



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION IV
1600 E. LAMAR BLVD.
ARLINGTON, TX 76011-4511

June 12, 2014

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

SUBJECT: NRC INSPECTION REPORT 040-08027/14-001

Dear Mr. Ellis:

This refers to the U.S. Nuclear Regulatory Commission (NRC) inspection conducted on April 29-May 1, 2014, 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 inspection included a review of the construction of your onsite disposal cell and a confirmatory survey of several previously excavated areas. The preliminary inspection findings were presented to you and your staff at the conclusion of the onsite inspection. The final inspection results were presented to you and your staff by telephone on May 28, 2014, after receipt of the NRC's confirmatory survey soil sample results. 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. Robert Evans, Senior Health Physicist, at 817-200-1234 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: 040-08027

License: SUB-1010

Enclosure:

NRC Inspection Report 040-08027/14-001

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Rita Ware, U.S. EPA, Region VI
Ann-Charlotte Engstrom, General Atomics
William Andrews, U.S. Geological Survey
Clayton Eubanks, Office of Attorney General
David Cates, Oklahoma Department of
Environmental Quality
Sara Hill, Cherokee Nation, Office of
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Jim Harris, U.S. Army Corps of Engineers
Mike Broderick, Oklahoma Department of
Environmental Quality

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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket: 040-08027

License: SUB-1010

Report: 040-08027/14-001

Licensee: Sequoyah Fuels Corporation

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

Dates: April 29-May 1, 2014

Inspectors: Robert Evans, Ph.D., P.E., C.H.P., Senior Health Physicist
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Enclosure

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Approved by: Ray L. Kellar, P.E., Chief
Repository and Spent Fuel Safety Branch

Attachment: Supplemental Inspection Information

EXECUTIVE SUMMARY

Sequoyah Fuels Corporation NRC Inspection Report 040-08027/14-001

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 the licensee was conducting decommissioning in accordance with license requirements.

Management Organization and Controls

- The licensee was conducting its technical reviews and Reclamation Plan changes in accordance with its performance-based license requirements. The inspectors concluded that the licensee's proposed change to cell height was conducted in accordance with the performance-based license. (Section 1.2)
- The licensee was investigating different sources of cover rock, and the licensee plans to conduct a formal evaluation of these sources using its performance-based license. The NRC staff will review this proposed change during a future inspection. (Section 1.2)

Onsite Construction

- The licensee was constructing the Phase III portion of the disposal cell in accordance with Reclamation Plan requirements. (Section 2.2)

Effluent Control and Environmental Protection

- The licensee continued to implement its groundwater corrective action and monitoring programs in accordance with license requirements. (Section 3.2)
- With regards to license requirements for endangered and protected species, the licensee agreed to submit a license amendment request in the near future to eliminate a conservation method that is no longer available for use at the site. (Section 3.2)

Closeout Inspection and Survey

- The inspectors reviewed the licensee's final status survey design and results for three areas previously excavated. The licensee's records indicate that it conducted the survey in accordance with license requirements, and all sample results were below the NRC-approved acceptance criteria. (Section 4.2.a)
- The inspectors conducted a confirmatory survey of the three excavated areas. The survey consisted of measurement of ambient gamma radiation levels and collection of soil samples. The survey results indicate that the licensee had effectively remediated the area. (Section 4.2.b)

Maintenance and Surveillance of Safety Controls

- During an NRC inspection conducted in April 2013, the inspectors concluded that the licensee failed to maintain documentation demonstrating that only properly calibrated and maintained radiological survey meters were used during decommissioning, a violation of license requirements. Corrective actions included updating the calibration recordkeeping software and procedure changes. The inspectors concluded that these corrective actions should prevent recurrence of the violation. (Section 5.1)

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 site 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 June 2013 (ML13184A136), the licensee completed the installation of the Phase III base and started disposing of radioactive waste material into the Phase III area. At the time of this inspection, the licensee's contractor was placing waste material into the Phase III portion of the disposal cell.

The licensee previously overfilled the Phase I and II areas of the disposal cell. The licensee was storing this excess material in the Phase I and II areas pending construction of the Phase III base. The licensee subsequently elected to increase the cell height by 25 feet, so this excess material now can be disposed in the Phase I and II areas. However, not all material in the Phase I and II areas above a certain elevation was properly compacted for disposal, so this material has to be removed and re-compacted. During the inspection, the licensee started to remove this excess overfill material from the Phase I and II areas so it could be re-compacted into lifts in accordance with Reclamation Plan requirements. Later this year, the licensee plans to construct the compacted clay cover and synthetic liner on the northern end (Phase I and II areas) of the disposal cell.

Other work completed by the licensee in recent months include remediation of the north burial area, south calcium fluoride holding basin, south sludge burial trenches, clarifier basin No. 1, and Pond 1 spoils pile. During this inspection, the licensee was draining clarifier basin No. 4 so it could be reclaimed. The remaining site structures within the radiologically restricted area included the eastern end of the main process building, water treatment facility, oil storage building, and laundry building.

The licensee continued to store equipment previously salvaged from the former DUF_4 (depleted uranium tetrafluoride) building in the main process building. The licensee plans to transfer this salvaged material to a different NRC licensee in the near future. Further, the licensee continues to store DUF_4 and natural uranium in about 80 drums. The licensee plans to ship this material for reuse or disposal at some point in the future.

The licensee still possessed approximately 11,000 tons of bagged raffinate sludge, material previously removed from the four clarifier basins. The licensee also possessed 851 bags of sediments removed from the emergency basin, north ditch, and sanitary lagoon. The licensee continues to store the bagged sludge and sediment material for possible transfer to an out-of-state uranium mill for use as alternate feed material. However, if the licensee is unable to transfer the material to the mill, the licensee plans to dispose of the sludge and sediment material in the onsite disposal cell.

1 Management Organization and Controls (88005)

1.1 Inspection Scope

The inspectors verified if the licensee had established and implemented programs to ensure that the disposal cell was being constructed in compliance with Reclamation Plan requirements.

1.2 Observations and Findings

In accordance with License Condition 54, the licensee is authorized to make changes to the license application, including the Reclamation Plan, under certain circumstances. The inspectors reviewed several proposed design changes to the disposal cell as well as several technical evaluations previously approved by the licensee.

The inspectors reviewed one design change which analyzes the impacts of increasing the height of the cell by 25 feet. The potential impacts include reduced stability of side slopes of the cell, damage or puncture of the liner system, and crushing of the collection and drain pipes in the cell liner system. The licensee's assessment indicates that the increase from elevation 590-feet to elevation 615-feet will have no impact on the disposal cell, including stability of the cell. The licensee's evaluation is provided in a technical memorandum dated July 11, 2013, as supplemented by memorandum dated November 7, 2013.

Prior to the onsite inspection, the NRC staff reviewed the licensee's July 2013 evaluation and determined that additional information was necessary regarding the effects on erosion stability. During a telephonic discussion with the licensee on September 20, 2013, the NRC staff voiced technical concerns regarding this design change. In response, the licensee agreed to revise its technical analysis to address these concerns. The licensee's November 7, 2013, memorandum describes the erosional stability analysis associated with increasing the final height of the disposal cell at the facility. The staff reviewed this additional information and determined that the evaluation follows the same procedures as previously presented and approved in the original Reclamation Plan.

As part of this design change, the licensee re-evaluated the riprap and apron rock sizes. Based on these new calculations, the required size of the rock increased to $D_{50} = 5.5$ inches from $D_{50} = 3.7$ inches for riprap on the side slopes and to $D_{50} = 10.9$ inches from $D_{50} = 5.7$ inches for the apron at the toe of the slopes. These changes were approved by the licensee's Plant Review Committee under Change Control Number CL009. The licensee submitted a summary of this change to the NRC in its annual performance-based license report dated January 13, 2014 (ML14027A151). During the inspection period, the inspectors reviewed the licensee's calculations and updated drawings and found them to be acceptable.

The licensee previously notified the NRC that the existing rock quarry may not have sufficient rock to complete the erosion protection features on the redesigned disposal cell. The licensee's staff accompanied the inspectors to a limestone quarry near Zeb, Oklahoma, that was under consideration as an alternate source of limestone rock. The licensee's staff noted the rectangular fracture pattern of the limestone made it desirable

for use as rock cover. The NRC staff collected samples of the limestone rock and discussed quarry operations with mine personnel.

The licensee plans to conduct a technical review of its alternate sources of rock through its performance-based license (License Condition 54). If the Plant Review Committee determines that the proposed change requires formal NRC approval, then the licensee will submit the request to the NRC. The licensee plans to provide the NRC with an opportunity to review the licensee's technical evaluation prior to installing rock from any new quarries on the disposal cell cover.

1.3 Conclusions

The licensee was conducting its technical reviews and Reclamation Plan changes in accordance with its performance-based license requirements. The inspectors concluded that the licensee's proposed change to cell height was conducted in accordance with the performance-based license. The licensee was investigating different sources of cover rock, and the licensee plans to conduct a formal evaluation of these sources using its performance-based license. The NRC staff will review this proposed change during a future inspection.

2 Onsite Construction (88001)

2.1 Inspection Scope

The inspectors reviewed the licensee's decommissioning activities to determine if these activities were being conducted in accordance with Reclamation Plan requirements.

2.2 Observations and Findings

License Condition 51 allows the licensee to conduct site decommissioning in accordance with the NRC-approved Reclamation Plan. The technical specifications, an attachment to the Reclamation Plan, provide the detailed requirements for construction of the disposal cell. During the inspection, the inspectors conducted tours of the construction area to observe work in progress. The inspectors compared the work in progress to the technical specification requirements. In summary, the inspectors concluded that the licensee was conducting the work in accordance with Reclamation Plan requirements.

At the time of the inspection, the licensee was removing waste material that had been temporarily staged in the Phase I and II areas above the 580-foot elevation. Because the material in storage above the 580-foot elevation had not been compacted in accordance with technical specification requirements, the licensee planned to remove and re-compact this material for permanent disposal in the Phase I and II areas. During the inspection, the licensee was constructing access roads to the top of the Phase I and II areas. The licensee will then start removing the un-compacted material from this area.

In the Phase III area, the licensee constructed the clay base in March-May 2013. The sand layer and leak detection piping were installed in May 2013, and the liner was installed in June 2013. The licensee installed the second sand layer and leachate collection system piping in June-July 2013.

The inspectors reviewed selected records documenting the licensee's construction of the Phase III base, including records for the synthetic liner and leachate collection system piping. As noted above, the base was installed in March-May 2013. The inspectors compared these construction activities to the requirements specified in technical specifications including quality assurance testing requirements. Based on the documentation reviewed by the inspectors, all seams were 100-percent visually inspected and non-destructive testing was conducted by the licensee's contractor. At the time of the inspection, the licensee was still awaiting final results of the destructive (shear and peel) tests on seam samples. In summary, the licensee's quality assurance tests confirmed that the synthetic liner was constructed and tested in accordance with technical specification requirements.

Leachate collection system pipe installation was completed in June-July 2013. Technical specifications stipulate that the pipe should consist of 6-inch high-density polyethylene diameter piping and nominal spacing within the perimeter of the disposal cell shall be 60 feet or less. The inspectors reviewed the licensee's quality assurance documentation to ensure that the leachate collection pipe system had been installed in accordance with technical specification requirements. In summary, the records indicate that the piping had been constructed in accordance with technical specifications.

After construction of the base of the Phase III portion of the cell, the licensee started filling the area with contaminated wastes. The licensee placed calcium fluoride material from the south calcium fluoride basin into the cell for use as a tracer material. The other material placed in the Phase III area included material originating from the Pond 1 spoils pile, clarifier IA, and north burial area. During the inspection, the licensee was removing waste material that had been staged in the calcium fluoride clarifier area into the Phase III area.

The licensee also constructed storm water berms, using a calcium fluoride/fly ash mixture in the interior sections and clean soil in the exterior sections. The licensee was constructing the second storm water berm lift during the inspection. For erosion control, the licensee started using straw mats in lieu of felt material in the Phase III area. Previously, the licensee installed felt and vegetation for erosion control on the Phase I and II areas. Prior to installation of the final cover, the licensee plans to remove all temporary material used for erosion control. The inspectors observed the status of the licensee's temporary erosion control efforts, noting that the straw mats appeared to be more effective than the felt and vegetative covers.

2.3 Conclusions

The licensee was constructing the disposal cell in accordance with Reclamation Plan requirements.

3 88045 Effluent Control and Environmental Protection

3.1 Inspection Scope

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

3.2 Observations and Findings

License Condition 49 specifies that the licensee shall implement a groundwater compliance monitoring program. Groundwater monitoring wells are located at various depths to monitor different groundwater units. License Condition 49 also specifies the maximum contaminant levels for various constituents including thorium-230 (1.2 picocuries per liter), uranium (30 micrograms per liter), and the sum of radium-226 and radium-228 (5.0 picocuries per liter). Monitoring history shows that the major constituents of concern are arsenic, fluoride, nitrate, and uranium.

The most recent results of the groundwater monitoring program were presented in the licensee's 2013 Annual Groundwater Report, submitted to the NRC on March 26, 2014. The licensee's results indicate that uranium continues to be detected above the maximum contaminant level of 30 micrograms per liter in certain groundwater samples. The various sample results for 2013 range from less than 1 microgram per liter up to 7,993 micrograms per liter. The highest individual sample result for uranium was collected from recovery well MWRW7, a well which monitors the Terrace/Shale 1 groundwater south of the former Main Process Building. In previous years, higher uranium concentrations have been detected in monitoring well MW025, located north of the solvent extraction building, which has since been plugged and abandoned to allow for reclamation activities in that area to proceed. In summary, the inspectors concluded that the licensee continues to implement the groundwater compliance monitoring program in accordance with license requirements.

The inspectors also discussed the status of License Condition 52 with licensee staff. This condition provides the requirements for protection of endangered and protected species in the clay borrow area. Condition 52.A requires the licensee to implement the bait-away protocol for the American burying beetle. However, the U.S. Fish and Wildlife Service has eliminated the bait-away protocol as a conservation method. If the licensee decides to expand the clay borrow area into nearby wooded areas, the licensee would be unable to implement the license condition as approved by the NRC. The NRC project manager and the inspectors discussed this license condition with the licensee's staff. The NRC and licensee staff agreed that the license needed to be revised. The licensee agreed to submit an amendment to the license in the near future, prior to expanding the clay borrow area into nearby wooded areas.

3.3 Conclusions

The licensee continued to implement its groundwater corrective action and monitoring programs in accordance with license requirements. With regards to license requirements for endangered and protected species, the licensee agreed to submit a license amendment request in the near future to eliminate a conservation method that is no longer available for use at the site.

4 83890 Closeout Inspection and Survey

4.1 Inspection Scope

The purpose of this portion of the inspection was to ensure that the licensee was conducting radiological surveys during decommissioning in accordance with license requirements.

4.2 Observations and Findings

a. Review of Final Status 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 excavated several former disposal areas. These disposal areas include the north burial area in the solid waste burial area No. 2, fluoride holding basin No. 1 (also known as the south calcium fluoride burial area), and fluoride sludge burial areas adjacent to fluoride holding basin No. 1. Before the licensee could backfill these areas, the licensee had to verify that the remediated ground surfaces met certain radiological characteristics.

Section 3.2.3 of the Reclamation Plan specifies that the licensee will follow the guidance provided in NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)," when conducting final status surveys. The licensee conducted final status surveys of these three remediated areas to demonstrate that the residual radioactivity in each survey unit satisfied the applicable release criteria. Detail guidance for conducting final status surveys is provided in Attachment B, Final Status Survey, of the Reclamation Plan. Additional details are provided in site procedure AI-33, Final Status Survey, Class 1 Soils.

The inspectors reviewed the licensee's final status survey design and survey results for the three excavated areas. The north burial area was approximately 1,420 square meters (m²) in size, while the south calcium fluoride and sludge burial areas were approximately 9,490 m². For land areas containing only uranium contamination, the licensee's final status survey sampling program consisted of collection and analysis of soil samples and walk-over surveys to measure ambient gamma radiation levels.

The MARSSIM provides guidance for survey unit size and number of samples per survey unit. Procedure AI-33 provides instructions for establishing a systematic sampling grid and required number of data points for each survey unit. In addition to systematic sampling, the licensee conducted walk-over gamma radiation surveys to identify potential areas of elevated radioactivity for biased soil sampling.

Using MARSSIM guidance, the licensee calculated that each 2,000 m² survey unit should have at least eight sample locations—one sample for every 250 m² of surface area. The inspector reviewed the licensee's preliminary sample results and concluded that the licensee had collected a sufficient number of samples in each excavated area. The licensee collected 10 samples from the north burial area (1,420 m²) and 52 samples from the southern excavated areas (9,490 m²). The total number of samples included both systematic and biased samples. In addition, the licensee is required to collect duplicate/split and replicant samples for quality assurance/quality control requirements.

Table 3-1 of the Reclamation Plan provides the NRC-approved cleanup levels for the ground surface and backfill material. In accordance with the Reclamation Plan, the natural uranium concentrations in the soil and backfill material must be less than or equal to 100 picocuries per gram (pCi/g), with background included. If the soil exceeds this cleanup level, then it must be placed into the disposal cell. The inspectors reviewed the licensee's preliminary soil sample results. All samples were less than the cleanup

level (100 pCi/g). The licensee plans to submit the final status survey results to the NRC at a later date, after the site has been remediated.

The licensee conducted walk-over surveys of the excavated areas to measure the ambient gamma radiation levels. As noted earlier, the licensee conducted these walk-over surveys to locate potential areas of elevated radioactive contamination. The licensee has not established formal acceptance criteria for this activity, but the licensee established an action level of three times background. This action level represents a differentiation between background levels and contaminated material. Prior to conducting the walk-over survey of the three excavated areas, the licensee conducted survey measurements in a background area. The licensee then compared the measurements in the excavated areas to the background measurements. Any area that exhibited elevated contamination was flagged for further investigation or additional remediation. The inspectors reviewed the licensee's preliminary walk-over survey results for the excavated areas. Based on these survey results, no area exceeded the action level (three times background).

The inspectors reviewed the licensee's plans for backfilling the excavated areas. The licensee planned to refill the areas with soil that contained contamination below the cleanup level. The licensee had identified the soil to be used as backfill, but at the time of the onsite inspection, the licensee had not radiologically surveyed the soil. The inspectors will review the licensee's radiological surveys and sampling of the backfill soil during a future inspection.

The licensee also planned to backfill the north burial area with clean concrete debris. The inspectors reviewed the licensee's radiological surveys of this concrete to ensure that the material met the release criteria for use as backfill. The concrete was originally part of a slab located in the vicinity of the interim storage cell. The licensee surveyed the concrete in the March-April 2014 time frame. The licensee first surveyed the upper surface of the concrete using a floor monitor. After the top surface was surveyed, the concrete slab was demolished and flipped over. The underside of the concrete slab was surveyed using hand-held radioactive particulate monitors. The licensee also conducted an ambient gamma radiation scans of the concrete. The licensee free-released the concrete using the release criteria for equipment as specified in License Condition 9.4. The inspectors confirmed that the licensee's surveys were thorough, and that no measurement exceeded the licensed release limit. In summary, the inspectors concluded that the concrete debris could be used as backfill material.

b. Confirmatory Survey

The inspectors conducted a confirmatory survey of the south calcium fluoride area, sludge burial area, and north burial area. The purpose of the survey was to confirm the effectiveness and accuracy of the licensee's final status survey relative to whether the areas meet the acceptance criteria established in the Reclamation Plan. The confirmatory survey included measurement of ambient gamma exposure rates and collection of soil samples.

The inspectors conducted the gamma scan using a Ludlum Model 19 microRoentgen survey meter (NRC 015546, calibration due date of 07/18/14) and a Ludlum Model 18 count rate meter with 2-inch by 2-inch sodium iodide probe (NRC 012778, calibration

due date of 11/07/14). 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 each survey meter. 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 walk-over surveys of the three areas. The inspectors measured the ambient gamma exposure rates using the Model 19 survey meter. With a background of about 8-10 microRoentgens per hour ($\mu\text{R/hr}$), the exposure rates in the north burial area ranged from 10-16 $\mu\text{R/hr}$, while the exposure rates in the south calcium fluoride and sludge burial areas ranged from 8-16 $\mu\text{R/hr}$. The inspectors also surveyed the same areas with the Model 18 count rate meter. With a background of about 6,000 counts per minute, the count rates in the north burial area ranged from 7,000 to 13,000 counts per minute. The count rates in the south calcium fluoride and sludge burial areas ranged from 4,000 to 10,000 counts per minute. Based on the observed exposure rates, no area exceeded the action level of three times background.

The inspectors collected six soil samples for comparison to the uranium cleanup level. The samples were selected from areas that exhibited slightly elevated measurements in the survey units or from areas that exhibited unusual soil characteristics. Four samples were collected from the south calcium fluoride and sludge burial areas and two samples were collected from the north burial area. The licensee split the samples with the inspectors. The inspectors used chain of custody forms to control the integrity of the samples.

After the soil samples were collected, the licensee screened the samples with an X-ray fluorescent (XRF) analyzer. Based on the XRF analyzer measurements, one sample appeared to contain uranium in concentrations above the cleanup level (100 pCi/g). This sample was collected from the northwest wall of the north burial area. The licensee decided that this area needed to be investigated, remediated, and resurveyed as necessary. The inspectors agreed with the licensee's conclusion and returned the sample to the licensee. Immediately after the onsite inspection, the licensee conducted additional remediation and resampled the area. The second sample was approximately 40 pCi/g of total uranium, a measurement that was below the cleanup level.

The five remaining samples were screened with the XRF analyzer, and these samples were identified as being less than the cleanup level, so the inspectors submitted these samples to its contract laboratory, Oak Ridge Associated Universities, for analysis. The NRC's samples were analyzed by gamma spectroscopy for determination of total uranium concentrations. In addition, the licensee submitted its split samples to its contract laboratory. The NRC's sample results and the licensee's split sample results are presented below:

Table: Split Soil Sample Results for Total Uranium

NRC Sample	Licensee Sample	Sample Location	NRC pCi/g	Licensee* pCi/g
NRC-1	HA-1502	South calcium fluoride area, eastern end	2.85 ± 0.54	2.09
NRC-2	HA-1503	South calcium fluoride area, eastern end	2.94 ± 0.52	2.07
NRC-3	HA-1504	South calcium fluoride area, western end	3.23 ± 0.66	2.78
NRC-4	HA-1505	Sludge burial area, eastern end	2.90 ± 0.65	2.28
NRC-5	HA-1506	North burial area, southeastern end	13.94 ± 0.88	7.84

*The licensee's sample results were converted from units of micrograms per gram

The inspectors compared the total uranium concentrations in the five samples to the NRC-approved cleanup level of 100 pCi/g. All sample results were less than the acceptance criteria. In addition, the inspectors noted that the NRC's sample results were similar to the licensee's sample results suggesting good correlation between the two laboratories.

Finally, the inspectors conduct a limited ambient gamma radiation scan survey of the concrete debris that the licensee planned to dispose in the north burial area. This confirmatory survey was conducted to ensure that the concrete was free of residual radioactivity, and the material could be used as backfill. The inspectors conducted the survey by walking around the concrete and measuring the ambient gamma radiation exposure rates. The inspectors did not conduct surveys on top of the concrete debris due to industrial safety concerns. Most of the ambient gamma radiation levels were at background levels. The inspectors could not survey one corner of the debris pile because of radiological interference from uranium in storage in an intermodal adjacent to the concrete debris file. In summary, the inspectors concluded that the concrete debris did not appear to be contaminated with uranium above background levels; although, the inspectors could not survey all of the concrete.

4.3 Conclusions

The inspectors reviewed the licensee's final status survey design and results for three areas previously excavated. The licensee's records indicate that it conducted the survey in accordance with license requirements, and all sample results were below the NRC-approved acceptance criteria.

The inspectors conducted a confirmatory survey of the three excavated areas. The survey consisted of measurement of ambient gamma radiation levels and collection of soil samples. The survey results indicate that the licensee had effectively remediated the area.

5 Maintenance and Surveillance of Safety Controls (88025)

5.1 (Closed) VIO 040-08027/1302-01: Failure to maintain adequate documentation of survey meter calibrations

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 used during decommissioning. The inspectors reviewed the certificates of calibration for approximately 20 instruments and noted that some recorded data for 2012-2013 appeared to be inconsistent or incorrect. The inspectors confirmed that the instruments were properly calibrated; however, the documentation did not always accurately reflect the calibrations performed. The licensee's failure to maintain records to clearly demonstrate that only properly calibrated and maintained radiological survey equipment was used during decommissioning was a violation of License Condition 51 requirements.

The licensee responded to the NRC Notice of Violation by letter dated July 31, 2013 (ML13221A179). A contractor conducted the instrument calibrations on behalf of the licensee. In response to the inspectors' discovery of the incomplete and inadequate records, the contractor conducted an internal investigation. The contractor concluded that one cause of the inadequate recordkeeping was the antiquated software that was being used by the person conducting the calibrations. A second contributing factor was the contractor's and licensee's failure to carefully inspect the calibration records after completion of the calibration process. The contractor notified the licensee that all records issued to the licensee since June 2013 were accurate reflections of the calibration work performed. The contractor's corrective actions included procedure and software updates.

In addition to the contractor's investigation and corrective actions, the licensee implemented several program changes. The licensee revised its calibration procedure in August 2013 to include a new requirement for its staff to inspect the incoming calibration documentation for completeness and accuracy. Any negative findings are documented on the same form that is used to document the initial instrument response checks. Any documentation discrepancies are also documented in a logbook which is reviewed monthly by the Manager, Health, Safety and Environment. The inspectors reviewed the corrective actions taken by the licensee and its contractor, and the inspectors concluded that these corrective actions should prevent recurrence of the violation.

6 Exit Meeting

The inspectors reviewed the preliminary inspection scope and findings during an exit meeting conducted at the conclusion of the onsite inspection on May 1, 2014. The final inspection findings were presented to the licensee's staff by telephone on May 28, 2014, after receipt of the confirmatory survey soil sample results. 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

J. Ellis, President
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 88001 Onsite Construction
IP 88005 Management Organization and Controls
IP 88025 Maintenance and Surveillance of Safety Controls
IP 88045 Effluent Control and Environmental Protection
IP 83890 Closeout Inspection and Survey

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

040-08027/1302-01 VIO Failure to maintain adequate documentation of survey meter calibrations

Discussed

None

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
CFR	Code of Federal Regulations
DUF ₄	depleted uranium tetrafluoride
IP	Inspection Procedure
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
m ²	square meters
µR/hr	microRoentgens per hour
NRC	U.S. Nuclear Regulatory Commission
pCi/g	picocuries per gram
XRF	X-ray fluorescent