

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 70-925/86001(DRSS); 70-1193/86001(DRSS)

Docket Nos. 70-925; 70-1193

Licenses No. SNM-928; SNM-1174

Licensee: Sequoyah Fuels Corporation  
Kerr-McGee Center  
Oklahoma City, OK 73125

Facility Name: Cimarron Facility

Inspection At: Cimarron Facility, Crescent, OK

Inspection Conducted: January 6-10, 1986

Inspector:  G. M. France, III

2/10/86  
Date

Approved By:  L. R. Greger, Chief  
Facilities Radiation Protection Section

2/10/86  
Date

Inspection Summary

Inspection on January 6-10, 1986 (Reports No. 70-925/86001(DRSS);  
No. 70-1193/86001(DRSS))

Areas Inspected: Routine, unannounced safety inspection including:  
organization; nuclear criticality safety; radiation protection program;  
training; operations review; transportation and radioactive waste; audits  
and procedures; and an onsite review of the licensee's amendment application  
to possess, excavate, and repackage various physical and chemical forms of  
buried thorium waste.

Results: No violations or deviations were identified.

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## DETAILS

### 1. Persons Contacted

\*R. L. Fine, Health and Safety Supervisor  
\*M. W. Hodo, Accounting and Administrative Analyst  
J. L. Kegin, Operations and Utilities Supervisor  
V. McClain, Decontamination Operator  
K. Morgan, Senior Health Physics Technician  
F. Murch, Senior Health Physics Technician  
\*A. W. Norwood, Standby Operations Manager  
\*W. J. Rhodes, Decontamination Supervisor  
\*V. D. Richards, Plutonium Decontamination Supervisor  
\*W. A. Rogers, Decontamination Supervisor  
W. Spencer, Senior Project Engineer  
G. Trujillo, Health Physics Technician

\*Denotes those present at the exit meeting conducted January 10, 1986.

### 2. General

This inspection, which began at 1:30 p.m. on January 6, 1986, was conducted to examine the routine radiation protection, radwaste, and transportation of radioactive material activities; the status of decommissioning programs at the uranium and plutonium plants; and the status of preparations for excavating buried thorium waste. During the course of this inspection, the inspector toured both plants and the onsite thorium waste location.

### 3. Management Organization and Controls

The inspector reviewed the licensee's management organization and controls for radiation protection operations and radwaste management, including changes in the organizational structure, procedure revising and updating, and utilization of audit systems.

#### a. Organization

Sequoyah Fuels Cimarron Operation currently employs 52 persons in security, health and safety, and decommissioning operations of the plutonium and uranium fuel facilities. This represents a 15 percent increase in personnel since the last inspection (Inspection Report No. 70-925/85001(DRSS); 70-1193/85001(DRSS)).

The onsite radiation protection organization consists of the Supervisor of Health Physics; a Health Physics Specialist; four Senior Health Physics Technicians; three Health Physics Technicians; and one Junior Health Physics Technician. The inspector interviewed members of the health physics staff and plant operators performing

decontamination operations. Based on these discussions, it appears that workers adhere to radiation protection procedures and special work permit provisions.

The inspector concluded that the radiation protection organization appears to have sufficient onsite and corporate management support to ensure implementation of an effective control program.

b. Procedure Revising and Updating

The inspector confirmed that the licensee periodically reviews and updates procedures during decommissioning operations. The following procedures were reviewed during the course of the inspection.

- KM-NP-15-48, Revision 4, July 25, 1985, Plutonium Plant Inventory

This procedure describes the methods used for physical inventory of Special Nuclear Materials. For Standby Operations, the Plutonium Plant is divided into three Material Balance Areas:

1. Vault - Waste Packaging and Storage
2. Glovebox Holdup Plutonium
3. Waste Shipment Storage (Rooms 121 and 123)

The inspector noted that the licensee's plant inventory procedures require nondestructive analysis (NDA) of individual waste packages for plutonium quantification.

The NDA inventory procedure enables the licensee to quantify and control the amount of plutonium waste shipped to burial and assures that plutonium quantification and summation of waste packages routed to the three material balance areas is maintained at less than critical quantities.

- KM-NC-10-61, Revision 3, August 21, 1985, Definitions and Units

This procedure defines terms and units frequently used in radiation safety procedures and health physics activities. Among the terms defined, protective (anti-C) clothing, MPC respirator factor, and safe operating limit were recently included as information to all workers.

- KM-NP-10-76, Revision 7, August 20, 1985, Nuclear Criticality Safety

This procedure establishes criticality safety practices, and requires each individual to know and follow applicable procedures pertaining to nuclear safety aspects of his/her job. The procedure also lists criticality safety rules. The

inspector noted that all personnel are cautioned to never exceed safe operating limits for accumulation of fissionable material.

- KM-NC-10-83, Revision 1, July 30, 1985, Plutonium Plant LSA Waste Drum Counter

The drum counter enables the licensee to restrict contamination levels in combustible LSA waste.

- KM-NP-36-18, Revision 4, July 26, 1985, Operation of Glovebox (GB) 40 Ion Exchange System

Along with filtration, the ion exchange system is used to reduce the radioactivity level of the decontamination solutions to a level that can be solidified and disposed of as Class A LSA waste.

Since both the vacuum pump exhaust and air supply in GB 40 have the potential of pressurizing the GB, the GB low negative pressure alarm switch has been wired to shut off the vacuum pump and to close the air supply solenoid valve when the GB negative pressure gets above 0.25" of water.

The operator is also cautioned that constant attendance is required during operation.

This procedure also addresses nuclear safety associated with positioning the tanks, IX columns, and filter canisters. The geometric configuration and location of these vessels is favorable to nuclear safety practices.

The inspector verified that changes made to operating and radiological protection procedures since the last inspection appear to be consistent with regulations and license requirements.

c. Special Work Permits

The inspector reviewed the licensee's special work permit (SWP) file and discussed the operational aspects of jobs performed in conjunction with SWP provisions.

The inspector reviewed SWP No. 0042. This SWP was specific to Procedure KM-NP-36-18, Revision 4, "Operation of GB 40 for Exchange System" discussed in Section 3(b), "Procedure Revising and Updating." Under SWP No. 0042, a process line is connected between an existing tank farm, which consists of 8 individual 5-inch diameter tanks, and the ion exchange operation in GB 40. The tanks hold waste solutions scheduled for transfer to GB 40 for filtration, ion exchange, and volume reduction by solidification with cement. The SWP requires use of respiratory protective devices.

The inspector concluded that the SWP adequately specified the necessary radiation safety controls.

d. Internal Reviews and Audits

The inspector verified that the licensee utilizes independent audits conducted by corporate compliance inspectors as an additional means of reporting deficiencies to management. The licensee's independent compliance inspection quarterly audit reviewed the packaging and shipping requirements and procedures at the Cimarron plutonium and uranium plants. In accordance with the uranium plant license, the SNM was downgraded by blending with depleted material. The blend approximated the enrichment of U-235 in natural uranium. According to the audit, the material was formed as 86 kgs of  $U_2Na_2SO_4$  and shipped to the licensee's Sequoyah Fuels  $UF_6$  conversion facility.

The inspector examined the Standby Manager's progress report and records of compliance audits and found no discrepancies requiring corrective action.

No violations or deviations were identified.

4. Radiation Protection

The inspector reviewed the licensee's internal and external exposure control programs including the required records, reports and notifications, and the licensee's program for maintaining occupational exposures ALARA.

a. Internal Exposure Control

The inspector reviewed licensee records of internal exposure evaluations including: bioassay and air sampling results; whole body count data; and MPC-hour determinations.

Urinalysis results for plutonium and uranium plant workers for the July through December 1985 operating period were below investigative levels. During the previous inspection (Inspection Report No. 70-925/85001[DRSS]) one uranium plant worker's urine sample showed 65 dpm/liter, which is the licensee's investigation level. Analysis of the worker's next voiding showed 10 dpm/liter. A whole body count showed  $0 \pm 42 \mu\text{g}$  U-235, which was below the detection limit for U-235. The employee's MPC-hour calculation was significantly less than 40 MPC-hours.

About 21 workers received whole body counts for U-235 detection and 28 workers were counted for Pu-239 detection. In-vivo counts for mixed fission, corrosion, and activation products disclosed maximum values of about 0.42 nCi of Am-241,  $82 \pm 40 \mu\text{g}$  of U-235, and 0 counts for Pu-239. The licensee's data of WBC results for one worker (employed over the last nine years) disclosed that WBCs for U-235 ranged from 78 to 138  $\mu\text{g}$ .

The licensee's data on nasal smears disclosed that all results were less than the action level of 15 dpm. The inspector observed nasal smears performed during a shift change in the plutonium plant controlled area.

Workers reporting skin contamination to the neck and thumb, of about 600 d/m, were decontaminated using soap and water with no apparent problems. Wound counters were used on workers with finger injuries; no detectable contamination was found at the injury site.

b. External Exposure

The licensee's film badge data for 1985, through November, disclosed that the highest whole body dose to any individual was 2.2 rems. Two other individuals received doses exceeding 1 rem.

c. Surveys

The inspector reviewed the licensee's program for radiological surveys to verify compliance with the regulations and with license requirements including: schedules for periodic surveys, effectiveness of surveys, and adequacy of instrumentation.

During an interview with a Senior Health Physics Technician, the inspector was informed that surprise or unannounced surveys have been performed. Surveys of personnel were performed during authorized breaks, periods of leisure, and prior to exiting the plant. One survey of about 12 uranium workers and 16 plutonium plant workers reviewed showed no contamination detected. In another survey, one work apparel sleeve measured about 800 dpm/100 cm<sup>2</sup>.

d. Respiratory Protection

The inspector interviewed a Senior Health Physics Technician and discussed provisions for supplying air to persons performing work in fabricated or temporary enclosures (plastic tents). The inspector observed the construction of a plastic enclosure and placement of the air supply manifold; the manifold system is used to supply air to persons wearing a bubble hood for protection against airborne particulate matter. The manifold system consisted of a condensate pot; various filters for removal of oil, moisture, and particles; a line pressure gauge; a regulator valve; and a rotameter to control flow to the hood. Based on special work permit requirements, an HP technician or trained operator is on standby during air supplied hood use.

e. Instruments and Equipment

The inspector reviewed the licensee's program for surveillance and calibration of instruments and equipment, including: instrument maintenance, adequacy of procedures, and effectiveness of system used to identify instruments due for calibration.



Selective review of records of calibration of portable survey instruments, constant air monitors, and plutonium stack monitors disclosed that calibrations were performed as required. No problems were noted.

During a tour of the plutonium facility, the inspector noted that instrument technicians were repairing instrument cables for several portable survey instruments to be used in a supporting role at the licensee's Sequoyah Fuels  $UF_6$  conversion facility. In response to the inspector's discussion about License Condition No. 10, Authorized Place of Use, the Health Physics Supervisor noted that licensed sealed sources which were normally used to calibrate survey instruments and authorized for use only at the Cimarron plant, were not transferred or used at any other facility.

The inspector reviewed the licensee's program for establishing instrument settings to distinguish background radiation from plutonium activity, and for monitoring airborne activity inside protective enclosures. In order to distinguish instrument alarms caused by plutonium from those caused by radon buildup, a monitor (Alpha 2) was selected with the capability of electronically discriminating against radon peaks. Other instruments such as area monitors are set about 10 percent above background to minimize random alarms from radon buildup. Instruments that are used in temporary enclosures (plastic tents) are set in the same manner as described above. No problems were noted.

The inspector concluded that instrument calibrations are performed at required frequencies, and that License Condition No. 10, Authorized Place of Use for licensed sources, has been complied with.

f. Air Sampling

The inspector reviewed the licensee's program for determining exposure to personnel from airborne radioactivity detected by lapel samplers, forced air samplers, and continuous air monitors (CAM).

The Health Physics Supervisor noted that a significant reduction in MPC-hour exposure from airborne activity was accomplished by chemically clearcoating items submitted for plasma arc cuts. The inspector reviewed the licensee's airborne exposure summary and selected air sample results and followup reports for discussion with the Health Physics Supervisor. Respiratory protection factors and time of exposure disclosed that MPC-hours for workers performing decontamination tasks inside temporary enclosures measured less than 10 MPC-hours. Projects performed where workers were wearing lapel samplers without respiratory protection measured about 4.7 MPC-hours. The MPC-hours is based on a weekly assessment.

Exposure assignments to projects performed at the uranium plant measured 0.1 to 0.2 MPC-hours, with respiratory protection.

g. Ventilation - Stack Releases

A review of stack release data disclosed that airborne radioactivity effluent to the unrestricted area was significantly lower than regulatory limits. The licensee noted that although decommissioning operations are being performed, the ventilation system still uses intermediate and final filter banks. The inspector's review of stack release data also disclosed that stack monitors inserted between intermediate and final filters occasionally show an increase of airborne radioactivity in the ventilation duct work. The Operations and Utilities Supervisor noted that the ventilation duct work was from the acid scrub system which is now nonoperational.

No violations or deviations were identified.

5. Operations Review

The inspector reviewed decommissioning procedures for both the plutonium and uranium plants, observed ongoing activities during the course of several tours of the facility, and reviewed the status of decommissioning. During facility tours the inspector observed licensee performance in accordance with statements, representations, and conditions contained in Appendix A of the licensee's application.

a. Plutonium Plant

Plant laboratory facilities and rooms are being rearranged to accommodate waste storage. The NDA counting room was moved nearer the barrel counter. Cement block support walks used to hold oxide process gloveboxes in place were removed, surveyed, and reduced in size for waste packaging. Plastic enclosures were being constructed for contamination control during plasma arc and/or hand saw cuts of metal gloveboxes.

Outdoor activities observed by the inspector in support of the licensee's request for license amendment (authorization for possession of thorium waste) included the following:

- Improvement of onsite roadway (gravel) to accommodate traffic to onsite burial location.
- Scalping of vegetation from burial pits in preparation for excavation of thorium waste removal.
- Construction of a change room and a ventilation shack, complete with filters and air handling equipment, at the burial site. The ventilation shack is constructed over a metal skid which can be towed to an excavation site selected atop the burial pit. Excavation can take place in 10-foot swaths. The ventilation shack door can be lowered into a prepared hole rendering an enclosure in preparation for the 10-foot excavation. Canvas



skirts can be fitted around the skid frame to complete the enclosure. Exhaust ventilation includes filters and airflow measuring equipment. Workers will be further protected by donning protective clothing, including respiratory protection if needed.

- Construction of a loading dock (compacted dirt reinforced with a wall constructed of railroad ties). The height of the dock will accommodate the height of a trailer bed for ease of loading containers of excavated radioactive material.

b. Uranium Plant

The major activity noted was a contaminated soil removal project. The licensee estimated that over 600 cubic feet of contaminated soil (over 30 pCi/gram) was removed, radiometrically surveyed, and put into barrels for waste disposal. The licensee has excavated the process piping and made radiometric measurements to identify soil contaminated by line leaks. To date, several thousand cubic feet of soil have been excavated and put in piles for closer survey and disposal. The inspector observed this operation and noted that contaminated dirt is handled with a front end loader or scoop. The dirt is placed on a conveyer and transported to a prepared container (55-gallon drum). The inspector noted that a similar conveyor was constructed to transport the dirt through dual hoppers; this conveyor will only be used during dry weather.

c. Small Quantities of Source Material

According to 10 CFR 40.22 the licensee is authorized to receive fifteen (15) pounds of source material for operational purposes. A 55-gallon drum of ore containing up to 15 pounds of thorium is being prepared as a standard for measuring thorium content of excavated thorium waste.

The inspector concurred that the licensee can legally receive up to 15 pounds of source material at any one time and up to 150 pounds of source material in any one calendar year under a general license.

The inspector concluded that the licensee's decommissioning activities appear adequate to protect the health and safety of facility workers and members of the general public. No violations or deviations were identified.

6. Nuclear Safety

The inspector examined records of audits performed by the licensee in order to determine if any breach of procedures had occurred since the previous inspection.

During a tour of the plutonium plant vault the inspector verified that the quantity of plutonium stored was less than the posted limits.

The inspector reviewed the licensee's documentation of facility changes requiring criticality considerations, including determination of whether the licensee has the appropriate expertise to establish criticality safety limits for facility operations, and determination of whether the licensee has positive management controls to assure that facility operations are conducted within nuclear criticality safety limits. A process line connecting the ion exchange (IX) operations in Box 40 to an existing tank farm, consisting of 8 five-inch diameter tanks, was reviewed for criticality safety. The inspector concurred that both systems, the IX system and the 8-tank liquid storage array were previously reviewed for criticality control and that the connecting line was nuclearly favorable by diameter (less than 2 inches) and acted only as a conduit to transfer liquid. The inspector noted that monthly safety audits were performed in compliance with license requirements.

Results of the December audit had not been received, and the inspector considered this an open item (70-1193/86001-01[DRSS]).

No violations or deviations were identified.

#### 7. Maintenance Surveillance

The inspector examined the licensee's maintenance operations to determine if records are maintained on plant systems pertinent to safety.

Maintenance inspection and performance records were reviewed for the following safety oriented systems:

- Load test - diesel generator
- Hoist and crane assembly - waste operations
- Standby fans - redundant blowers ventilation system
- Final filter - DOP annual test
- Stack monitor calibration

The inspector noted that the annual emergency generator load test was completed in December 1985, and no major items of repair were needed.

No violations or deviations were identified.

#### 8. Transportation

The inspector reviewed the transportation activities to determine whether the licensee is maintaining an adequate program to assure radiological safety in the receipt and delivery of licensed radioactive materials.

Licensee shipping records disclosed that the licensee performed adequate program requirements that covered:

- Monitoring for radiation and contamination of radwaste packages and transport vehicles.
- Shipping paper documentation in accordance with licensee procedures.

The inspector reviewed shipping records that disclosed that concrete blocks removed from the plutonium building process room were transported to U.S. Ecology for disposal. A nondestructive analysis performed on the concrete blocks disclosed about 79  $\mu\text{g}$  (about 5 $\mu\text{Ci}$ ) of Pu-239. The isotopic content of plutonium contamination in the cement blocks was:

<u>Isotope</u>	<u>Percent</u>
Pu-239	86.45
Pu-240	11.62
Pu-241	0.90

During the course of this inspection the inspector observed that contaminated soil showing greater than 30 pCi/g was packaged with cement powder for moisture and condensate control. The inspector examined records for other shipments of TRU and LSA waste and found no discrepancies.

No violations or deviations were identified.

#### 9. Safety Meetings

According to plant policy, weekly safety meetings were conducted; they included discussions on general contamination control during decommissioning activities. In response to inspector inquiries, the Health Physics Supervisor and a Decon Supervisor indicated that there was no problem with workers reporting injuries to hands or to gaining worker confidence in performing wound counting.

Safety meeting discussions also included safety topics related to some of the outdoor activities. Discussions were held on MSHA bulletins for safety and health practices in tractor, shovel, and hydraulic equipment operations.

No violations or deviations were identified.

#### 10. Allegation Followup

Allegations by a former licensee employee were investigated and documented in Inspection Reports No. 70-1193/84002 and No. 70-1193/85001. Samples were collected of surface water, soil, and vegetation. As noted in Inspection Report 70-1193/85001, the NRC independent laboratory evaluation conducted by RESL/USD OE Idaho Operations Office showed that uranium

analytical results for vegetation were higher than previous licensee environmental results. To resolve this matter the inspector split three vegetation samples with the licensee. Two samples were collected over the licensee's burial/disposal site and a reference or background sample was collected from another location. The NRC samples were submitted to RESL/USDOE Idaho Operations Office for uranium analysis. The results of these analyses will be reported in a future inspection report.

11. Exit Meeting

The inspector met with licensee representatives (denoted in Section 1) at the conclusion of the onsite inspection on January 10, 1986. The inspector summarized the scope and findings of the inspection. In response to certain items discussed by the inspector, the licensee:

- a. Acknowledged the inspector's comments concerning the receipt of source material under 10 CFR 40.22.
- b. Acknowledged the inspector's comments concerning License Condition 10, authorized place of use for sealed sources.

During the course of the inspection and the exit meeting, the licensee did not identify any documents or inspector statements and references to specific processes as proprietary.