



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION IV  
1600 E. LAMAR BLVD.  
ARLINGTON, TX 76011-4511

April 22, 2015

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

SUBJECT: NRC INSPECTION REPORT 040-08027/15-002

Dear Mr. Ellis:

This refers to the inspection conducted on March 24-26, 2015, at your Sequoyah Fuels Corporation, site near Gore, Oklahoma. This inspection was an examination of activities conducted under your license as they relate to public health and safety to confirm 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 results of the inspection were discussed with you and members of your staff at the exit briefing conducted at the conclusion of the onsite inspection on March 26, 2015.

The inspection included a review of the status of your onsite disposal cell and an inspection of areas routinely reviewed. The results were presented to you and your staff at the conclusion of the onsite 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 "Agency Rules of Practice and Procedure," 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 Dr. Gerald Schlapper, Health Physicist, at 817-200-1273, or the undersigned at 817-200-1191.

Sincerely,

*/RA/*

Ray L. Kellar, P.E., Chief  
Repository and Spent Fuel Safety Branch  
Division of Nuclear Materials Safety

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

Enclosure:  
NRC Inspection Report 040-08027/15-002

cc w/encl:   A. Gutterman  
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              A. Enstrom  
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              S. Hill  
              J. Harris  
              M. Broderick

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U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket: 040-08027

License: SUB-1010

Report: 040-08027/15-002

Licensee: Sequoyah Fuels Corporation

Location: P.O. Box 610, Gore, Oklahoma

Dates: March 24-26, 2015

Inspectors: Gerald Schlapper, Ph.D., C.H.P., Health Physicist  
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Division of Nuclear Materials Safety  
Region IV

Donald Stearns, Health Physicist  
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Accompanied by: Ray L. Kellar, P.E., Chief  
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Region IV

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Approved by: Ray L. Kellar, P.E., Chief  
Repository and Spent Fuel Safety Branch  
Division of Nuclear Materials Safety  
Region IV

Attachment: Supplemental Inspection Information

Enclosure

## EXECUTIVE SUMMARY

### Sequoyah Fuels Corporation NRC Inspection Report 040-08027/15-002

This U.S. Nuclear Regulatory Commission (NRC) inspection was a routine, announced inspection of decommissioning activities being conducted at the Sequoyah Fuels Corporation site near Gore, Oklahoma. The inspectors concluded that Sequoyah Fuels Corporation (the licensee) was conducting decommissioning activities in accordance with regulatory and license requirements.

#### Management Organization and Controls

- The licensee had sufficient staff for the work in progress. The licensee conducted its technical reviews and Reclamation Plan changes in accordance with the performance based license requirements. (Section 1).

#### Radiation Protection

- The licensee conducted its radiation protection program in accordance with the requirements of 10 CFR Part 20 and the license. (Section 2)

#### Emergency Preparedness

- The licensee maintained emergency response programs that included instructions for responding to individuals who become injured at the facility. (Section 3)

#### Effluent Control and Environmental Protection

- The licensee's effluent and environmental monitoring programs were conducted in accordance with license and regulatory requirements. Monitoring results for liquid and gaseous releases indicated that radioactive effluent releases were less than regulatory limits. Elevated concentrations of radioactive material continue to be identified by the licensee in a limited number of groundwater monitoring wells. The licensee continued implementation of a groundwater corrective action program. The licensee implemented a fertilizer distribution program in accordance with license requirements. (Section 4).

## Report Details

### Summary of Plant Status

License Condition 51 allows the licensee to conduct decommissioning in accordance with the Reclamation Plan dated July 2008, as amended. The licensee commenced with site decommissioning in April 2009. To decommission the site, the licensee planned to dismantle and remove systems and equipment, demolish structures, treat sludges and sediments, remediate contaminated soils, and treat wastewater. Most of the residual waste material will be placed in an onsite cell for permanent disposal.

The licensee is constructing the disposal cell in three phases. Since the previous inspection, conducted in November, 2014, the licensee continued to remediate the site and continued to construct the onsite disposal cell. The licensee finished construction of the base of the Phase III portion of the disposal cell in July 2013. During the period since the last inspection, the licensee's contractor continued to place waste material into the Phase III portion of the cell for permanent disposal.

Other work completed by the licensee during the past year included remediation of the storm water capture area, DUF<sub>4</sub> (depleted uranium tetrafluoride) Building foundation, Pond 1 spoils pile, north burial pit (formerly known as solid waste burial area No. 2), northeastern area (formerly a burial and burn site), fluoride clarifier basin, north/south fluoride settling basins, and clarifier basin No. 4. During the inspection, the licensee was demolishing a cell room in the former main processing building.

The licensee continued to store a limited amount of equipment previously salvaged from the former DUF<sub>4</sub> Building in the main process building. The licensee plans to transfer this salvaged material to another NRC licensee in the near future. Further, the licensee continued to store DUF<sub>4</sub> and natural uranium in 77 drums. The drums were being stored in two metal shipping containers in the southeastern corner of the site. The licensee plans to ship this material for reuse or disposal at some point in the future.

The licensee still possesses approximately 11,000 tons of bagged raffinate sludge, material previously removed from the four clarifier basins. The licensee also possesses 851 bags of sediments removed from the emergency basin, north ditch, and sanitary lagoon. The licensee continued to store the bagged sludge and sediment material for possible transfer to an out-of-state uranium mill for use as alternate feed material. If the licensee is unable to transfer the material to the mill, the license allows the licensee to dispose of this material in the onsite disposal cell. If the material is to be placed in the cell, this must be done while appropriate locations are still available within the cell. A decision as to placement of the material will be made soon.

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

### **1.1 Inspection Scope**

The inspectors assessed site staffing to determine if the licensee had adequate staff for the work underway. The inspectors reviewed the licensee's decommissioning activities to determine if these activities were being conducted in accordance with Reclamation Plan requirements.

## 1.2 Observations and Findings

The licensee's organizational structure is presented in Section 2.2 and Figure 2-1 of the license application. The organizational requirements for reclamation are also provided in Section 1.0 of the Quality Assurance (QA) Plan. The licensee's onsite staff consisted of six individuals who are Sequoyah Fuels employees. The licensee noted that one of the six individuals was to retire within the month following the inspection. 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 but normally is around a total of 40 contractors. At the time of inspection, all management-level positions were filled with experienced staff. The inspectors concluded that the licensee had sufficient staff to ensure compliance with license and regulatory requirements.

License Condition 54 allows the licensee to make changes to the Reclamation Plan under certain circumstances. The NRC staff reviewed two changes to the Reclamation Plan during the last inspection conducted in November 2014 (ML15034A612). The inspector was unable to complete a review of the second change, designated as CL012, which involved a revision to technical specifications to expand the number of locations designated as a soil borrow area. During the review, the inspector noted that the licensee made two additional technical changes when the licensee's Plant Review Committee approved CL012 without sufficient explanation for the reasons for these two changes. The first change involved the materials specifications (how much material must pass through a #200 sieve) and the second change involved the thickness of the side slopes. The inspectors discussed these two technical changes with the licensee, in part, to understand how they impacted radon attenuation. The licensee agreed to revise CL012 to provide additional justifications for these two technical changes, which were still under review by the licensee at the time of the inspection. The inspectors will review the licensee's revised CL012 during a future inspection.

The inspectors reviewed the list of condition reports written by the licensee in 2014 and 2015. Two condition reports were selected for review, one from 2014 and one from 2015. Condition Report 14-6-2 documented an event where a truck used for dispersing water on the site contained a small amount of radioactive material introduced in the tank from a barrel. The barrel was not labeled and the truck driver believed that the liquid in the barrel was non-radioactive. The radioactive material from the unlabeled barrel was mixed with other non-radioactive material in the truck tank, which was dispersed on the site. After the event was discovered, the tank and soil areas that were potentially affected were sampled and cleaned up as necessary by site personnel. The licensee took corrective actions to ensure all drums containing radioactive material were properly labeled.

Condition Report 15-1-1 documented an event where site personnel disposed of a piece of equipment containing thorium without proper planning or personnel monitoring using appropriate air sampling requirements. The licensee found that bioassay results for personnel involved in the work process were all below detectable limits. A radiological survey of the area where the piece of equipment was disposed of in the cell was conducted and remediated until the survey results were within acceptable limits. The initial storage location where the piece of equipment had been stored was surveyed and remediated. The licensee took corrective actions to ensure that future equipment would



be included on a work plan and the approval to work on the equipment would be provided by Health and Safety. In both cases the licensee evaluated that there was no adverse impact to the workers or the reclamation of the site. The inspector agreed with the licensee's evaluation. The events described by the above condition reports are minor violations that are not subject to enforcement action in accordance with the NRC's Enforcement Policy.

At the time of the inspection, the licensee had remediated both clarifier basins 1 and 4. Clarifier basins 2 and 3 remained in service and were being used for storage and processing of potentially contaminated water. Processed water discharged from the clarifier basins was directed to the storm water reservoir for eventual discharge to the environment in accordance with State permit requirements.

The licensee conducted some remediation work within Pond 2, the large pond located west of the main plant site. However, this work had been placed on hold pending completion of the remediation of clarifier basin Nos. 1 and 4. Subsurface contamination from the area of the clarifier basin was thought to be leaching into Pond 2, and the licensee concluded that remediation of the clarifier basin area was necessary before it could finish reclamation of Pond 2.

The licensee continues to store approximately 11,000 tons of bagged raffinate sludge material at the former yellowcake storage pad. The licensee was considering its options for disposal of this material. The Reclamation Plan allows the licensee to dispose of this material in the disposal cell. The licensee has been pursuing other disposal options, without success. The licensee's engineering contractor had reviewed the cell design and determined the best area within the cell for placement of the material. Other material already placed in the Phase III portion of the cell was excavated to accommodate the disposal of the bagged material. The inspectors understood that the licensee would have to review the proposed changes to the disposal cell in accordance with its performance-based license. As noted earlier, the licensee plans to make a final decision about the disposal of the raffinate sludge and pond sediment material later in 2015. The inspectors will review the licensee's efforts in this program area during a future inspection.

### 1.3 Conclusions

The licensee had sufficient staff for work in progress. The licensee conducted its technical reviews and Reclamation Plan changes in accordance with the performance based license requirements.

## **2 Radiation Protection (83822)**

### 2.1 Inspection Scope

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

### 2.2 Observations and Findings

The inspectors conducted site tours to observe the storage of radioactive material and to conduct independent surveys within the radiologically controlled area. Radiation levels

were measured using a micro-Roentgen instrument , Thermo Scientific Model RadEye B20, Serial Number 12398, calibration due date, 9/24/2015. Areas were found to be correctly posted to indicate existing radiological conditions. In addition the inspectors surveyed unrestricted areas at the site. With a normal background exposure rate of approximately 8-12 microRoentgens per hour (microR/hr), the rates in the unrestricted areas ranged from 10 to 15 microR/hr.

The licensee conducts monitoring of site workers for internal and external exposure to radioactive materials. External exposure with Optically Stimulated Luminescent (OSL) dosimeters was limited to those individuals who are authorized to utilize the x-ray fluorescence system and the two on site radiation protection technicians. Since the last inspection of this data there were no significant exposures noted from external sources. Internal exposure monitoring was based on analysis of breathing zone lapel samplers and bioassay measurements. Review of air concentrations and stay time provides the licensee with derived air concentration - hour (DAC-hour) information which is directly used to determine potential internal exposures. Licensee data indicated on two occasions a roller operator had measurable DAC-hour exposures of 2.64 and 4.05 DAC-hours (6.6 and 10.1 millirem). A review of bioassay data for 2014 showed that the maximum uranium content in any bioassay sample was 3.52 micrograms of uranium per liter of urine, well below any regulatory limit.

During an NRC inspection conducted in April 2013 (ML13184A136), the inspectors concluded that the licensee had failed to maintain documentation demonstrating that only properly calibrated and maintained radiological survey meters were being used during decommissioning. In response, the licensee and its instrument calibration contractor implemented various corrective actions as described in the licensee's letter dated July 31, 2013 (ML13221A179). During this inspection, the inspectors reviewed the licensee's program for maintenance and calibration of radiation survey instruments to ensure compliance with license requirements and approved procedures.

Portable radiation survey instruments are calibrated on a 6-month frequency with most instruments forwarded to the parent company, General Atomics (GA) for calibration. General Atomics is licensed for calibration services by the State of California, License Number 0145-37, Amendment 187, Item 24. For those instruments not calibrated by the parent company, recognized and licensed commercial suppliers are utilized. The licensee maintains a data base of instruments and calibration due dates. The inspectors verified that instruments with past due calibrations are removed from use and placed in a dedicated storage location while awaiting shipment for calibration. The inspectors performed a spot check of instruments in the field and found that all were within the calibration due dates and working properly. The inspectors noted that instruments with capability to measure alpha, beta, and gamma radiation were available.

The inspectors reviewed the calibration certificates for approximately 15 portable survey instruments and two low background counting instruments. During the review of calibration certificates for one Ludlum Model 2221 with a Ludlum Model 44-9 probe, the inspector noted that on the calibration performed in December, 2013, the probe efficiency had increased to 21%. On the subsequent calibration performed on May 13, 2014, the efficiency had dropped to 9.9%. The instrument technician for Sequoyah Fuels also noticed the drop in efficiency and performed an informal efficiency check. The technician contacted the GA calibration facility and was provided a replacement probe.

During the review of calibration documentation, the inspector noted that the Model 44-9 probes typically have an efficiency of approximately 10% to 12%. Previous calibrations with similar probes and with the probe in question indicated efficiencies in this range. The inspector pointed out that the efficiency determination of 21% was the efficiency in question. During a discussion with the GA calibration supervisor and the Sequoyah Fuels Environment, Health and Safety Manager, it was decided that the most likely error during the calibration was that the technician had probably set the count time for the instrument for a 2 minute count rather than a 1 minute count, resulting in an approximate doubling in calculated efficiency for the probe.

The inspector requested a copy of surveys using the instrument/probe combination when items were released for unrestricted use. Using an efficiency of 12%, the inspector determined that only one item, a concrete slab, was surveyed for unrestricted use where the true result was above the release limits for unrestricted use. The licensee provided documentation that the concrete slab was actually buried on site near the north end of the disposal cell. This area of burial will be within the area that will remain under institutional controls. This failure to comply with instrument calibration requirements constitutes a minor violation that is not subject to enforcement action in accordance with the NRC's Enforcement Policy. The licensee will initiate a condition report to address the issue. No further issues were identified in the review of use of radiation survey instruments.

The inspector also reviewed documentation for calibration of the two low background counters used by the licensee. These counting systems are calibrated on a quarterly frequency and the inspector found calibrations to be current. Calibration includes the selection of a proper operating voltage and efficiency determination. No issues were identified in this review.

### 2.3 Conclusions

The licensee conducted its radiation protection program in accordance with the requirements of 10 CFR Part 20 and the license.

## 3 **Emergency Preparedness (88050)**

### 3.1 Inspection Scope

The purpose of this portion of the inspection was to ensure that the licensee was maintaining their emergency preparedness program during decommissioning in accordance with regulatory and license requirements and was prepared for emergency events.

### 3.2 Observations and Findings

The licensee's emergency response instructions are described in Procedure X-100, dated June 30, 2014. The procedure acknowledges that no production process lines are currently in operation at the site. Thus the events of concern are those common to the construction industry including slips, trips, falls, fire and severe weather events. However, at this site radioactive material may be involved as a contaminant. The procedure notes that the senior Sequoyah Fuels Corporation representative will function

as the emergency coordinator. The procedure discusses safety precautions, training requirements, equipment availability, facilities to be utilized, and emergency coordinator duties. The procedure clearly notes that the presence of radioactive material would not influence response to fire or personnel injury. Attachment 1 of the procedure presents an emergency response site map that details locations of hazardous materials. The list of hazardous material is updated annually through a report sent electronically to the Oklahoma Department of Environmental Quality (OKDEQ). OKDEQ then forwards the report to local responding agencies. Attachment 2 of the procedure provides contact information for emergency services supporting the site and was verified by the inspector as current. Attachment 3 of the procedure contains a notice to emergency response personnel. The corporate office performed a compliance inspection in 2014 that among other things verified the availability of fire extinguishers across the site to respond in the event of a fire. The corporate inspection found that the extinguishers were available as required and that they were all fully charged. The inspectors selected random fire extinguishers on the site to determine availability and to ensure they were fully charged. All fire extinguishers examined were found to be satisfactory.

### 3.3 Conclusion

The licensee maintained emergency response programs that included instructions for responding to individuals who become injured at the facility.

## **4 Effluent Control and Environmental Protection (88045)**

### 4.1 Inspection Scope

The inspectors reviewed the licensee's environmental control and protection program for compliance with regulatory and license requirements.

### 4.2 Observations and Findings

License Condition 49 specifies that the licensee implement a groundwater compliance monitoring program. Groundwater monitoring wells are located at various depths to monitor different groundwater units. License conditions also specify groundwater protection standards in the form of maximum contaminant levels for various elements. Results of the groundwater monitoring program are presented in the 2014 Annual Groundwater Monitoring Report submitted to the NRC on March 19, 2015. The licensee's results indicate that uranium continues to be detected above the maximum contaminant level of 30 micrograms per liter in a limited number of samples. The various samples range from less than 1 microgram per liter up to 10,613 micrograms per liter. The licensee continues to implement the groundwater compliance monitoring program in accordance with regulatory requirements and license conditions

The inspector reviewed the monthly radiation safety officer progress reports for October 2014, November 2014, December 2014, and January 2015. The reports noted that no fixed area air samples were conducted between October 2014 and January 2015. Fence line air sample locations were observed during a site tour and found to be in good condition. The inspector noted that fence line results for the four stations on the north, south and east site boundaries remained below action levels of 50 percent of the allowed concentration limits, typically at 10 percent or less of the limit. In October 2014 an elevated air sample reached approximately 22 percent of the allowed limit at the

sample location just west of the Pond 1 Spoils Pile and North of Clarifier Pond 1A. After October 2014, all the air samples returned to normal levels including the elevated sample discussed above. The licensee noted that these elevated readings were believed to be related to waste in the disposal cell that was uncovered and left exposed. As the buried material dries out there is a potential for airborne release and hence increased airborne levels. The licensee concluded that during subsequent activities, exposed contaminated soil and waste should be covered to better control generation of airborne radioactive material and implemented a requirement to cover exposed contaminated soil.

The inspector reviewed records of liquid discharges for 2014. Data supplied in the monthly RSO/Project report produced by the radiation safety officer/environment health and safety manager indicated that there were no liquid discharges during 2014. The inspectors along with the RSO toured the discharge locations. The inspectors noted that the direct piping to the permitted Outfall 001 had been removed, but could be replaced and the outfall returned to service if necessary. Modifications to the remaining permitted outfall, Outfall 008, had been made to better control discharge using this route. Discharges from this monitored outfall are only available from the Storm Water Reservoir (SWR), where all water discharge is collected in order to limit the amount of total suspended solids discharged to the Illinois River.

The inspectors also reviewed the route of discharge of water through two corrugated steel pipes located on the downstream side of the former Pond 1 spoils pile area. The inspectors noted that runoff from a clean portion of the disposal cell and from the Pond 1 spoils area drains into the upstream area where the pipes are located. The Pond 1 spoils area has been released for unrestricted use based on facility measurements that were verified by NRC inspectors in the last inspection report (ML15034A612). Discharge from these pipes flows into a large drainage ditch and collects into a small pool, upstream of the permitted Outfall 008. From this pool the water is then pumped to the SWR, which acts as a settling basin to reduce the level of suspended solids. On approval of the environment, health and safety manager, the water from the SWR is discharged through Outfall 008. No water is directly discharged to the river. The discharged water is sampled at Outfall 008, per the requirements of the Oklahoma Pollution Discharge Eliminations System Permit (Oklahoma Discharge Permit), effective July 1, 2005. A 24-hour composite sample is taken from all water discharges. Sampling of the waste water process is further described in Procedure O-180, Facility Wastewater Discharge Operations, dated March 31, 2014. Samples are then sent to a certified third-party off-site laboratory, Outreach Laboratory, Broken Arrow, Oklahoma for analysis (EPA Lab Number OK00922, ODEQ ID Number 9571). The inspectors reviewed data supplied by the laboratory for the last six months and verified that levels of radioactivity were well below those permitted by the Oklahoma Discharge Permit.

License Condition 9.1 authorizes the licensee to apply fertilizer onto licensee-owned or controlled lands. Crops produced on the land cannot be used directly as human food but are allowed to be utilized by cattle for grazing and for production of hay or seed materials. The license specifies that the licensee monitor a control plot in order to implement program controls and comply with requirements for best agricultural practices. The activity must also comply with requirements of the licensee's Oklahoma Discharge Permit. The license requires an annual report summarizing fertilizer distribution activities during the previous year. The required annual report describing the

program for 2014 planned for submittal in April was reviewed by the inspector and found to comply with license requirements.

#### 4.3 Conclusion

The effluent control and environmental protection programs were implemented in accordance with license and regulatory requirements. The sample results indicated that liquid and gaseous radioactive effluent releases were less than regulatory limits. The licensee continued to implement a groundwater corrective action program. Elevated concentrations of radioactive material continued to be identified by the licensee in some groundwater monitoring wells. The licensee continued to use ammonium nitrate solution as a fertilizer on land used to produce hay. The licensee implemented the fertilizer distribution program in accordance with license requirements.

#### **5 Exit Meeting**

The inspectors reviewed the inspection scope and findings during an exit meeting conducted at the conclusion of the onsite inspection on March 26, 2015. During the inspection, the licensee did not identify any information reviewed by the inspectors as proprietary.

## **SUPPLEMENTAL INFORMATION**

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

#### Sequoyah Fuels Corporation

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R. Miller, Contractor, RMA  
S. Munson, Manager, Health, Safety and Environment  
B. Reid, Director, Decommissioning, RMA  
K. Schlag, Manager, Quality Assurance, RMA

### **INSPECTION PROCEDURES USED**

IP 83822	Radiation Protection
IP 88005	Management Organization and Controls
IP 88045	Effluent Control & Environmental Protection
IP 88050	Emergency Preparedness

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

#### Opened

None

#### Closed

None

#### Discussed

None

### **LIST OF ACRONYMS**

ADAMS	Agencywide Documents Access and Management System
CFR	Code of Federal Regulations
EPA	Environmental Protection Agency
GA	General Atomics
IP	Inspection Procedure
NRC	Nuclear Regulatory Commission
OKDEQ	Oklahoma Department of Environmental Quality
QA	Quality Assurance