



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

April 3, 2020

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

SUBJECT: SEQUOYAH FUELS CORPORATION - NRC INSPECTION REPORT
040-08027/2020-001

Dear Mr. Ellis:

This letter refers to the routine, announced U.S. Nuclear Regulatory Commission (NRC) inspection conducted onsite from March 2-4, 2020, at the Sequoyah Fuels Corporation site in Gore, Oklahoma. This inspection examined activities conducted under your license as they relate to public health and safety, the common defense and security, and to confirm compliance with the Commission's rules and regulations and the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, tour of the grounds, performance of independent radiation measurements, and interviews with personnel. The inspection findings were discussed with you and your staff at the conclusion of the onsite portion of the inspection on March 4, 2020. The NRC staff held a follow up discussion of the inspection findings with you and your staff by conference call on March 30, 2020. No violations were identified and no response to this letter is required.

In accordance with Title 10 of the *Code of Federal Regulations* Part 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 Agency-wide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <https://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy or proprietary information so that it can be made available to the Public without redaction.

J. Ellis

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Should you have any questions concerning this matter, please contact Ms. Marti Poston, Health Physicist, at (817) 200-1181 or the undersigned at (817) 200-1156.

Sincerely,

A handwritten signature in black ink, appearing to read "Heather J. Gepford". The signature is fluid and cursive, with a large, sweeping initial "H".

Heather J. Gepford, PhD, CHP, Chief
Materials Licensing and Decommissioning
Branch
Division of Nuclear Materials Safety

Docket: 040-08027

License: SUB-1010

Enclosure:

NRC Inspection Report 040-08027/2020-001

cc: w/enclosure:

M. Broderick, ODEQ

**U.S. NUCLEAR REGULATORY COMMISSION
REGION IV**

Docket No.: 040-08027

License No.: SUB-1010

Report No.: 040-08027/2020-001

Licensee: Sequoyah Fuels Corporation

Location Inspected: Gore, Oklahoma

Inspection Dates: March 2-4, 2020

Inspectors: Marti R. Poston, Health Physicist
Materials Licensing and Decommissioning Branch
Division of Nuclear Materials Safety

Robert J. Evans, Senior Health Physicist
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Division of Decommissioning, Uranium Recovery and Waste
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Approved by: Heather J. Gepford, PhD, CHP, Chief
Materials Licensing and Decommissioning Branch
Division of Nuclear Materials Safety

Attachment: Supplemental Inspection Information

Enclosure

EXECUTIVE SUMMARY

Sequoyah Fuels Corporation NRC Inspection Report 040-08027/2020-001

The U.S. Nuclear Regulatory Commission (NRC) performed a routine, announced, health and safety inspection from March 2-4, 2020, at the Sequoyah Fuels facility in Gore, Oklahoma. The inspection included observations of site activities, independent radiation surveys, review of records, and interviews with site personnel. In summary, the licensee was conducting decommissioning activities in accordance with regulatory and license requirements as described below.

Onsite Construction

The licensee was constructing the disposal cell in accordance with the Reclamation Plan. (Section 1.2)

Management Organization and Controls

The licensee had sufficient staff for the work in progress. The licensee's quality assurance inspection and health and safety audit programs were found to be extensive. The licensee implemented a corrective action program to identify conditions adverse to quality. The licensee conducted its Reclamation Plan changes in accordance with the performance-based license requirements. (Section 2.2)

Radiation Protection; Maintenance and Surveillance

The licensee conducted its radiation protection and maintenance and surveillance programs in accordance with the requirements of 10 CFR Part 20 and the license. (Section 3.2)

Effluent Control and Environmental Protection

The licensee conducted its effluent control and environmental protection programs in accordance with regulatory and licensing requirements. (Section 4.2)

Training

The licensee conducted training for employees, contractors and visitors in accordance with licensing requirements. (Section 5.2)

Emergency Preparedness

The licensee implemented an emergency preparedness program that was adequate to protect the safety and health of employees, contractors, visitors, and members of the public. (Section 6.2)

Closeout Inspection and Survey

The inspectors reviewed the licensee's radiological survey design and sample results for the 005 trench excavation located downgradient from former Pond 1. The licensee's records indicated that it had designed and conducted its final survey in accordance with NRC-approved

Reclamation Plan requirements, and all sample results were less than the limits specified in the Reclamation Plan. The licensee's records indicate that the area had been effectively remediated. (Section 7.2.a)

The inspectors conducted confirmatory surveys of the 005 trench excavation and two stockpiles of material staged for reuse. The surveys included measurement of ambient gamma radiation levels and collection of soil samples. The gamma radiation levels were less than the action level, but the soil sample results were unavailable at the conclusion of the onsite inspection. The soil sample results will be presented to the licensee under separate correspondence. (Section 7.2.b)

Maintenance and Surveillance and Radioactive Waste Processing, Handling, Storage and Transportation

Since the previous inspection, the licensee had not conducted any activities that would require review under these two inspection procedures. (Section 8)

Report Details

Site Status

The NRC Source Materials License SUB-1010, License Condition 51 requires the licensee to conduct decommissioning activities in accordance with the Reclamation Plan dated July 2008 as amended (Agencywide Documents Access and Management System [ADAMS] Accession Nos. ML080220345, ML120481780 and ML081960238). The Reclamation Plan called for dismantling and removal of systems and equipment, demolition of structures, treatment of sludge and sediments, remediation of contaminated soils, and treatment of wastewater. Consistent with the Reclamation Plan, almost all waste material from decommissioning activities will be placed in an onsite cell for permanent disposal.

Since the previous inspection, conducted in March-April of 2019 (ADAMS Accession No. ML19119A124), the licensee continued to conduct decommissioning activities in accordance with the Reclamation Plan. The activities completed in 2019-2020 include demolition of the yellowcake pad and excavation of the soil beneath the former pad, removal of the 005 collection trench from service and excavation of the impacted soil, removal of the combination stream drain pipe and excavation of contaminated soils, removal of the centrifuge building and associated equipment, continued construction of the disposal cell cover system, stockpiling of soil for reuse and management of wastewater.

At the time of the inspection, the licensee was constructing the final cover system on selected side slope areas of the disposal cell. The licensee also continued to manage wastewater in accordance with site procedures.

1 Onsite Construction (Inspection Procedure (IP) 88001)

1.1 Inspection Scope

Determine if the decommissioning activities conducted for construction of the cell are in accordance with the NRC-approved Reclamation Plan.

1.2 Observations and Findings

License Condition (LC) 51 requires 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 and placement of materials into the disposal cell. The inspectors conducted tours of the construction area to observe work in progress. Work activities observed by the inspectors included: placement of the sub soil and rock layer of the final cover system and confirmatory surveys of the 005 collection trench area, 005 monitor trench area, and two soil stockpiles.

The inspectors compared the work in progress to the construction requirements outlined in the technical specifications. The inspectors also reviewed records for construction related activities that have occurred since the last inspection conducted in the spring of 2019. The inspectors concluded that the licensee was conducting final cover system construction in accordance with the Reclamation Plan requirements.

Since the previous inspection, the licensee started construction of the sand drainage layer, subsoil layer, and rock layer on the side slopes of the disposal cell. The licensee's efforts were focused on the northeast portion of the disposal cell. The three access ramps and top of the disposal cell remained open to accommodate placement of additional waste material into the disposal cell. The inspectors reviewed documentation related to the construction of the final cover system. The inspectors reviewed survey results documenting the thickness of the drainage sand layer and the subsoil layer, and observed that the minimum thickness requirements for both were met (18 inches for drainage sand and 5.5 feet for the subsoil). No survey records documenting the thickness of the rock layer were available for the inspectors to review; the licensee plans to perform these surveys once more areas of the rock have been placed.

The inspectors observed placement of the subsoil and rock layers of the final cover system. The inspectors observed that the licensee used appropriate equipment to perform the work and had established adequate soil and rock placement methods.

Based on the records reviewed and the observation of the construction, the inspectors determined that the subsoil and rock layers of the final cover system were installed in general conformance with the technical specifications. While the inspectors did not observe placement of the drainage sand, the exposed portions of the drainage sand at the perimeter of the work areas appeared to be in general conformance with the technical specifications. The inspectors determined that the quality control samples had been obtained, but the laboratory test results were not available for review. Based on the inspectors' assessment of the layer thicknesses and construction techniques, they concluded that work was being performed in accordance with the technical specifications.

While observing placement of soil layers on top of the geosynthetic portion of the cover system, the inspectors were able to visually inspect the completed portions of the geosynthetic on the side slopes. The inspectors did not observe any rips, tears or holes in the finished work product.

The licensee continued to utilize the storm water reservoir to manage non-impacted storm water. The licensee occasionally released water from the storm water reservoir in accordance with its State of Oklahoma, Department of Environmental Quality (ODEQ) discharge permit. At the time of the inspection, the licensee had remediated both clarifier basins 1 and 4, but more remediation was necessary in those areas of the site. Clarifier basins 2 and 3 remained in service and were being used for storage and processing of potentially contaminated water. Processed water from the clarifier basins was directed to the storm water reservoir for eventual discharge to the environment in accordance with ODEQ permit requirements. The licensee continued to use Pond 2 to manage storm water at the site.

The licensee collected leachate from the on-site disposal cell in two storage tanks located on the west side of the disposal cell. For calendar year 2019, the total leachate generation rate was estimated to be 264 gallons per day. The licensee and inspectors anticipated that this rate will continue to decrease as more of the final cover system is constructed. The collected water was being transferred to the clarifier basins for temporary storage and processing. The licensee and the inspectors identified the future of existing leachate tanks as an issue that will need to be addressed prior to license

termination and transition to long term care by the U. S. Department of Energy. The licensee and NRC staff plan to engage with the Department of Energy on this issue.

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. A summary of the changes is provided in the table below.

Change Number	Description
CL020	Radionuclide activity concentrations for subsoil zone materials
CL021	Modification to material and placement methods for subsoil zone and erosion protection

Change to License No. 20 (CL020) established a radionuclide activity concentration for subsoil materials. The Reclamation Plan had established a radionuclide activity concentration limit for clay liner materials of “concentrations lower than the soil cleanup levels” based on the potential use of clay materials from areas of the site that might have been impacted by operations. The Reclamation Plan did not establish a radionuclide activity concentration level for the subsoil materials despite the potential use of the soils from the same potentially impacted areas. With this change the licensee imposed the same radionuclide activity concentration established for the clay liner to the subsoils. As the concentration levels established for the clay liner materials were previously approved as part of the Reclamation Plan, the NRC staff finds this change acceptable.

Change to License No. 21 (CL021) documents an increase in the thickness of the subsoil layer and combines the rock and topsoil into one layer. After placement of the rock component of the cover system, the licensee plans to place topsoil and use the equipment to work the topsoil into the voids between the rock. The inspectors determined this change would accelerate the processes that would have happened naturally over time. As the overall thickness of the cover system will remain the same as what was approved in the Reclamation Plan, the NRC staff finds this change acceptable.

The inspectors reviewed two deviations from the technical specifications documented since the previous inspection. The first deviation reviewed, D005, related to the use of a non-textured geosynthetic liner along an area at or near the base of the disposal cell. These areas have little to no slope. The licensee’s engineer performed a slope stability analysis evaluation of the proposed changes. The NRC staff reviewed the deviation and observed that the slope stability analysis resulted in an adequate factor of safety. Therefore, this deviation is acceptable to NRC staff.

The second deviation related to the configuration of the anchor trenches. The inspectors understand that the licensee plans to connect new portions of the liner at the top of the existing anchor trench. Soil placed in this area would still be compacted. This deviation is acceptable to the inspectors as the liner would remain in place; although, it is connected in a different manner.

Based on their review of the change application documentation, the inspectors determined that the licensee was correctly implementing and documenting changes in accordance with LC 54.

After the conclusion of the onsite inspection, the NRC staff conducted a follow-up conference call with the licensee on March 30, 2020. The participants discussed the licensee's plans for the timing of radon flux modeling and radon flux sampling. Various documents seemed to provide conflicting information as to when these two activities would be conducted. According to licensee representatives, updated radon flux modeling, required by LC 51.A, will be conducted after all wastes have been placed within the disposal cell. The licensee planned to conduct radon flux sampling, as required by the Reclamation Plan and regulations, after the disposal cell cover had been installed; however, the licensee might conservatively conduct radon flux sampling after installation of the 2-foot clay layer on the top of the disposal cell. The licensee planned to clarify the timing of these two license and regulatory required events in a future change notice, developed in accordance with its performance-based license.

1.3 Conclusions

The licensee was constructing the final cover system in accordance with the Reclamation Plan.

2 Management Organization and Controls (IP 88005)

2.1 Inspection Scope

Determine if site activities were conducted in accordance with regulatory requirements and the license, and in a manner that will protect the environment and the safety and health of workers and the public.

2.2 Observation and Findings

The licensee's organizational structure is presented in Section 2.2 and Figure 2-1 of the license renewal application, referenced in LC 9.1. The organizational requirements for reclamation are also provided in Section 1.0 of the Quality Assurance (QA) Program, referenced in LC 51.C. The licensee's staff consisted of four employees and approximately 35 contractors. The licensee used contractors for QA oversight, geotechnical support, cell construction, radiation safety support, and miscellaneous site maintenance activities as needed. 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.

The inspectors reviewed the licensee's oversight programs and interviewed licensee staff responsible for implementing these programs. The oversight programs included routine site inspections, reviews, and audits.

Routine audits and program reviews are required by LC 9.1, the Reclamation Plan, and 10 CFR 20.1101(c). The licensee's ALARA (As Low As Reasonably Achievable) Committee held a meeting in January 2020 to review the radiological data for 2019 and to establish ALARA goals for 2020. The committee reviewed radiological data including occupational exposures. The committee established ALARA goals including lower action level for bioassays and internal exposures.

Attachment D to the Reclamation Plan requires the licensee to conduct quarterly audits of licensed activities. The inspectors reviewed the licensee's quarterly audits for 2019.

The audits were conducted by independent reviewers from the parent company. The auditors did not identify any non-compliances. The inspectors concluded that the audits were thorough reviews of the licensee's programs.

License Condition 9.1, Enclosure 2, Section 2.8 specifies that the health and safety manager shall conduct an inspection of all plant activities involving radioactive material on a monthly basis. The inspectors reviewed the licensee's monthly reports and concluded that the reports provided detailed accounts of activities that had been completed in previous months.

Attachment A of the licensee's Reclamation Plan contains technical specifications for the disposal cell, and was most recently revised in May 2019. The inspectors verified that documentation of construction inspection work was being conducted and observed in accordance with technical specifications Section 1.6, "Construction Documentation."

Daily QA reports summarized activities on site and discussed the general conditions of the site and disposal cell. The reports outlined areas needing attention, such as work activities performed by the various contractors, any QA testing and surveying, ongoing discussions and key decisions, important communications, and minor design modifications. The inspectors reviewed the daily reports issued since the last routine inspection. The reports provided detailed information of the activities in progress since the previous inspection. The site QA Manager maintained an electronic file with photographs of key construction activities.

License Condition 51.C requires, in part, that the licensee "shall develop a quality assurance project procedure (QAPP) prior to the initiation of remediation activities that incorporates the Data Management Plan, oversight and QA, soil sampling quality assurance, and the final status survey." The inspectors reviewed licensee administrative Procedures A-202, "Quality Assurance Project Procedure for Cell Construction," and A-303, "Quality Assurance Project Procedure for Final Status Survey." These procedures adequately fulfilled the requirements of LC 51.C and were regularly reviewed and updated by the licensee. The licensee established a corrective action program in accordance with Section 5 of the QA Program. The inspectors concluded that the licensee established and implemented a corrective action program for conditions adverse to quality.

2.3 Conclusion

The licensee had sufficient staff for the work in progress. The licensee's QA inspection and health and safety audit programs were found to be extensive. The licensee implemented a corrective action program to identify conditions adverse to quality. The licensee conducted its Reclamation Plan changes in accordance with the performance-based license requirements.

3 Radiation Protection; Maintenance and Surveillance (IPs 83822 and 88025)

3.1 Inspection Scope

The inspectors reviewed the licensee's radiation protection and maintenance and surveillance programs to ensure compliance with regulatory and license requirements.

3.2 Observations and Findings

Details of the licensee's radiation protection program were provided in Attachment D to the NRC approved Reclamation Plan. The program requirements included external and internal exposure monitoring, air sampling, respiratory protection, bioassay, hazardous waste permits, contamination control and instrumentation programs.

Attachment D, Section 2.4, states that external exposure monitoring, when required, will be accomplished using optically stimulated luminescence dosimeters. Further radiation surveys may be performed to supplement personnel monitoring. As allowed by 10 CFR 20.1501(a)(1), the licensee downgraded its dosimetry requirements in 2011 based on actual results obtained from 2001-2010. The licensee updated the external dosimetry requirements in 2018 for workers who supported packaging and loading operations involving raffinate sludge material. The shipments ended in December 2018, thus the licensee returned to the reduced dosimetry program. At the time of the inspection, the only workers required to be monitored for external exposures were those authorized to operate the X-ray fluorescence analyzer.

Since the last NRC inspection, the licensee monitored five individuals for external exposures using optically stimulated luminescence dosimeters. The highest measured dose to an individual was 14 millirem, a dose that was well below the regulatory limit of 5000 millirem per year.

Section 2.3 of Attachment D to the Reclamation Plan and License Condition 24 specify the internal exposure monitoring requirements. Internal exposure monitoring was normally conducted using breathing zone (lapel) air samplers. Action levels were provided in Attachment D and more restrictive action levels were established by the ALARA Committee. The inspectors reviewed the licensee's records for 2019. Although no individual exceeded the action levels in 2019, the inspectors noted a slight increase in internal exposures during July 2019 as a result of work activities involving thorium-230 material.

The inspectors reviewed the licensee's records for assigned doses. During 2019, the licensee monitored 27 workers. The maximum total effective dose equivalent exposure was 21 millirem, and the maximum total organ dose equivalent exposure was 141 millirem, results that were below the regulatory limits of 5000 millirem and 50,000 millirem per year, respectively.

The respiratory protection requirements are provided in Section 2.2 of Attachment D to the Reclamation Plan. The licensee issued respiratory protection to two individuals in 2019. These work tasks included removal of concrete at the yellowcake storage pad and removal of piping and equipment from the raffinate load-out building. The licensee specifically audited this program area as part of its 2020 annual program review. The inspectors also conducted a detailed review of this program area and concluded that the licensee had established procedures, provided training, conducted medical evaluations and possessed sufficient equipment for future use.

The bioassay requirements are provided in Section 2.3 of Attachment D to the Reclamation Plan. The licensee collected 1471 individual samples in 2019. The highest sample result was 2.67 micrograms of uranium per liter of urine, a value below the lowest action level of 15 micrograms of uranium per liter of urine specified by LC 42.

The results indicated that the licensee was not experiencing widespread contamination control problems.

Hazardous work permits were used to describe specific or special worker protection requirements for activities involving radioactive material that was not covered by a procedure. The licensee issued 18 hazardous work permits in 2019-2020. These permits included personal protective equipment and monitoring requirements. Permits were issued for work activities that included demolishing the yellowcake storage pad concrete, excavating the combination stream piping and former 005 collection trench, dismantling the switchgear yard equipment, and hauling debris, soil and sand to the disposal cell. Overall, the licensee implemented the hazardous work permit program for non-routine work activities in accordance with the instructions provided in the Reclamation Plan.

The licensee established and implemented a contamination control program in accordance with the requirements specified in Section 2.6 of Attachment D to the Reclamation Plan. The various types of contamination control surveys included equipment release surveys, spot checks of laundry, unrestricted area and restricted area room surveys. The inspectors reviewed a random sampling of the survey records and concluded that the records provided information on the area or component surveyed instrumentation used to conduct the survey and the results of the survey.

The inspectors performed a spot check of the portable survey instruments in use at the site. Instruments in use were found to be in calibration. The inspectors reviewed surveys conducted within and outside the radiologically restricted area. Radiation survey forms reviewed included daily routine contamination surveys, daily source checks, equipment releases, quarterly dose rate surveys, quarterly contamination surveys of unrestricted areas and other daily, weekly, monthly, quarterly or annual surveys. The inspectors concluded that the surveys were appropriately performed at the required intervals.

During site tours, the inspectors observed the status of the radiologically restricted boundary. Since the previous inspection, the licensee relocated the boundary on the northern end of the property. The boundary was moved inward to support reclamation activities associated with placement of the radon barrier and erosion protection material on the disposal cell. By moving the boundary inward, the contractors could use heavy equipment to place clean soil, sand, or rock on the side slopes of the cell without having to cross restricted area boundaries.

The temporary boundary change was controlled with entrance and exit points, rope barriers, and warning signs. Training was provided to workers to ensure that they understood the administrative requirements for the new boundary. The licensee issued a temporary operating procedure in September of 2019 to control the boundary change. The inspectors concluded that the temporary boundary change appeared to be well controlled by the licensee.

3.3 Conclusions

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

4 Effluent Control and Environmental Protection (IP 88045)

4.1 Inspection Scope

The inspectors reviewed the effluent and environmental monitoring programs to determine if the licensee was implementing these programs in accordance with license and regulatory requirements.

4.2 Observations and Findings

a. Groundwater Monitoring

The licensee conducted groundwater compliance monitoring as required by LC 49 and the licensee's groundwater monitoring plan (ADAMS Accession No. ML050680228). Routine groundwater monitoring was conducted for the constituents of concern and the protection standards for each constituent is detailed in LC 49.B. The licensee sampled the six background wells, 64 compliance wells, four corrective action monitoring locations, six seep and drainage locations, and four surface monitoring locations on an annual basis. Seep and drainage locations were sampled on a quarterly basis. These numbers reflect the removal of monitoring locations for the 005 collection trench (2224A) and the 005 monitor trench (2224B), which were removed to support decommissioning. These two monitoring locations were part of the confirmatory surveys conducted by the NRC inspectors during this inspection.

The licensee maintained the groundwater corrective action plan (GCAP) (ADAMS Accession No. ML102380151) approved by the NRC per LC 53. The purpose of the GCAP is to reduce the hazardous constituents in the impacted compliance wells. As the site is decommissioned and the contaminated soils and shales are excavated and placed in the disposal cell, the source for contamination of the groundwater should be removed or eliminated. The inspectors determined that the licensee was implementing the GCAP in accordance with the license and regulatory requirements.

The annual groundwater samples were collected in April 2019, and the quarterly sampling was performed in January, April, July, and December 2019, and January 2020. Annual sampling and quarterly sampling were collected in April 2019. In 2019, only the removal of 2224A (005 collection trench) and 2224B (005 monitor trench) locations from the groundwater sampling occurred. These locations were removed as part of the reclamation of that area. No groundwater monitoring wells were plugged or abandoned.

The inspectors reviewed a draft version of the licensee's 2019 Annual Groundwater Report. This draft report contained monitoring program changes, analytical results for all compliance wells, background wells, seep and drainage locations, and surface water monitoring. The report also included trending of sample results for compliance and corrective action monitoring. The licensee continued to make progress in groundwater cleanup. The inspectors found the draft report to be in compliance with LCs 49 and 53. The 2019 Annual Groundwater Report dated March 10, 2020, was submitted to NRC shortly after the close of this inspection.

c. Environmental Monitoring

The licensee's environmental protection program is defined in Chapter 5 of the Reclamation Plan, approved by the NRC in letter dated December 21, 2010 (ADAMS Accession No. ML102740446). The environmental monitoring program consisted of four fence line air monitoring locations, storm water discharge from Outfall 008, and annual monitoring of the ammonium nitrate fertilizer program. The licensee discontinued radon monitoring at the fence line after the second quarter of 2019, due to consistently negligible radon concentration values at the fence line. The State of Oklahoma Department of Environmental Quality permits the land application of treated waste water and the discharge of storm water via Outfall 008 through the licensee's Oklahoma Pollution Discharge Eliminations System Permit.

The licensee submits semi-annual effluent monitoring reports, which include the fence line air monitoring results and the outfall releases, to the NRC as required by 10 CFR 40.65. The inspectors reviewed the licensee's August 21, 2019 (ADAMS Accession No. ML19247C772), and February 4, 2020 (ADAMS Accession No. ML20044F206), semi-annual effluent reports. The inspectors noted that the analytical results indicated there were no airborne releases of uranium, thorium-230, or radium-226 during 2019. Liquid samples from the storm water discharged from Outfall 008 in 2019, indicated less than four percent of the average annual limits for uranium, thorium-230, and radium-226. The inspectors determined that the results showed compliance with regulatory and license requirements.

The inspectors observed pumping operations from the storm water reservoir to Outfall 008. The licensee demonstrated pH sampling and meter calibration, which is performed daily while pumping, and flow rate calculation, which is done using a 90-degree V-notch weir and staff gauge installed at the outfall. The licensee's method for calculating flow rate based on staff gauge level was appropriate. The inspectors reviewed the licensee's logs for pH calibration and storm water runoff discharge at Outfall 008, which were satisfactory.

An annual report was provided to the NRC providing a summary of the licensee's land application of ammonium nitrate fertilizer. The inspectors reviewed the licensee's April 8, 2019, Ammonium Nitrate Fertilizer Program 2018 Report (ADAMS Accession No. ML20038A139). The report included the pre-and post-growing season soil analysis, as well as forage analysis results. No ammonium nitrate fertilizer was applied during 2018, so no mid-season soil analysis was conducted. The inspectors noted that forage collection during 2018 had elevated molybdenum concentrations and the use of hay was restricted by the licensee. The inspectors determined that the results showed compliance with regulatory and license requirements.

4.3 Conclusions

The licensee conducted its effluent and environmental monitoring programs in accordance with regulatory and licensing requirements.

5 Training (IP 88010)

5.1 Inspection Scope

The inspectors reviewed the licensee's training program to determine if the licensee was in compliance with the license requirements.

5.2 Findings and Observations

License Condition 9.4 states, in part, that the licensee shall follow the guidance set forth in Regulatory Guide 8.31, "Information Relevant to Ensuring that Occupational Radiation Exposure at Uranium Recovery Facilities will be As Low As is Reasonably Achievable (ALARA)," or NRC-approved equivalent. Regulatory Guide 8.31, Section C.2.5 states, in part, that all new employees should be instructed by means of an established course in the inherent risks of exposure to radiation and the fundamentals of protection against exposure to uranium and its progeny before beginning their jobs.

The licensee's records indicated that orientation and initial training was provided to new employees/contractors in calendar years 2019 and 2020. The licensee conducted annual refresher training to site workers in January and February 2020. The NRC inspectors noted that fire extinguisher training was conducted for all staff on October 16, 2019. X-ray fluorescence (XRF) refresher training was conducted for three staff members on February 27, 2020.

The licensee had one individual identified as a health physics technician. Regulatory Guide 8.31, Section C.2.4.2.2, provides the requirements for education, training, and experience for the RSO and health physics technicians. The NRC inspectors confirmed that the health physics technician met all requirements in accordance with Regulatory Guide 8.31.

5.3 Conclusions

The licensee conducted training for employees, contractors, and visitors in accordance with licensing requirements.

6 Emergency Preparedness (IP 88050)

6.1 Inspection Scope

Determine if the licensee's emergency preparedness program is sufficient to ensure adequate protection of the safety and health of employees, contractors, members of the public, and the environment.

6.2 Observations and Findings

The licensee's emergency response process is outlined in licensee Procedure X-100, "Emergency Response." This procedure clearly defines the events of concern as those typically found in construction – trips, slips and falls, fire, or severe weather conditions. The procedure acknowledged the presence of radioactive material as a contaminant and coordinates with first responder organizations accordingly. The procedure appointed the

senior Sequoyah Fuels employee as the Emergency Coordinator and clearly defined that individual's duties and responsibilities. Hazardous materials onsite were clearly identified annually.

License Condition 44 requires that the licensee evaluate the consequences of a spill or incident/event against the criteria of 10 CFR 20 Subpart M and 10 CFR 40.60. Licensee Procedure A-207, "Reporting requirements for NRC," established the evaluation of these consequences and the reporting requirements for compliance with the license condition.

6.3 Conclusions

The licensee implemented an emergency preparedness program that was adequate to protect the safety and health of employees, contractors, visitors, and members of the public.

7 **Closeout Inspection and Survey (IP 83890)**

7.1 Inspection Scope

The inspectors reviewed the licensee's closeout and survey program to ensure that the licensee's final surveys were conducted as stated in the Reclamation Plan, and the inspectors conducted independent surveys to verify that surveyed areas had been decontaminated to acceptable radiological levels for unrestricted use.

7.2 Observations and Findings

a. Review of Final Status Surveys

In 2002, the license constructed a collection trench and a monitor trench near the head of the 005 Outfall drainage pathway. This area was located downgradient of former Pond 1. The licensee permanently removed the trenches from service in 2018 to support reclamation activities. The licensee conducted a final status survey of the area in 2019. The NRC inspectors conducted confirmatory survey of these areas during this inspection (see next section for details on the confirmatory survey).

As noted in the NRC approved Reclamation Plan, Sections 1.2 and 3.2.2, drainage areas located within the impacted area boundary required remediation if the soil in the areas contained contamination in excess of the cleanup criteria. Contaminated soil located outside of the impacted area boundary would be left in place. Appendix G to the Reclamation Plan provided a dose assessment for the 005 drainage pathway downgradient of the impacted area boundary. The dose assessment concluded that dose to members of the public from contamination in the downgradient pathway were less than 0.2 millirem per year.

Section 3.2.3 of the Reclamation Plan specified that the licensee will conduct final status surveys based on the radionuclides of concern for that area. In accordance with the Reclamation Plan, the radionuclides of concern in the 005 trenches were natural uranium, thorium-230, and radium-226. Appendix B to the Reclamation Plan provided the final status survey requirements for the decommissioning project. In Appendix B, the licensee committed to use the guidance provided in NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)," Revision 1. The

licensee's final status survey consisted of measurements of ambient gamma radiation levels and collection of soil samples.

The inspectors reviewed the licensee's walk-over gamma radiation scan survey results. The licensee's results indicated that all data points were less than the action level of three times background. In addition, the licensee collected 18 soil samples from the 3,640 square meter area with a required minimum of 15 samples based on the size of the area. The licensee also collected duplicate and replicate samples as required by site procedures. One sample result exceeded the sum-of-fractions ratio, and the licensee cleaned and resampled that area. The final survey results were less than the cleanup levels specified in Table 3-1 of the Reclamation Plan.

In summary, the licensee's records indicated that the excavated area had been effectively remediated. The scan survey results were less than the action level and the soil sample results were less than the cleanup level specified in the Reclamation Plan.

b. Confirmatory Surveys

The inspectors conducted confirmatory surveys of the 005 collection and monitor trench area. The purpose of the confirmatory surveys was to confirm the effectiveness and accuracy of the licensee's final status surveys relative to whether the areas met the acceptance criteria established in the Reclamation Plan. The confirmatory surveys included measurement of ambient gamma exposure rates and collection of soil samples.

The inspectors conducted the gamma scans using three instruments: two Radeye SX survey meters coupled to SPA-3 probes (serial no. 52210 with SPA-3 serial no. 19212 and serial no. 52198 with SPA-3 serial no. 19211, both with calibration due date of March 2, 2020) and one Ludlum Model 19 microR survey meter (serial no. 33033, calibration due date December 18, 2020). All surveys were conducted on March 2, 2020.

Prior to conducting the gamma scan, the inspectors measured the ambient background levels to establish action levels for the survey meters. The background measurements were recorded outside of the restricted area in the yard adjacent to the administrative building. Because the licensee's action level was three times the background level, for consistency, the inspectors' action levels were also set at three times the measured background levels. As summarized in Table 1 below, none of the survey measurements exceeded the action level.

The inspectors also collected five soil samples from the area based, in part, on gamma scan survey results. The samples were submitted to the NRC's contract laboratory for analysis of alpha and gamma-emitting radionuclides. The results were not available at the end of the inspection period and will be presented to the licensee at a later date. When received, the inspectors will compare the soil sample results to the cleanup criteria provided in Table 3-1 of the Reclamation Plan.

In addition to the 005 collection and monitor trench area, the inspectors conducted confirmatory surveys of two soil stockpiles. The west stockpile was 3,350 square meters, and the east stock pile was 1,200 square meters. Most of the material came from the combination stream drain pipe excavation beneath the former yellowcake storage pad. The licensee planned to reuse the material onsite as allowed by

Attachment A to the Reclamation Plan, if the subsoil material had radioactivity concentrations lower than the subsurface soil cleanup levels as provided in Table 3-1 of the Reclamation Plan.

To verify that the soil could be reused, the licensee constructed the stockpiles in lifts and conducted walk-over gamma surveys of each lift. The licensee also collected 32 soil samples. The number of samples was based on the quantities of material being stockpiled. The licensee’s results for the gamma surveys and soil sampling indicate that the stockpiled material could be reused in the construction of the disposal cell cover.

The inspectors conducted confirmatory surveys of the two stockpiles. The confirmatory survey included measurement of ambient gamma radiation exposure rates and collection of soil samples. The inspectors measured background levels prior to the gamma scan surveys, for comparison to the action level of three times background. The scan survey results were less than the action level. The results of the three confirmatory surveys are presented in Table 1 below.

Table 1: Scan Survey Results (in units of microrentgen per hour)

NRC Meter	Serial Numbers	Background	005 Area	East Stockpile	West Stockpile
Ludlum 19	33033	9-11	10-16	10-16	10-14
Radeye SX with SPA-3	52210 19212	7-8	6-12	8-11	8-11
Radeye SX with SPA-3	52198 19211	7-8	6-9	8-11	6-11

The inspectors collected two soil samples from the western stockpile and three samples from the eastern stockpile. The samples were submitted to the NRC’s contract laboratory for analysis. The results of the analyses were not available at the conclusion of the onsite inspection and will be presented to the licensee at a later date.

In summary, the results of the gamma scan surveys for the three areas were less than the action level of three times background. The results of the NRC’s soil sampling will be presented to the licensee in separate correspondence at a later date.

7.3 Conclusions

The inspectors reviewed the licensee’s radiological survey design and sample results for the 005 trench excavation located downgradient from former Pond 1. The licensee’s records indicated that it had designed and conducted its final survey in accordance with NRC-approved Reclamation Plan requirements, and all sample results were less than the limits specified in the Reclamation Plan. The licensee’s records indicated that the area had been effectively remediated.

The inspectors conducted confirmatory surveys of the 005 trench excavation and two stockpiles of material staged for reuse. The surveys included measurement of ambient

gamma radiation levels and collection of soil samples. The gamma radiation levels were less than the action level; the soil sample results were not available at the conclusion of the onsite inspection. The soil sample results will be presented to the licensee in separate correspondence.

8 Maintenance and Surveillance (IP 88025) and Radioactive Waste Processing, Handling, Storage and Transportation (IP 88035)

Since the previous inspection, the licensee had not conducted any site activities which would require review under these two inspection procedures.

9 Exit Meeting Summary

The NRC inspectors presented the preliminary inspection findings to the licensee's representatives at the conclusion of the onsite portion of the inspection on March 4, 2020. A follow-up briefing was held with the licensee on March 30, 2020.

SUPPLEMENTAL INSPECTION INFORMATION

Partial List Of Persons Contacted

Licensee Personnel

J. Ellis, President
S. Munson, Manager, Safety, Health and Environment
R. Miller, Contractor RMA
K. Schlag, Contractor, RMA

Inspection Procedures Used

IP 83822	Radiation Protection
IP 83890	Closeout Inspection and Surveys
IP 88001	Onsite Construction
IP 88005	Management Organization and Controls
IP 88010	Training
IP 88025	Maintenance and Surveillance of Safety Controls
IP 88035	Radioactive Waste Processing, Handling, Storage and Transportation
IP 88045	Effluent Control and Environmental Monitoring
IP 88050	Emergency Preparedness

Items Opened, Closed, and Discussed

Opened

None

Closed

None

Discussed

None

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