



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
1600 EAST LAMAR BLVD  
ARLINGTON, TEXAS 76011-4511

December 20, 2012

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

SUBJECT: NRC INSPECTION REPORT 040-08027/12-003

Dear Mr. Ellis:

This refers to the inspection conducted on November 7-8, 2012, at your Sequoyah Fuels Corporation site 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 findings were presented to your staff at the conclusion of the onsite inspection, and a final exit briefing was held with you by telephone on December 19, 2012, following receipt of results of NRC confirmatory samples obtained during the inspection. The enclosed report presents the results of this 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 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 Agencywide Documents Access and Management 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, Senior Health Physicist, at 817-200-1234 or the undersigned at 817-200-1191.

Sincerely,

*/RA/*

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

Docket: 040-08027  
License: SUB-1010

Enclosure:  
NRC Inspection Report 040-08027/12-003

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U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket: 040-08027

License: SUB-1010

Report: 040-08027/12-003

Licensee: Sequoyah Fuels Corporation

Location: P.O. Box 610  
Gore, Oklahoma

Dates: November 7-8, 2012

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

Linda M. Gersey, Health Physicist  
Repository and Spent Fuel Safety Branch

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 040-08027/12-003

This inspection was a routine, announced inspection of decommissioning activities being conducted at the Sequoyah Fuels Corporation site in Gore, Oklahoma. The inspection included a confirmatory survey of the eastern portion of the Phase III disposal cell footprint. The inspectors concluded that the licensee was conducting decommissioning activities in accordance with the NRC-approved Reclamation Plan.

### **Management Organization and Controls**

- The licensee had sufficient staff to conduct decommissioning work and to ensure compliance with license requirements (Section 1.2.a).
- The licensee was implementing its performance-based license conditions in accordance with license requirements (Section 1.2.b).
- The licensee implemented its hazardous work permit program in accordance with Reclamation Plan requirements (Section 1.2.c).

### **Closeout Inspection and Survey**

- The licensee conducted decommissioning activities in accordance with the NRC-approved Reclamation Plan (Section 2.2.a).
- The licensee conducted a demonstration survey to confirm that the remediated portions of the Phase III disposal cell footprint met the criteria established in the Reclamation Plan (Section 2.2.b).
- The inspectors conducted a confirmatory survey of the eastern portion of the Phase III footprint, and the survey results suggest that the licensee had effectively remediated the area (Section 2.2.c).

## Report Details

### Summary of Plant Status

The licensee commenced with site decommissioning during April 2009. To decommission the site, the licensee plans to dismantle and remove systems and equipment, demolish structures, treat site sludges and sediments, remediate contaminated soils, and treat wastewater. Most of the residual waste material will be placed in an onsite disposal cell for permanent disposal.

The licensee plans to construct the disposal cell in three phases. At the time of this inspection, the licensee had filled both the Phase I and Phase II areas with waste material. Because the licensee needed additional space to temporarily stage contaminated material destined for disposal in the Phase III area, the licensee placed additional contaminated wastes on top of the material currently situated in the Phase I and II areas. A contractor conducted an analysis and determined that the licensee could temporarily stage a certain amount of excess waste on top of the Phase I and II areas without impacting the integrity of the disposal cell. A temporary cover was installed over portions of the Phase I and II areas for erosion control. At some future date, the licensee will remove this excess waste material from the Phase I and II areas and place the material into the Phase III area for permanent disposal.

During the inspection, the licensee was excavating the footprint of the Phase III disposal cell in preparation for construction of the base of the cell. After excavation of the eastern portion of the Phase III footprint, the licensee conducted demonstration surveys to confirm that the area met the radiological criteria established in the license. When the demonstration surveys and the NRC's confirmatory surveys are complete, the licensee plans to begin backfilling the surveyed area. After backfilling, the licensee plans to construct the base of the cell in the surveyed area.

Other work in progress included reclamation of the former sanitary lagoon and excavation of the solvent extraction building subsurface area. The licensee was also demolishing the former cooling tower basin. Further, the licensee was in the process of cleaning Clarifier 3A. This pond previously contained nitrate-impacted water. After cleaning, the licensee plans to use this pond for storage of non-impacted storm water.

Since the previous inspection, the licensee plugged the combination stream line. This line previously provided continuous monitored flow for the site's National Pollutant Discharge Elimination System (NPDES) permit. The state-authorized outfall remains in service and will be used in the future for non-routine liquid effluent discharges and rainfall effluents.

At the time of the inspection, the remaining site structures within the radiologically restricted area included the eastern end of the former main processing building, water treatment facility, oil storage building, and laundry building. The licensee continued to store equipment previously salvaged from the former DUF<sub>4</sub> (depleted uranium tetrafluoride) building. The salvaged equipment was being temporarily stored in the eastern end of the former main process plant. The salvaged equipment included electrical switchgear and contaminated process equipment. The licensee plans to transfer this material to a different NRC licensee in the near future.

The licensee still possessed approximately 11,000 super-sacks of raffinate sludge. Most of the raffinate sludge originated from the four clarifier basins. In recent months, the licensee bagged additional sediments from the emergency basin, north ditch areas, and sanitary lagoon. The

licensee continues to stage the bagged and dewatered sludge material on the former yellowcake storage pad for possible transfer to an out-of-state uranium mill for processing as alternate feed material.

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

### **1.1 Inspection Scope**

The inspectors reviewed management organization and controls to ensure that the licensee had established the controls necessary to ensure that the disposal cell was being constructed in compliance with Reclamation Plan requirements.

### **1.2 Observations and Findings**

#### **a. Organizational Staffing**

The organizational structure is provided in Section 2.2 and Figure 2-1 of the license application. In addition, the construction quality assurance (QA) organizational requirements are provided in the Reclamation Plan, Attachment C, Section 1.0.

The licensee implemented two organizational changes since the last inspection. The former QA manager was reassigned to the position of decommissioning project manager, a position previously filled by the company president. A new individual was assigned to the position of QA manager. Because the QA manager was a voting member of the Plant Review Committee, the company president has to be formally notified of the change in committee membership. This written notification was not complete at the time of the inspection.

The licensee's onsite staff consisted of five individuals. The licensee used contractors for QA oversight, geotechnical support, cell construction, radiation safety support, and miscellaneous site maintenance activities as needed. The number of contractors varied, depending on the work in progress. The inspectors concluded that the licensee had sufficient staff to ensure compliance with license and regulatory requirements.

#### **b. Performance-Based License Review**

In accordance with License Condition 54, the licensee is authorized to make changes to the license application, including the Reclamation Plan, under certain instances. The inspectors reviewed the licensee's implementation of its performance-based license. Since the last inspection, the licensee completed various technical reviews, including Reclamation Plan clarifications and changes.

During the previous inspection, the inspectors noted that the licensee had temporarily staged excess wastes in the Phase I and II areas. The licensee needed a place to temporarily store these excess wastes prior to disposal, and the licensee chose to stage these wastes on top of the Phase I and II areas. At that time, the Phase I and II areas had already been filled with wastes, but the final cover had not been installed over these wastes. There is no licensed limit for the amount of wastes which can be staged in these areas. At some point in the future, the licensee will remove these excess wastes

from the Phase I and II areas, and place the material in the Phase III area for permanent disposal. In addition, the licensee will then install the final cover on the Phase I and II areas.

The inspectors previously questioned whether the weight of the excess waste material could cause structural damage to the disposal cell. The licensee's representatives stated that the excess wastes would have no structural impacts on final cell operation or design, in part, because the volume of overfill was less than the volume of the cover material that will eventually be installed on the cell. As a precaution, a contractor conducted a review of the effects of overfilling the Phase I and II areas with wastes. This study was completed in early October 2012. The study concluded that stockpiling can occur up to 10 feet above the original design specification without any consequences on the integrity of the cell. The Plant Review Committee concurred with this evaluation on October 9, 2012.

The Plant Review Committee also formally defined the disposal cell footprint and associated derived concentration guideline levels (DCGL) for soil in this area. This clarification was necessary, because the only DCGL applicable to the footprint area was the natural uranium DCGL. The licensee is not required to sample for thorium-230 and radium-226 in the footprint area. The committee approved a definition of the disposal cell footprint that relied on the wording of the Reclamation Plan and NRC correspondence provided to the licensee. These two technical reviews, the staging of excess wastes on the Phase I and II areas and the definition of the footprint, will be reviewed by NRC construction experts during a future NRC inspection.

The licensee's Plant Review Committee conducted one formal meeting since the last inspection. The committee met during late October 2012 to approve changes to the technical specifications, Attachment A to the Reclamation Plan. The committee revised the responsibilities for approving various construction changes. The inspectors considered these changes to be acceptable, and the changes were made in accordance with the requirements of the performance-based license.

c. Hazardous Work Permits

The licensee had five open hazardous work permits at the time of the inspection. The permits included excavation of soils from the impacted soil of the Phase II disposal cell, decontamination and down-sizing scrap metal from the laundry building, and inspection of the DUF<sub>4</sub> filters. The hazardous work permit requirements are documented in Section 9.2 of the Reclamation Plan, Attachment D. The inspectors reviewed the hazardous work permits and found them to include the appropriate precautions for radiation and industrial safety.

1.3 Conclusions

The licensee had sufficient staff to conduct decommissioning work and to ensure compliance with license requirements. The licensee was implementing its performance-based license conditions in accordance with license requirements. The licensee implemented its hazardous work permit program in accordance with Reclamation Plan requirements.

## **2 Closeout Inspection and Survey (83890)**

### **2.1 Inspection Scope**

The purpose of this portion of the inspection was to ensure that the licensee was conducting decommissioning in accordance with license and Reclamation Plan requirements.

### **2.2 Observations and Findings**

#### **a. Excavation of Phase III footprint**

The inspectors observed the licensee's contractor conducting reclamation of the Phase III footprint area. The inspectors also discussed these activities with the licensee's representatives. In general, the licensee elected to construct the Phase III portion of the disposal cell from east to west. During the inspection, the contractor had excavated the eastern portion of the Phase III footprint and was actively excavating the western portion. A physical barrier remained between the two parts to keep contamination in the western area from spilling into the eastern area. At some point in the near future, the licensee plans to construct the base of the Phase III disposal cell in the eastern area, while continuing to prepare the western portion for future construction.

The excavated material was being screened for sorting into three groups - highly impacted, moderately impacted, and low impacted. The licensee conducted the screening using an x-ray fluorescence (XRF) meter and a radioactivity survey meter coupled to a sodium iodide detector. The XRF meter measured the uranium concentrations in the soil, while the survey meter measured the radioactivity levels of the soil.

The licensee developed action levels for each group. The highly impacted material was the most radioactive. This material was being sorted and transferred to the Phase I and II disposal areas as overfill. Eventually, this overfill material will be disposed in the Phase III area. The highly impacted material included material excavated from the solvent extraction yard.

Radioactive soils and debris that were classified as moderately impacted were being stored in the calcium fluoride settling basins and clarifier area. This material will eventually be disposed in the Phase III disposal area.

Low impact material, including material from the vicinity of the former DUF<sub>4</sub> building, will be used as subgrade fill in the Phase III footprint area. The subgrade fill will be used as foundation material below the base of the disposal cell. To be used as subgrade fill, the low impact material cannot contain radioactive material in excess of the licensed limit. The licensee continues to screen and sample this material to ensure that it meets the criteria for use as backfill material. The licensee was staging this material near the former DUF<sub>4</sub> Building. When the licensee begins using the staged material as backfill material, the licensee will resample the material as required by the Reclamation Plan during placement and compaction. The inspectors confirmed that the licensee's methods for screening and sampling the soil were effective for ensuring compliance with the licensed limit for subgrade fill material.

b. Review of Demonstration Survey Results

License Condition 51 stipulates that the site will be decommissioned in accordance with the guidance provided in the Reclamation Plan dated January 4, 2008, as amended. At the time of the inspection, the licensee had completed the excavation of the eastern portion of the Phase III footprint. Before the licensee can begin backfilling the area and constructing the base of the cell, the licensee has to demonstrate that the ground surface meets certain radiological characteristics.

The Reclamation Plan provides the NRC-approved DCGL for the ground surface and the backfill material. In accordance with the Reclamation Plan, if these soils contain natural uranium in concentrations greater than 570 picocuries per gram (pCi/g), then these soils have to be excavated and placed into the disposal cell. Following the excavation of contaminated soils, the Reclamation Plan stipulates that a demonstration survey be conducted to confirm that the DCGL has been satisfied. The licensee conducts this demonstration survey using the general guidelines provided in the Reclamation Plan for final status surveys.

The licensee conducted the demonstration survey for the eastern portion of the Phase III footprint during October-November 2012. The area was 6,430 square meters in size. The inspectors reviewed the preliminary results of this demonstration survey during the onsite inspection. The licensee's demonstration survey consisted of measurement of ambient gamma radiation levels and analysis of soil samples for total uranium concentrations.

The licensee conducted the walk-over survey, in part, to identify areas of elevated radioactivity. The action level for this walkover survey was set at three times the background level. The survey was conducted using a portable survey meter coupled to a sodium iodide detector. In summary, the licensee's walk-over survey results were below the action level.

The licensee collected 27 soil samples from the area. The licensee analyzed the samples using the XRF meter. The licensee also sent the samples to an offsite laboratory for analysis. The inspectors reviewed these preliminary survey results during this inspection. At the time of the inspection, the licensee's sample results were available for NRC review, although the licensee had not reviewed and approved the survey report. The preliminary results indicate that the total uranium concentrations in all samples were less than the DCGL of 570 pCi/g. The highest sample result was 280 pCi/g, about half of the DGCL. The inspectors will review the final survey results during a future inspection.

c. Confirmatory Survey

The inspectors conducted a confirmatory survey of the eastern portion of the Phase III footprint area. The purpose of the survey was to confirm that the area met the acceptance criteria established in the Reclamation Plan. The survey included measurement of ambient gamma exposure rates and collection of soil samples. The inspectors conducted the gamma scan using a Ludlum Model 19 survey meter (NRC 033906, calibration due date of 01/10/13) and a Ludlum Model 12 count rate

meter with 2-inch by 2-inch sodium iodide probe (NRC 20888G, calibration due date of 10/18/13). The ambient gamma exposure rates were measured, in part, to identify any area that exhibited radiation levels above background for soil sampling.

Prior to conducting the gamma scan, the inspectors measured ambient background levels to establish action levels for these survey meters. The background measurements were collected outside of the restricted area in the yard adjacent to the administrative building. The licensee's action level for gamma radiation exposure rates was three times the background level. The NRC inspectors' action levels were also set at three times the measured background levels for consistency.

The inspectors conducted surface scans of the eastern portion of the Phase III footprint. All areas within the eastern portion of the Phase II footprint were less than the action level, with two exceptions. The western edge of the excavated area exceeded the action level due to the presence of radioactivity in the soils located to the west of the excavated area. The licensee plans to remediate these soils at a later date. Also, the radiation levels in the vicinity of the former main processing building slightly exceeded the action levels, most likely due to the residual radioactivity still present in the structure or due to contaminated soils located outside of the surveyed area.

The inspectors collected eight soil samples for comparison to the total uranium DCGL. The licensee split the samples with the inspectors. Seven samples were collected from within the eastern footprint area, and the eighth sample was collected from soils staged near the former DUF<sub>4</sub> building. The licensee planned to use these soils as backfill material in the Phase III footprint, and the inspectors wanted to ensure that these soils met the radiological criteria for use as backfill material.

After the soil samples were collected, the licensee screened the samples with the XRF meter. One XRF meter result suggested that the total uranium concentration would exceed the action level; therefore, this sample (NRC-2) was left onsite. This sample was collected from the northwestern corner of the excavated area, and the licensee voluntarily removed this area from the boundary of the demonstration survey. The licensee planned to continue remediating and excavating this area. The licensee will repeat the demonstration survey in this area at a later date.

The NRC's seven soil samples were submitted to Oak Ridge Associated Universities (ORAU) for analysis. The NRC's samples were analyzed by gamma spectroscopy for determination of total uranium concentrations. The NRC's sample results and the licensee's split sample results are presented below:

**Split Soil Sample Results for Total Uranium**

NRC Sample	SFC Sample	Sample Location	NRC pCi/g	NRC µg/g	SFC µg/g
NRC-1	HA-1298	Northwest corner	108.2 ± 7.0	160	187
NRC-3	HA-1300	Northern area	21.3 ± 1.8	31.5	28.2
NRC-4	HA-1301	North-central area	7.2 ± 1.0	10.6	9.78
NRC-5	HA-1302	Central area	10.4 ± 1.3	15.4	11.8

NRC-6	HA-1303	South-central area	3.57 ± 0.77	5.3	4.68
NRC-7	HA-1304	Southern area	35.4 ± 2.6	52.3	81.9
NRC-8	HA-1305	Staged soil	16.2 ± 1.5	23.9	21.5

The inspectors compared the total uranium concentrations in the samples to the NRC-approved DCGL of 570 pCi/g (842 micrograms of uranium per gram of soil). All sample results were less than the NRC-approved DCGL. The inspectors also noted that the NRC's sample results were similar to the licensee's sample results. In summary, the areas within the eastern portion of the Phase III disposal cell footprint met the soil DCGL established in the Reclamation Plan for uranium. The inspectors concluded that the area had been effectively remediated by the licensee.

### 2.3 Conclusions

The licensee conducted decommissioning activities in accordance with the NRC-approved Reclamation Plan. The licensee conducted a demonstration survey to confirm that the remediated portions of the Phase III disposal cell footprint met the criteria established in the Reclamation Plan. The inspectors conducted a confirmatory survey of the eastern portion of the Phase III footprint, and the survey results suggest that the licensee had effectively remediated the area.

### 3 **Exit Meeting**

The inspectors reviewed the preliminary scope and findings of the inspection during an exit meeting that was conducted at the conclusion of the onsite inspection on November 8, 2012. A final exit briefing was conducted by telephone on December 19, 2012. During the inspection, the licensee did not identify any information reviewed by the inspectors as proprietary.

## Supplemental Inspection Information

### PARTIAL LIST OF PERSONS CONTACTED

R. Miller, Contractor  
S. Munson, Manager, Health and Safety  
A. Rahi, Health and Safety  
B. Reid, Director, Decommissioning Projects  
K. Schlag, Manager, Quality Assurance

### INSPECTION PROCEDURES USED

IP 83890 Closeout Inspection and Survey  
IP 88005 Management Organization and Controls

### ITEMS OPENED, CLOSED, AND DISCUSSED

#### Opened

None

#### Closed

None

#### Discussed

None

### LIST OF ACRONYMS

CFR	<i>Code of Federal Regulations</i>
DCGL	derived concentration guideline level
DUF <sub>4</sub>	depleted uranium tetrafluoride
IP	NRC Inspection Procedure
µg/g	micrograms per gram
NPDES	National Pollutant Discharge Elimination System
ORAU	Oak Ridge Associated Universities
pCi/g	picocuries per gram
QA	quality assurance
XRF	x-ray fluorescence