD, Chief  
Repository and Spent Fuel Safety Branch

Attachment: Supplemental Inspection Information

ENCLOSURE

## **EXECUTIVE SUMMARY**

### Sequoyah Fuels Corporation NRC Inspection Report 040-08027/09-002

This inspection was a non-routine, announced inspection of decommissioning activities being conducted at the Sequoyah Fuels Corporation site. This inspection included a review of the licensee's implementation of the NRC-approved Reclamation Plan. In summary, the licensee was conducting decommissioning activities in compliance with license and regulatory requirements.

#### **Decommissioning Inspection Procedure for Materials Licensees**

- Overall, the licensee was conducting decommissioning activities in accordance with the NRC-approved Reclamation Plan (Section 1).
- The licensee conducted a demonstration survey to confirm that the remediated portion of the Phase I disposal cell footprint met the criteria established in the Reclamation Plan for construction of the onsite disposal cell. The demonstration survey was conducted in accordance with Reclamation Plan requirements, and the results of the survey were reported to the NRC. At the time of the inspection, the licensee was remediating the remainder of the Phase I footprint. The licensee will have to complete the demonstration survey, and update the survey report, following the completion of these remediation activities (Section 1).
- The inspector conducted a confirmatory survey in the Phase I footprint area that had been demonstration surveyed by the licensee. The confirmatory survey included measurement of ambient gamma exposure rates and collection of concrete and soil samples. The inspector identified elevated ambient gamma exposure rates in the vicinity of the DUF<sub>4</sub> Building. These elevated exposure rates were found to be originating from contaminated equipment located within the building. The soil and concrete sample results were well below the NRC-approved derived concentration guideline level suggesting that these areas had been effectively remediated by the licensee (Section 1).

## Report Details

### Summary of Plant Status

At the time of the inspection, the licensee was in the early stages of site decommissioning. Site decommissioning will include dismantlement and removal of systems and equipment, demolition of structures, removal and treatment of sludges and sediments, remediation of contaminated soils, and treatment of wastewater. Most of the residual waste material will be placed in an onsite disposal cell for permanent disposal. The disposal cell was originally designed for a capacity of 8.3 million cubic feet of disposed material, although the cell can be modified to accommodate from 5 to 11 million cubic feet of material.

The disposal cell will be constructed in phases. During the inspection, the licensee was in the process of preparing to construct Phase I of the onsite disposal cell. The Phase I area is the north-eastern portion of the cell. Once the first phase has been constructed, the licensee will begin excavating contaminated soils that are situated in the Phase II footprint. Soils in the Phase II area that exceed the cleanup level will be placed into the Phase I cell for disposal.

At the time of the inspection, most of the Phase I footprint area had been surveyed by the licensee in an effort to confirm that the area met the radiological criteria specified in the Reclamation Plan. The licensee was in the process of expanding the Phase I area in the southern and western directions. The licensee was surveying these surface soils and removing soils that exceeded the cleanup level. After these new areas have been cleared, the licensee plans to conduct a demonstration survey to confirm that these areas meet the criteria for construction of the disposal cell. Demonstration surveys are the surveys being conducted by the licensee to demonstrate that the areas within the footprint of the disposal cell have been remediated to levels below the NRC-approved derived concentration guideline level (DCGL).

The licensee still possesses approximately 11,000 tons of de-watered raffinate sludge. The sludge was being stored in bags for possible offsite transfer to an out of state uranium mill for processing as alternate feed material. If the licensee is unable to transfer the material, the NRC-approved Reclamation Plan allows the licensee to dispose of the sludge in the onsite disposal cell.

## **1 Decommissioning Inspection Procedure for Materials Licensees (87104)**

### **1.1 Inspection Scope**

The purpose of the inspection was to determine if licensed decommissioning activities were being conducted in accordance with the NRC-approved Reclamation Plan.

### **1.2 Observations and Findings**

License Condition 51 authorizes the licensee to implement the Reclamation Plan dated January 4, 2008, as amended. Prior to the onsite inspection, the licensee had prepared most of the Phase I area for construction of the onsite disposal cell. During the inspection, the licensee was preparing the remainder of the Phase I area for cell construction. The Phase I area is approximately 11,400 square meters in size and will be the northeastern corner of the disposal cell. The Phase I area is located in the general vicinity of the former DUF<sub>4</sub> (depleted uranium tetrafluoride) Building. The

Phase I footprint consisted mostly of concreted surfaces. The remainder of the surfaces consisted of site soils. No plant equipment was located within the Phase I area.

The Reclamation Plan provides acceptance criteria for the residual radioactive contamination of the soils that will be located underneath the disposal cell. In accordance with the Reclamation Plan, if these soils contain natural uranium in concentrations greater than 570 picocuries per gram (pCi/g), these soils will have to be excavated and placed into the disposal cell.

Following the excavation of the soils located within the footprint of the disposal cell, the Reclamation Plan stipulates that a demonstration survey be conducted to confirm that the cleanup criteria have been satisfied. The licensee previously conducted a demonstration survey in most of the Phase I footprint area. The results were documented in a survey report that was submitted to the NRC by letter dated October 5, 2009. The inspector reviewed the report during the inspection. Although the survey was not a final status survey, the licensee conducted the survey using the general criteria of a Class 3 area as specified in the Multi-Agency Radiation Survey and Site Investigation Manual (NUREG-1575).

The inspector compared the survey design to the criteria established in the Reclamation Plan and concluded that the survey had been conducted in accordance with Reclamation Plan requirements. The Phase I demonstration survey report includes 2,263 individual gamma exposure rate measurements that range from 6,593 counts per minute (cpm) to 47,618 cpm with a background of 9,342 cpm. As noted below, the elevated exposure rates were measured in the Phase I area located adjacent to the DUF<sub>4</sub> Building. The report also includes soil sample results from previous sampling events. None of the soil sample results exceeded the 570 pCi/g guideline level. The report concludes that the area meets the criteria established in the Reclamation Plan for disposal cell construction.

The inspector conducted a confirmatory survey of the Phase I demonstration area, the area that had been previously surveyed by the licensee. The NRC's survey included measurement of ambient gamma exposure rates and collection of soil and concrete samples. The gamma scan was conducted using a Ludlum Model 12 survey meter with a 44-10 sodium iodide probe (NRC number 20888G with a calibration due date of 10/09/10). The concrete and soil samples were collected by the licensee under the direct observation of the inspector.

Prior to conducting the gamma scan, the inspector conducted background measurements to establish both the background level and the action level for the survey meter. The background measurements were collected outside of the restricted area in the yard adjacent to the administrative building. The inspector measured an average background level of 7,000 counts per minute (cpm). In accordance with the Reclamation Plan, the action level was established at 21,000 cpm, or three times background, for this survey meter. The inspector then conducted surface scans of the Phase I area.

One area located within the Phase I footprint exceeded the gamma scan action level, the area located immediately adjacent to the DUF<sub>4</sub> Building. This area measured up to 45,000 cpm with an action level of 21,000 cpm. The inspector noted that the ambient gamma radiation levels were most likely elevated because of contaminated equipment located within the DUF<sub>4</sub> Building. The exterior surface of the DUF<sub>4</sub> Building measured up

to 75,000 cpm. The radiation 'shine' from the DUF<sub>4</sub> Building was apparently impacting the inspector's Phase I area survey results.

With the licensee's assistance, the inspector collected one concrete sample and four soil samples. The concrete sample was collected near the DUF<sub>4</sub> Building in an area that was impacted by the radiation 'shine' emanating from the building. Four soil samples were collected in the same general area, in part, to ascertain whether the elevated radiation levels were the result of contaminated soils located within the Phase I area or were the result of 'shine' from the DUF<sub>4</sub> Building. Two samples were collected underneath the concrete pad located west of the DUF<sub>4</sub> Building, and two samples were collected from surface soil located south of the DUF<sub>4</sub> Building. The five samples were submitted to Oak Ridge Institute for Science and Education (ORISE) for analysis. The results of the sample analyses are presented in the table below.

**Table: Results of Soil Sample Analyses**

Sample Number and Type	Gamma Exposure Rates (cpm)	Total Uranium (pCi/g)
NRC-1 Concrete 0-10"	40,000 (impacted by DUF <sub>4</sub> Bldg.)	7.03 ± 0.80
NRC-2 Soil 10-16"	9,500	10.6 ± 1.0
NRC-3 Soil 16-22"	Not Measured	26.6 ± 2.0
NRC-4 Soil 0-6"	9,000	18.5 ± 1.4
NRC-5 Soil 6-12"	Not Measured	8.35 ± 0.89

The five samples were analyzed by gamma spectroscopy for determination of uranium-234, uranium-235, and uranium-238 concentrations. The activities of these three radionuclides were then combined by ORISE for determination of total uranium concentrations. The total uranium concentrations were then compared to the NRC-approved DCGL of 570 pCi/g. None of the sample results exceeded the DCGL suggesting that the sampled areas had been effectively remediated by the licensee. Further, the sample results suggest that the elevated ambient gamma radiation levels were the result of shine from the DUF<sub>4</sub> Building located outside of the Phase I area and not from contaminated soils located within the Phase I area.

The inspector noted that two areas located inside the original Phase I footprint but outside of the demonstration area (the area previously surveyed by the licensee) exceeded the ambient gamma radiation action level. These two areas were located to the west and south of the demonstration area. The licensee was aware of these contaminated soils and planned to remediate these soils immediately after the completion of the onsite inspection. Following remediation, the licensee plans to conduct a demonstration survey in the remainder of the Phase I footprint and update the survey report as necessary. The NRC staff will review these demonstration survey results, and the results of surveys conducted in the Phase II footprint area, during a future inspection.

### 1.3 Conclusions

Overall, the licensee was conducting decommissioning activities in accordance with the NRC-approved Reclamation Plan. The licensee conducted a demonstration survey to confirm that the remediated portion of the Phase I disposal cell footprint met the criteria established in the Reclamation Plan for construction of the onsite disposal cell. The demonstration survey was conducted in accordance with Reclamation Plan requirements, and the results of the survey were reported to the NRC. At the time of the inspection, the licensee was remediating the remainder of the Phase I footprint. The licensee will have to complete the demonstration survey, and update the survey report, following the completion of these remediation activities.

The inspector conducted a confirmatory survey in the Phase I footprint area that had been demonstration surveyed by the licensee. The confirmatory survey included measurement of ambient gamma exposure rates and collection of concrete and soil samples. The inspector identified elevated ambient gamma exposure rates in the vicinity of the DUF<sub>4</sub> Building. These elevated exposure rates were found to be originating from contaminated equipment located within the building. The soil and concrete sample results were well below the NRC-approved derived concentration guideline level suggesting that these areas had been effectively remediated by the licensee.

## **2 Exit Meeting**

The inspector reviewed the scope and findings of the inspection during an exit meeting that was conducted at the conclusion of the onsite inspection on November 10, 2009. The inspector presented the final exit briefing to the licensee on January 4, 2010, following the receipt of the soil sample results from ORISE on December 31, 2009. During the inspection, the licensee did not identify any information reviewed by the inspector as proprietary.

## **SUPPLEMENTAL INSPECTION INFORMATION**

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

John Ellis, President  
Scott Munson, Environmental Manager  
Billy Reid, Quality Assurance  
Rob Miller, Contractor

### **INSPECTION PROCEDURES USED**

IP 87104 Decommissioning Inspection Procedure for Materials Licensees

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

#### Opened

None

#### Closed

None

#### Discussed

None

### **LIST OF ACRONYMS**

CFR	Code of Federal Regulations
cpm	counts per minute
DCGL	derived concentration guideline level
DUF <sub>4</sub>	depleted uranium tetrafluoride
IP	NRC Inspection Procedure
ORISE	Oak Ridge Institute for Science and Education
pCi/g	picocuries per gram