APPENDIX B

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 40-8027/91-11 License: SUB-1010

Docket: 40-8027

Licensee: Sequoyah Fuels Corporation (SFC)
P.O. Box 610
Gore, Oklahoma 74435

Facility: Sequoyah Facility

Inspection At: Gore, Oklahoma

Inspection Conducted: June 17-21 and 24-28, 1991

Inspectors: Dana C. Ward, Project Manager

Gary R. Konwinski, Project Manager

Approved by: Lawrence A. Yandell 8/22/91
Lawrence A. Yandell, Deputy Director Date
Division of Radiation Safety
and Safeguards

Inspection Summary

Inspection Conducted June 17-21 and 24-28, 1991 (Report 40-8027/91-11)

Areas Inspected: Routine, unannounced inspection of activities related to operations, radiation safety, environmental protection, and a review of SFC actions related to the facility-wide environmental program. Areas inspected included: Operations review, radioactive waste management, radiation protection instruments and equipment, contamination control training, and the facility environmental investigation.

Results: Within the areas inspected, one violation was identified. This violation involved the failure to implement a procedural requirement to calibrate a pulse generator in accordance with the manufacturer's recommendations, as required by procedure. SFC used the pulse generator to calibrate portable radiation protection detection equipment.

The inspectors also identified weaknesses regarding the failure to maintain and adhere to operating procedures in that SFC revised work activities in the handling of solid waste but did not revise the procedure prior to implementing the changes. These weaknesses indicated a lack of attention-to-detail in maintaining and adhering to operating procedures. This is an issue that has been identified in previous NRC inspection reports and SFC has initiated actions to correct these weaknesses.

DETAILS

1. Persons Contacted

*Reau Graves, Jr., President
*Carol Couch, Manager, Environmental
-*Kenny Schlag, Hydrologist
*Terry Gipson, Contractor RSA,Inc.
- Don Latham, PLG, Inc.
- Ron Adkisson, Vice President, Business Development
- Scott Munson, Manager, Health and Safety
- Ken Simeroth, Health Physics Supervisor
- Richard Parker, Manager, Operations
- Rick Callahan, Health Physics Supervisor
- Herman Leatherman, Acting Manager, Engineering
- Sue Smith, Supervisor, Waste Treatment and Solid Waste
-*Lee Lacey, Vice President, Regulatory Affairs
- Tommy Johns, Uranium Trioxide (UO_3) Area Manager
-*Joe Bohannon, Quality Assurance Engineer
-*Robert Miller, Nuclear Licensing Engineer
-*J. H. Mestepey, Senior Vice President
*Garry Young, PLG, Inc.

- Denotes attendance at exit interview on June 21.
*Denotes attendance at exit interview on June 28.

2. Operations Review (88020)

During the week of June 21 the Sequoyah facility was in an operating status. The licensee had planned to start operations at the depleted uranium tetraflouride (DUF4) facility during the week, but general maintenance of the facility's process equipment had not been completed. The inspector toured both the main processing building and the DUF4 facility several times during the inspection week.

The inspector noted during several walk-through inspections of the DUF4 facility that contamination control had improved. No contaminated tools or equipment were noted outside of control points and maintenance personnel were conducting contamination control according to procedures. The inspector repeatedly toured the main process building, miscellaneous digest facility, and the solvent extraction building during the inspection and found housekeeping and contamination control appropriately maintained. The solvent extraction building floor was noted to be dry except for some puddles of possibly contaminated liquids originating from well-field pumping activities that were conducted periodically during the week.

The inspector did notice in the main process building on the third level of cell rework that a door was altered to prevent entrance from the plant. The door knob had been removed, and a steel plate replaced it. This door

was designated by postings as an evacuation route from the processing section of the facility. Licensee representatives stated that 2 weeks earlier, the door was altered to prevent employees from entering the clean area of the plant, and that a new evacuation route had not been established. Later discussions with the licensee's representative indicated that the door had been fixed subsequent to the inspection.

During a tour of the laundry facility, the inspector noted that a worker had not been or reviewed Procedure HS-506, "Laundry Facility Operations", which was the procedure that governed the work that he was performing. SFC records indicated that the worker's job-related training consisted of two 8-hour shifts with another worker, on May 22-23, 1991. Although the worker appeared to understand his duties, the fact that the worker was performing duties for almost 4 weeks without reviewing the procedure that governed his activities indicated a lack of appropriate training.

3. Radioactive Waste Management (88035)

The inspector performed a detailed review of the operating procedures for solid waste handling activities. A walk-down of each procedure was performed with the Waste Management Supervisor. Operators were interviewed prior to, during, and after the walk-down with the Waste Management Supervisor. Radioactive waste management activities were further observed during general walk-throughs of the facility.

During detailed reviews and walk-downs of Procedures N-201-6, "Decontamination Area," N-170-3, "Incinerator," and N-210-3, "Shipping Empty Yellowcake Drums," the inspector found that the licensee was conducting these operations in accordance with the procedures. No problems were noted by the inspector other than the incinerator used for burning uncontaminated burnables was developing two large holes in the flyash containment screen. This was brought to the attention of management at the exit interview.

The inspector performed a review of Procedure G-318, "Drum Crusher Operation," prior to observing related activities onsite. During the walk-through, it was noted that the existing drum crusher was no longer operating, and the procedure was therefore outdated. The inspector noted that a new automated drum crusher facility was nearing completion which will be housed in a separate building west of the miscellaneous digester building. This new facility will use the dust collection system from the miscellaneous digester in an attempt to eliminate any fugitive dust problems. The licensee assured the inspector that a new procedure would be written and approved prior to operation. No further activities were conducted by the inspector in this area.

The inspector reviewed Procedure G-317, "Low Level Radioactive Waste Packaging, Shipping, and Quality Assurance Programs." No shipments were made while the inspector was onsite, but observations of drum packing

methods and reviews of records indicate that the procedure was being followed and that the procedure was in accordance with all appropriate standards except for two erroneous references.

The inspector noted that Section 3.2 of Procedure G-317 incorrectly referenced 10 CFR 49 and that Section 4.1 incorrectly referenced 40 CFR 173.403(n)(4). These errors were minor, but indicated a lack of attention to detail. The licensee's representative stated that these were typographical errors and would be corrected.

A review of Procedure G-301, "Solid Waste Management," was performed, and it was noted that the procedure did not sufficiently or accurately reflect the current solid waste operation. The inspector noted that the operation has been completely changed in the last year according to the procedure and information obtained from the Solid Waste Supervisor (SWS) and the employees conducting the work.

The SWS was fully aware that Procedure G-301 did not accurately reflect the operation as it was being conducted. The SWS stated that a revised procedure had been written and that it had been given to the former Manager, Health and Safety (H&S) approximately 1 year ago, and that possibly the present manager could locate the revised document. The revised procedure could not be located during the inspection, and it appears that this item had been overlooked by SFC personnel.

The inspector identified that the lack of a current procedure limited its usefulness as a tool to conduct the operation efficiently. Department managers appeared to be confused about where certain waste types should be placed for disposal, but it appeared that no radiologically contaminated waste was taken out of the restricted area. Within the restricted area, contaminated waste could follow several pathways until final disposition was determined. Specific comments as a result of the review of the procedure are as follows:

- Section 4.2.3b. states, in part, "Contaminated metal is to be taken to the contaminated materials holding yard located across the road north of No. 1 emergency basin."

  However, contaminated metal was stored on the southwest corner of the yellowcake pad.

- Section 4.3.1 states, in part, "potentially contaminated radioactive material must be surveyed, for sorting purposes, consistent with the instructions for Eberline Portable Alpha Counter PAC-1S."

  However, since approximately June 1990, the normal instrument used for surveys was the Ludlum Model 12.

- Section 4.3.4 states, in part, "Contaminated burnables are to be packaged in good drums and stored in the designated restricted area for future disposal. These drums are to be dated and numbered in series beginning with the number ten thousand one."

  However, no such contaminated burnable drum numbering system existed.

- Section 4.3.9 states, in part, "Uncontaminated unburnable material will be deposited in the trash bins for offsite disposal or be packaged in new unused drums dated and numbered in series beginning with the number twenty thousand one."

  However, no such uncontaminated unburnable drum numbering system existed.

- Section 4.3.10 states, in part, "Any significant amount of uranium, which might have been placed inadvertently in the trash and found through trash sorting, is to be drummed, dated, labeled as to contents and placed in the designated area inside the fenced area by the yellowcake unloading dock."

  However, no such area existed. Any significant amount of uranium found in trash sorting was returned to the system.

- Section 4.4.1 states, in part, "The storage area for drummed solid waste will be inspected monthly for evidence of leaking drums. The inspection log will be maintained by the Waste Management Supervisor."

  However, no inspection log was maintained by the Waste Management Supervisor. The licensee presently maintains an inventory of over 5,700 drums of waste, much of which is contaminated soils from the solvent extraction excavation. Licensee's representatives stated that the drums were checked regularly in mass and any drum found leaking was redrummed.

Although licensee personnel did not appear to actively review the procedure revisions which had been submitted to the previous Manager, H&S, the inspector noted that SFC had started to undertake an effort designed to review, correct, and improve procedures.

4. Radiation Protection, Instruments and Equipment (83822)

The inspector reviewed procedure HSDEPT-110, "Health Physics Portable Instrument Calibration" and examined much of the portable instrumentation during the inspection. Generally, the portable radiation detection equipment was being maintained in good order. One Ludlum Model 12 meter, Serial No. 72706 was noted to be calibrated in December 1990 and due July 1991. This exceeds by 1 month the procedural requirement stated in Section 4.1.1 of Procedure HSDEPT-110 of a 6-month recalibration period.

The inspector noted when reviewing the calibration form, "Health Physics Portable Instrument Calibration," that the form lacked a calibration due date. The Health Physics Supervisor also maintained a computer log of instruments that were due for calibration, but Ludlum Model 12, Serial No. 72706 was not recorded on the log.

The inspector noted in the procedure that a pulse generator calibrator (Model MP-1 Eberline Pulser) was used for calibration and routine checks of portable radiation detection equipment. Section 4.1.2(a) of Procedure HSDEPT-110, states that all calibration, repair, and routine maintenance will be performed as recommended by the manufacturer's technical manuals. The manufacturer recommended a 3-month calibration interval on the pulse generator calibration. The pulse generator had no calibration sticker attached to it, nor could any records be produced that the instrument had been calibrated in the last year. The pulse generator had been maintained and calibrated by the instrument and electrical department (I&E), and according to licensee representatives, I&E had transferred the pulse generator and all calibration records to the H&S department in June of 1990. Licensee representatives stated that the pulse generator had not been calibrated since I&E transferred it to H&S. The fact that the pulse generator had not been calibrated every 3 months in accordance with the manufacturer's recommendations was identified as a violation of License Condition 9, Section 2.2 of SFC's license renewal application dated August 23, 1985, as supplemented (40-8027/9111-01).

The inspector noted two other occasions where SFC calibrated instruments with equipment that was itself not calibrated. The first case was identified in NRC Inspection Report 40-8027/91-04 dated June 6, 1991, where the inspector determined that a violation of the maintenance surveillance program had occurred because equipment used to perform the licensee's surveillance testing and calibration programs, were themselves not calibrated. The second case was identified in NRC Inspection Report 40-8027/91-07 dated June 21, 1991, where the inspector determined that calibration kits used to calibrate high volume air samplers, were themselves not calibrated.

The inspector also reviewed the calibration standards (alpha, beta, gamma) used by the licensee and found that they were maintained in accordance with procedures and good health physics practices.

5. Contamination Controls (83822)

The inspector attended two training sessions on contamination control. These sessions were given 12 different times during the month of June until all employees were trained. The material presented during training stressed contamination control during work requiring a hazardous work permit, crossing control points, opening contaminated systems, special activities, disposing of contaminated materials, and frisking. The training was comprehensive with demonstrations by the Health Physics Supervisor. A handout outlining the course was given to all participants.

The inspector noted that a good dialogue was established between the instructors and the attendees. The inspector noted that the Sequoyah Oversight Team (SOT) stressed the positive attributes of this training "in getting the message across to the facility personnel about management expectations and how those expectations are to be translated into action." However, the training did not appear to be effective.

During the week of June 24, 1991, SFC informed NRC that a health physics consultant had observed several violations of SFC's health physics procedures. In SFC's July 3, 1991, letter to NRC, SFC stated that these violations included instances of eating, drinking, and tobacco chewing in the restricted area; failure to follow proper frisking and step-off pad procedures; not washing hands prior to entering the break room; cutting a juice container with a potentially contaminated knife; and applying cosmetics in the restricted area. These incidents occurred 2 weeks after SFC had begun contamination control training for SFC employees as part of a response to a contamination event in the DUF4 facility on June 5, 1991 (reference NRC Inspection Report 40-8027/91-10 dated July 22, 1991). It appeared the contamination control training was not effective.

6. Facility Environmental Investigation (88045)

The inspector reviewed the Facility Environmental Investigation (FEI) Plan that had been prepared by SFC and submitted to NRC by letter dated October 26, 1990. In the plan, 26 operational units were defined for investigation, based upon a relative environmental priority. The main process building area and the solvent extraction (SX) areas were first and second priorities, respectively. The south fish pond was prioritized as the 26th unit. The investigations associated with these 26 units, as well as two additional units, will be presented in a final environmental report that is scheduled for completion in July 1991. The two additional units that have been identified are the lime neutralization area which is due west of the SX building and the combination stream trench. A lime silo and a mixing tank that treats NF-scrubber liquids were contained within the lime neutralization area. These components are built upon a curbed concrete pad which is designed to contain leaking and overflowing fluids. The combination stream was set aside as an additional unit due to the amount of investigative effort that has been devoted to it.

The investigation work that SFC has completed involved soil and water characterizations of each unit as applicable. Soil characterization involved collection of samples from boreholes, trenches, and surface locations. These locations had data collected for uranium, nitrate, and fluoride, and to varying degrees these soil constituents had elevated levels. Uranium values ranged from less than 5.0 micro-gram per gram (µg/g) to a high of 10,270 µg/g in the east SX-yard. Nitrate concentrations ranged from less than 2.5 µg/g to 2882.7 µg/g northwest of the miscellaneous digestor. Fluoride concentrations ranged from 48 µg/g

to 65,100 µg/g in the limestone neutralization area. These data values indicated that soil contamination was wide spread at the site both on the surface and at depth. The July report will more fully delineate the areas of contamination.

Water analysis was performed on water from ground-water wells, utility trenches, boreholes, surface-water runoff, and impoundments. Water analyses generally considered uranium, nitrate, pH, fluoride, and specific conductivity. Arsenic was added as a constituent of concern after it was found in the ground water in certain locations. The concentrations of all ground-water constituents ranged from background to significantly elevated levels. The data generated was too lengthy to discuss specific constituent ranges; however, it is sufficient to plot the movement of these constituents around the site. The areas of constituent movement have been delineated in draft reports and will be more fully explored in the licensee's July submittal.

The data indicate that primary pathways for constituent transportation are those areas where aggregate backfilled utility trenches have created high conductivity corridors. In addition to these areas, there is general ground-water movement that is carrying dissolved constituents in downgradient directions. Although the general ground-water movement is not as rapid as that in the utility trenches, it covers larger areas.

Data collected to date are sufficient to define the distribution and transportation of the various constituents in the shallow shale and deep sandstone units, with the exception that the spread of nitrates west of the facility has not been bounded. If this situation is to be fully described, additional wells will be required between the restricted area fence and the Illinois River.

To date, 171 wells are being utilized to characterize the ground water at the site. Eight of these wells preexisted the FEI program and are currently a licensed portion of the environmental monitoring program. Of the 171 wells that are developed at the site, 154 have water and are routinely sampled. Two complete rounds of analytical work have been collected. These data will be presented in the July final environmental report.

In response to an NRC concern that additional constituents may be present in the ground water, metal and organic suites were run on several wells that showed elevated levels of uranium, fluoride, and nitrate. The wells that were chosen represented areas where worst-case situations were likely to exist. These analytical results indicated that arsenic was a constituent of concern.

In response to this, arsenic was added to the list of sampled constituents for all wells and utility trench monitoring locations. A laboratory detection limit of 0.005 milligram/liter (mg/l) for arsenic was utilized

for 154 wells and 25 utility trench monitors. The arsenic data indicated that 66 wells had results below the established detection limits, 57 wells had concentrations between 0.005 mg/l and 0.1 mg/l, 24 wells had concentrations between 0.1 mg/l to 1.0 mg/l, and 6 wells had concentrations above 1.0 mg/l. The maximum concentration was 5.6 mg/l and one well was unaccounted for in the compiled data.

The utility trench monitors indicated that 10 locations had arsenic concentrations less than the laboratory detection limit of 0.005 mg/l, 14 ranged from 0.005 mg/l to 0.1 mg/l and one exceeded 0.1 mg/l, with a maximum concentration of 0.36 mg/l.

The data indicate that site background for arsenic is less than the laboratory detection limit of 0.005 mg/l. Therefore, the hazardous constituent of arsenic is elevated at the site, primarily in the monitor wells. This is unlike the uranium contamination at the site where maximum concentrations are more likely to be observed in the utility trench monitoring locations. This situation is being evaluated further by SFC and their consultants to determine the source of the arsenic. One likely source of the arsenic could be as an impurity in the hydrofluoric acid, where it could be concentrated in the sludge as the acid is volatilized.

As part of the verification program at the SFC site, soil samples were taken by an NRC inspector on June 10, 1991. These samples were collected west of the plant from the restricted area boundary to the Illinois River. During the sampling event, SFC split the soil samples with the NRC for laboratory accuracy verification. SFC's results indicate that uranium concentrations are elevated near levels that were identified during a more complete 1986 study. The licensee's results indicate that uranium is moving with surface runoff from the site to points as distant as the Illinois River. Due to this, a complete characterization of the area will be performed.

NRC sent split samples to Oak Ridge National Laboratory (ORNL) for analyses. Upon completion of ORNL's laboratory analysis, NRC plans to compare the results with SFC's and transmit the results by correspondence.

During the week of June 24, NRC split numerous ground-water samples with SFC. These split samples will also be analyzed by ORNL and the results will be compared with SFC's. Based on SFC data, it appears that other metals are not ground-water constituents of concern; however, the split sampling that was performed will confirm the presence or absence of these metals in the groundwater. The samples were taken from newly installed wells, previously installed wells with appropriate completion details, waste streams, and waste impoundments. Laboratory results will likely take a matter of weeks before analyses are available. When available, the results will be appropriately documented. A complete list of the samples and their locations is given below.

Well Number/Well Diameter		Formation Sampled	Sample Location
North Ditch	--	surface water body	at pump
Emergency Basin	--	surface water body	at pump
MW-34T	2"	combination stream trench	lower combination stream
MW-33T	2"	combination stream trench	mid combination stream
MW-10	2"	shallow shale	E. of YC storage pond
MW-36	2"	shallow shale	E. of sewage lagoon
MW-36A	2"	deep sandstone	E. of sewage lagoon
MW-10A	2"	deep sandstone	E. of YC storage pad
MW-2326	4"	deep sandstone	SW corner of pond 2
MW-2302B	4"	deep sandstone	W. of emergency basin
Fluoride Clarifier decant		surface pipe	middle of employee parking lot
RW-3	4"	combination stream trench	NW of SX-building
Laundry room wash water		surface pipe	Adj. to men's change room
Manhole labeled roof drain		subsurface pipe	NW corner of main process bldg.

All of the wells that were visited were well maintained, appropriately capped, and labeled with the correct designation. It appears that well instaliation has been constructed in such a manner as to ensure the reliability of the sample results. The sampling protocol utilized dedicated bailers that were permanently hung with an inert rope. Well purging took place on the day prior to sampling, allowing adequate recovery to ensure that formation water was being sampled. On several occasions the inspector observed that the licensee's contractor allowed the bailer to penetrate the entire water column and sink to the bottom of the well where sediment was introduced into the sampling device. Sediment in the sampling device could bias the sampling results.

Several other wells were observed during the inspection, but not sampled. It was noted that three wells: RW-1, RW-2, and RW-3 were designated as monitor/recovery wells. However, only well RW-1 was recovering water. Well RW-1 was installed on November 14, 1990, developed and tested within days, and completed as a recovery well on January 14, 1991. Its yield to date has been 75-125 gallons per week.

Wells RW-2 and RW-3, although designated as recovery wells, have not been activated as such. These wells were installed on January 16, and March 5, 1991, respectively, and tested to determine their recovery abilities

shortly after these dates. Both wells are estimated to produce uranium contaminated waters in the 2-5 gallon per minute range. These wells represent good locations for water recovery, but SFC personnel stated the wells had not been completed due to other time demands. Utilization of these recovery wells would collect contaminated subsurface waters and minimize further spread of such waters.

7. Exit Interview

The inspectors conducted exit briefings with licensee personnel identified in Section 1 of this report. The inspectors summarized the scope and findings of the inspection.

The licensee indicated that the final FEI report was on schedule for a July delivery date and that completion of the recovery wells would proceed.