



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

March 29, 2012

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

SUBJECT: NRC INSPECTION REPORT 040-08027/12-001

Dear Mr. Ellis:

This refers to the inspection conducted on March 6-7, 2012, at your Sequoyah Fuels Corporation site located near Gore, Oklahoma. This inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel. The enclosed report presents the results of this inspection. No violations were identified, and no response to this letter is required.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact Mr. Robert Evans, Senior Health Physicist, at 817-200-1234 or the undersigned at 817-200-1191.

Sincerely,

/RA/

D. Blair Spitzberg, PhD, Chief
Repository and Spent Fuel Safety Branch

Docket: 040-08027
License: SUB-1010

Enclosure:
NRC Inspection Report 040-08027/12-001

cc w/Enclosure:

Alvin H. Gutterman
Morgan, Lewis, Bockius LLP
1111 Pennsylvania Avenue, NW
Washington, DC 20004

Rita Ware, RCRA Enforcement Branch
Compliance Assurance & Enforcement Division
U.S. EPA, Region VI
1445 Ross Avenue, Mail Stop 6EN-HX
Dallas, Texas 75202-2733

Ann-Charlotte Engstrom, Vice President,
General Counsel & Secretary
General Atomics
P.O. Box 85608
San Diego, California 92186-5608

William Andrews, Supervisory Hydrologist
U.S. Geological Survey
202 N.W. 66th Street
Oklahoma City, Oklahoma 73116

Clayton Eubanks
Environmental Protection Unit
Office of Attorney General
313 NE 21st Street
Oklahoma City, Oklahoma 73105

Jim Harris
U. S. Army Corps of Engineers
1645 South 101st East Avenue
Tulsa, Oklahoma 74128-4629

Sara Hill, Esq.
Assistant Attorney General
Cherokee Nation
Office of Attorney General
P.O. Box 948
Tahlequah, Oklahoma 74465

Mike Broderick, Administrator
Oklahoma Department of
Environmental Quality
Waste Management Division
Radiation Management Section
P.O. Box 1677
Oklahoma City, Oklahoma 73101-1677

Internal distribution w/Enclosure:

- R. Caniano, D:DNMS
- V. Campbell, DD:DNMS
- B. Spitzberg, C:DNMS/RSFS
- K. Kalman, FSME/DWMEP/DURLD
- Z. Cruz, FSME/DWMEP/DURLD
- G. Schlapper, RSFS
- L. Gersey, RSFS
- R. Evans, RSFS
- M. Herrera, Fee Coordinator, DRMA

Hard Copy:

- DNMS File Room
- DNMS Secretarial File

DRAFT: S:\DNMS\NMSB-B\RJE\SFC IR 2012-001.docx

FINAL: R:_DNMS\2012\SFC IR 2012-001.docx

ADAMS		<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> SUNSI Review Complete	Reviewer Initials: RJE	
		<input checked="" type="checkbox"/> Publicly Available		<input checked="" type="checkbox"/> Non-sensitive		
		<input type="checkbox"/> Non-publicly Available		<input type="checkbox"/> Sensitive		
DNMS:RSFS	C:RSFS					
RJEvans;dlf	DBSpitzberg					
/RA/	/RA/					
3/11/12	03/29/12					

OFFICIAL RECORD COPY

T=Telephone

E=E-mail

F=Fax

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket: 040-08027

License: SUB-1010

Report: 040-08027/12-001

Licensee: Sequoyah Fuels Corporation

Location: P.O. Box 610
Gore, Oklahoma

Dates: March 6-7, 2012

Inspector: Robert Evans, PE, CHP, Senior Health Physicist
Repository and Spent Fuel Safety Branch

Approved by: D. Blair Spitzberg, PhD, Chief
Repository and Spent Fuel Safety Branch

Attachment: Supplemental Inspection Information

Enclosure

EXECUTIVE SUMMARY

Sequoyah Fuels Corporation NRC Inspection Report 040-08027/12-001

This inspection was a routine, announced inspection of decommissioning activities being conducted at the Sequoyah Fuels Corporation site in Gore, Oklahoma. Overall, the licensee was conducting decommissioning activities in accordance with the NRC-approved reclamation plan.

Management Organization and Control

- At the time of the inspection, the licensee had sufficient staff to conduct decommissioning work and to ensure compliance with license requirements (Section 1.2.a).
- The licensee was conducting site reclamation in accordance with the general guidance provided in the reclamation plan (Section 1.2.b).
- The licensee was implementing its performance-based license conditions in accordance with license requirements (Section 1.2.c).
- The inspector reviewed and closed a previously cited violation related to the licensee's failure to maintain records of changes made to the reclamation plan pursuant to the performance-based license (Section 1.2.d).

Radiation Protection

- The licensee conducted its radiation protection program in accordance with the requirements of 10 CFR Part 20 and the license (Section 2.2).

Effluent Control and Environmental Protection

- The licensee implemented its effluent and environmental monitoring programs in accordance with license and regulatory requirements, and releases were less than regulatory limits. Elevated concentrations of radioactive material continued to be identified in selected groundwater monitoring wells. In response, the licensee continued to implement its groundwater corrective action program (Section 3.2).

Report Details

Summary of Plant Status

At the time of the inspection, the licensee was conducting site decommissioning in accordance with the NRC-approved reclamation plan. The licensee commenced with site decommissioning during April 2009. To decommission the site, the licensee plans to dismantle and remove systems and equipment, demolish structures, treat site sludges and sediments, remediate contaminated soils, and treat wastewater. Most of the residual waste material will be placed in an onsite disposal cell for permanent disposal. The disposal cell will be constructed in three phases. The disposal cell was originally designed for a capacity of 8.3 million cubic feet of waste material, although the cell can be modified to accommodate between 5-12 million cubic feet of material.

The Phase I area encompasses the northeastern portion of the cell and is approximately 11,400 square meters in size. The licensee began placing material into this portion of the cell during June 2010. At the time of this inspection, the Phase I area had been filled with waste material. The Phase II area encompasses the northwestern portion of the cell and is approximately 18,600 square meters in size. During the inspection, the licensee was placing wastes into this portion of the disposal cell, but this portion of the cell was almost full. Also, the licensee had installed a storm water berm around the Phase I and II areas using clean clay material. This berm will eventually become part of the first layer of the disposal cell cover.

Since the previous inspection, a contractor for the licensee demolished the DUF₄ (depleted uranium tetrafluoride) building, the evaporator structure, and the western portion of the main process plant. Prior to demolition, the licensee and its contractor removed and salvaged equipment from the DUF₄ building. The salvaged equipment included electrical switchgear and contaminated process equipment. The licensee plans to transfer this material to a different NRC licensee in the future. The salvaged equipment was being temporarily stored in the eastern end of the former main process plant.

Prior to demolition of the western portion of the main process building, the licensee recovered yellowcake material from the process systems. The licensee was storing this yellowcake material in drums in the eastern portion of the main process building pending transfer to an out-of-state facility. The licensee also recovered some DUF₄ material prior to demolition of the DUF₄ building. This material was also being stored in the main processing building pending offsite transfer.

During the inspection, the contractor was demolishing the concrete foundations for various site structures. In the near future, the licensee plans to construct the base for the Phase III portion of the disposal cell. As part of this activity, the licensee plans to dewater the sanitary lagoon and remove radioactive sediments from the bottom of the lagoon. The licensee plans to store some of the soils removed from the Phase III footprint temporarily in the Phase I and II portions of the disposal cell. As discussed later, the licensee is considering the use of crushed concrete as subgrade backfill in the Phase III footprint.

A different contractor was removing radioactive material from the floor of Pond 2. This activity was almost complete at the time of this inspection. The contractor was transferring the Pond 2 material for disposal in Phase II of the disposal cell. The licensee was conducting radiological surveys in Pond 2 as necessary to support decommissioning of the pond. Following completion of decommissioning, the licensee plans to conduct a final status survey of the pond floor to

ensure that reclamation activities were effective. After completion of the final status survey, and after the NRC has been given the opportunity to conduct a confirmatory survey, the licensee plans to partially backfill the pond to minimize water intrusion into the groundwater below the pond.

The licensee still possessed approximately 11,000 bags of raffinate sludge. Most of the raffinate sludge originated from the four onsite clarifier basins. The licensee recently dewatered and bagged sediments from the emergency basin and north ditch areas. In the near future, the licensee plans to remove, dewater, and bag additional sediments from the sanitary lagoon. The licensee continues to stage the bagged material on the former yellowcake storage pad for possible transfer to an out-of-state uranium mill for processing as alternate feed material. If the licensee is unable to transfer the material, the reclamation plan allows the licensee to dispose of the raffinate sludge and pond sediments in the onsite disposal cell. If the licensee subsequently ships the sludge and sediments to the out-of-state mill, the licensee estimates that it will take approximately 600-650 truck shipments to transfer all of the material to the mill.

Also during the inspection, the licensee was in the process of preparing the uranium hexafluoride cylinders for disposal. The licensee possessed slightly less than 800 cylinders. The licensee was cutting the cylinders into sections. At the time of the inspection, the licensee had sectioned between 150-200 cylinders, and approximately 700 cylinders still needed to be sectioned. The licensee was temporarily storing the sectioned cylinders within the restricted area. The cylinder endcaps will be disposed in the cell, because the endcaps have an internal ring that prevents the licensee from effectively decontaminating the endcaps. However, the licensee plans to decontaminate the shells of the cylinders for eventual free-release and recycling. The NRC plans to inspect the licensee's free-release surveys during a future inspection.

1 Management Organization and Controls (88005)

1.1 Inspection Scope

The inspector reviewed management organization and controls to ensure that the licensee was maintaining effective oversight of decommissioning activities.

1.2 Observations and Findings

a. Organizational Staffing

The organizational structure is provided in Section 11.1 and Figure 2-1 of the license application. At the time of the inspection, the primary plant staff consisted of five individuals: the president, environmental/health and safety manager, senior health and safety technician, decommissioning and decontamination project supervisor, and administrative assistant. The licensee also received part-time support from the director of regulatory affairs.

The licensee used contractors for quality assurance oversight, geotechnical support, cell construction, radiation safety support, and miscellaneous site maintenance activities as needed. Since the last inspection, the licensee created a new part-time position—quality control inspector. This individual provided direct visual oversight of cell construction activities. The inspector concluded that the licensee had sufficient staff to ensure compliance with license and regulatory requirements.

b. Observation of Construction Activities

The inspector conducted site tours to observe work in progress. At the time of the inspection, a contractor was demolishing the foundations of former site structures. A second contractor was conducting cleanup of Pond 2 and constructing Phase II of the disposal cell. The inspector observed that the licensee's contractors were conducting these reclamation activities in a safe and orderly manner. The licensee implemented radiation protection controls during reclamation work, including use of protective clothing and use of breathing zone air samplers.

The inspector compared the work in progress to the requirements of the reclamation plan. Section 3.4.2 and Attachment E, Appendix A, provide the anticipated material placement sequences. At the time of the inspection, the licensee had almost filled the Phase II portion of the disposal cell. The inspector noted that the licensee had cleared some of the material from the Phase III footprint, but most soils and foundation material remained in the Phase III area.

The inspector noted that the anticipated construction sequence assumed that the contaminated material from the Phase III footprint would be placed into Phase II of the disposal cell. The quantity of contaminated soils in the Phase III footprint area was originally estimated to be approximately 12,000 cubic yards, although the licensee suspected that the actual volume may be greater than the estimated volume.

Despite the reclamation plan recommendation, the licensee was unable to place the Phase III material into the Phase II portion of the cell because the Phase II portion was essentially full. Instead, the licensee plans to place a thin layer of calcium fluoride material on top of the Phase II material, and overfill the Phase II area with material from Phase III footprint. The calcium fluoride layer provides a visual dividing line between the two layers of contaminated soils. After construction of the Phase III base, the licensee will move the overfill from Phase II into Phase III for permanent disposal.

Because the licensee had already filled the Phase II area, the licensee will have to handle the contaminated soils removed from the Phase III area at least twice—once to move the material out of the Phase III footprint and a second time to move the material into Phase III of the disposal cell. This extra handling may result in some additional, yet minor, exposure of site workers to the contaminated soils.

The inspector discussed with the licensee the reasons why the Phase II portion of the cell was filled prior to excavation of the Phase III footprint soils. First, the licensee elected to reduce the size of the Phase I and II footprints due to the difficulty of remediating the areas in the southern portions of these two phases. This reduction in size resulted in less volume in the first two phases. Second, the quantity of material removed from Pond 2 was significantly more than the licensee anticipated. The reclamation plan assumed that the licensee would remove approximately 24,000 cubic yards of contaminated material from Pond 2. In reality, the licensee removed approximately 70,000-90,000 cubic yards of material from Pond 2. Third, the licensee added roughly 55,000 cubic yards of clean material to support cell construction and to prevent contamination of equipment. The reclamation plan did not discuss the use of clean soil in the construction of the disposal cell. As described below, the licensee subsequently approved the addition of clean material to the disposal cell through its performance-based license.

Although the reclamation plan allows the licensee to deviate from the anticipated construction sequence, the licensee stated that it would review the reclamation plan and update the construction sequence through its performance-based license. The NRC inspectors will continue to monitor disposal cell construction and associated occupational exposures during future inspections to ensure that worker exposures remain below regulatory limits.

c. Performance-Based License Review

In accordance with License Condition 54, the licensee is authorized to make certain changes to the license application, including the reclamation plan, under certain instances. The inspectors reviewed the licensee's implementation of its performance-based license, including design changes to the construction of the disposal cell.

The licensee had completed four technical reviews since the previous inspection that was conducted during November 2011. These four reviews involved changes to the reclamation plan. Some of these changes included observations made by the NRC inspectors during the previous inspection and documented in NRC Inspection Report 040-08027/11-002 dated January 31, 2012.

The licensee was considering its options for using crushed concrete as filler material in the Phase III footprint. This change to the reclamation plan will require a future review by the licensee's Plant Review Committee (PRC). Overall, the inspector noted that the licensee's PRC conducted these four technical reviews as stipulated by the license. The technical adequacy of these PRC reviews will be reviewed by the NRC during a future construction-related inspection.

d. (Closed) Violation 040-08027/1102-01: Failure of PRC to review design changes prior to implementation

During the previous inspection, the inspectors determined that the licensee had implemented various changes to the onsite disposal cell during May-November 2011, changes that deviated from the requirements specified in the reclamation plan. The licensee implemented these changes without maintaining records of the changes, including a written safety and environmental evaluation by the PRC. This failure was identified as a violation of License Condition 54.E. The NRC subsequently issued a Notice of Violation to the licensee by letter dated January 31, 2012.

The licensee responded to the Notice of Violation by letter dated February 29, 2012. The licensee committed to update the applicable implementing procedure, to review previous changes for compliance with the performance-based license, and to document project status meetings, meetings that sometimes would discuss possible changes to the reclamation plan and as-built design of the disposal cell.

During this inspection, the inspector confirmed that the licensee had implemented all corrective actions as specified in its letter. Further, the licensee held several PRC meetings since the previous inspection, indicating that the licensee was implementing its performance-based license condition.

1.3 Conclusions

At the time of the inspection, the licensee had sufficient staff to conduct decommissioning work and to ensure compliance with license requirements. The licensee was conducting site reclamation in accordance with the general guidance provided in the reclamation plan. The licensee was implementing its performance-based license conditions in accordance with license requirements. The inspector reviewed and closed a previously cited violation related to the licensee's failure to maintain records of changes made to the reclamation plan pursuant to the performance-based license.

2 Radiation Protection (83822)

2.1 Inspection Scope

The inspector examined the licensee's radiation protection program for compliance with license and 10 CFR Part 20 requirements.

2.2 Observations and Findings

The inspector reviewed the licensee's occupational exposure records for 2011. Exposure monitoring consisted of a combination of external monitoring, internal monitoring, and bioassays. The licensee monitored 36 individuals during 2011, and the highest dose was 0.280 rem (0.0028 sievert) with a regulatory limit of 5 rem (0.05 sievert).

To monitor for external exposures, thermoluminescent dosimeters were assigned to certain individuals based on work activities. During 2011, the licensee assigned dosimeters to nine contract workers who were conducting building demolition work. The licensee exchanged the dosimeters quarterly. The highest external exposure for 2011 was 0.047 rem (0.00047 sievert).

The licensee monitored internal exposures using breathing zone/lapel air samplers. The licensee measured the derived air concentration-hours to which individuals were exposed. The highest doses were associated with Pond 2 reclamation work due to the licensee's use of the thorium-230 effluent concentration limit. During 2011, the highest internal dose (and the highest total dose) was 0.280 rem (0.0028 sievert) total effective dose equivalent. The highest total organ dose equivalent was calculated to be 3.319 rem (0.03319 sievert), with a regulatory limit of 50 rem (0.5 sievert).

The bioassay requirements are specified in License Conditions 9.4, 42, and 43. The licensee collected routine bioassay samples from workers for analysis of uranium concentrations. One sample result collected during September 2011 exceeded the action level of 15 micrograms of uranium per liter of urine ($\mu\text{g/l}$). A contract employee supporting building demolition submitted a bioassay sample with a uranium concentration of 23.1 $\mu\text{g/l}$. Two supplemental samples were collected 7 and 14 days following the initial bioassay. These bioassay results were 2.72 and 1.04 $\mu\text{g/l}$, respectively. The licensee determined that the intake of uranium for this contract employee totaled 1.7 milligrams. This intake was below the limit of 10 milligrams of uranium in one week as specified in 10 CFR 20.1201(e).

The inspector briefly reviewed the licensee's respiratory protection program. This program is described in Section 2.2 of the reclamation plan. The reclamation plan requires the licensee to establish a program for medical evaluations, fit tests, selection and issue of respirators, inspections, cleaning, maintenance, storage, and training of workers. The inspector confirmed that the licensee had respirator medical clearance evaluations on file for site workers, as well as fit testing, training, and survey records. The NRC will review the implementation of the licensee's respiratory protection program in the field during a future inspection.

During the inspection, the licensee was sectioning the former uranium hexafluoride cylinders. According to information provided by the licensee, the work was being conducted under Hazardous Work Permit No. 11-33. The work permit required workers to wear coveralls, surgeons gloves (typically worn under other gloves such as leather), full face respirator with a particulate filter, and lapel air sampler. The licensee conducted contamination surveys during the job. For safety reasons, the licensee established protocols for securing the cylinder to prevent movement. The workers performing this work also submitted routine bioassay (urine) samples for uranium analysis at a weekly frequency. Recent monitoring sample results indicate that the licensee's health and safety controls have been effective with respect to worker exposure.

2.3 Conclusions

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

3 Effluent Control and Environmental Protection (88045)

3.1 Inspection Scope

The inspector reviewed the licensee's effluent, groundwater, and environmental monitoring programs to verify compliance with regulatory and license requirements.

3.2 Observations and Findings

a. Effluent Monitoring Program

The liquid effluent monitoring program is described in Section 5.1 of the license application. The licensee monitored two release points, the combined stream Outfall 001 and the storm water Outfall 008. As required by 10 CFR 40.65, the licensee reported the liquid effluent releases to the NRC in semiannual reports. The reports document that the effluents for 2011 were under 9 percent of the effluent concentration limits as specified in 10 CFR Part 20, Appendix B, Table 2.

The inspector reviewed the licensee's effluent monitoring program records. For Outfall 001, the licensee continuously collected water samples because the combination stream was continuously flowing. The licensee analyzed these samples monthly for uranium, nitrate, and fluoride concentrations. The licensee is also required to analyze the water samples on a quarterly basis for thorium-230 and radium-226 concentrations, although the licensee had been analyzing these samples monthly. The licensee collected samples from Outfall 008 only during rain events, and the licensee experienced 30 rain events during 2011.

The licensee's records indicate that one uranium sample result exceeded the action level at Outfall 001. With an action level of 225 µg/l, one sample measured 266 µg/l. Further, two samples collected from Outfall 008 also exceeded the uranium action level. These sample results were 325 and 309 µg/l. If any sample result exceeds the action level, the corrective actions include investigation and reporting to licensee management. According to the licensee, these elevated samples were attributed to surface water runoff from the yellowcake storage pad located within the restricted area. The licensee cleaned the pad and associated sump. Despite these individual exceedances, the average concentrations remained well below the effluent concentration limits during 2011.

In addition to sampling the effluents for radioactive constituents, the licensee also sampled the groundwater for chemical constituents in accordance with its State of Oklahoma discharge permit. Several times during 2011, the effluents exceeded the State limits for total suspended solids at Outfall 008. The licensee attributed these exceedances to surface water runoff from the areas where construction activities were in progress. In response, the licensee elected to re-route the storm water runoff from Outfall 008 to the storm water reservoir. The licensee installed a temporary earthen dam in front of Outfall 008 to force the surface runoff to flow by gravity to the reservoir. In the future, the licensee plans to pump the excess reservoir fluid back to Outfall 008 for release, after the total suspended solids have settled out, although the licensee had not pumped any fluid from the reservoir to Outfall 008 at the time of this inspection. The NRC will review the effectiveness of this new flow path during a future inspection.

b. Groundwater Monitoring Program

License Condition 49.A requires the licensee to implement a groundwater compliance monitoring program as described in the groundwater monitoring plan dated February 25, 2005. Table 4 of the groundwater monitoring plan provides the sampling and analyses schedule. The program consisted of 86 monitoring locations, including 6 background wells, 64 point-of-compliance wells, six intercept trenches (seeps and drain points), four surface water locations, and six corrective action monitoring points.

To support reclamation activities, the licensee permanently plugged and abandoned 13 wells between 2009-2012; therefore, the licensee no longer collected samples from these wells. Table 5 of the groundwater monitoring plan includes a monitoring well plugging and abandonment schedule. The schedule for the wells plugged since 2009 was specified in Table 5 as "maintain until reclamation." The licensee had to remove the wells prior to soil remediation or construction of the disposal cell. The licensee is not required to install replacement wells for these abandoned wells.

The inspector compared the monitoring results for 2011 with the groundwater protection standards as specified in License Condition 49.B. The primary chemical constituents analyzed included uranium, fluoride, nitrate, and arsenic. The results indicate that uranium continues to be above the maximum contaminant level (30 µg/l) in three of five groundwater units. The highest results were in the shallow groundwater located in the vicinity of the former solvent extraction building.

Trends are specific to each well. For example, the licensee noted that uranium concentrations in background Well MW70 appeared to be trending higher. Well MW70

is located in the northeastern corner of the site near the former DUF₄ building. The most recent sample result revealed a uranium concentration of 46 µg/l, with a maximum contaminant level of 30 µg/l. The licensee planned to obtain more sampling data before it can determine if this sample result was representative of a trend or an abnormal sample result. As noted in the Reclamation Plan, the groundwater was contaminated by previous spills and leaks that occurred during plant operations. Cleanup of the groundwater continues in accordance with a groundwater corrective action program.

The licensee continues to recover seepage and drainage using collection trenches, French drains, and recovery wells. Seepage and drainage were monitored at six locations in the western portion of the site. Also, the corrective action monitoring program consisted of four trench locations and two monitoring wells. These six monitoring stations were located down-gradient of the groundwater intercept trenches. Exceedances of the maximum contaminant level for uranium were identified in several samples, including one from the 005 drainage trench. Also, one sample collected from the MW010 collection trench indicated that the uranium concentration was higher than the historical trend. Finally, several samples collected from the seeps and drainages exceeded the uranium maximum contaminant level. The licensee continued to recover potentially contaminated groundwater from the trenches during 2011.

The surface water is sampled annually at four locations. The most recent samples were collected during September 2011. The samples were analyzed for uranium, radium-226, radium-228, arsenic, and nitrate concentrations. None of the surface water sample results exceeded the respective action levels.

License Condition 49.C requires the licensee to submit an annual groundwater report to the NRC. The most recent report was submitted to the NRC on March 1, 2012. The inspector reviewed the report during the inspection and concluded that the report was comprehensive.

c. Environmental Monitoring Program

The environmental monitoring program requirements are provided in license application Section 5.2. The licensee conducted air particulate, sediment, radon, and impoundment underdrain sampling. The inspector reviewed the results of the licensee's environmental monitoring samples collected during 2011. In summary, no sample obtained by the licensee exceeded the respective action level or effluent concentration limit.

The licensee maintained four perimeter air sampling stations that continuously sampled the ambient air. The licensee exchanged the filter media weekly and analyzed the samples for gross alpha concentrations. During 2011, all sample results were below the action level. The licensee noted that some sample results were above normal due to onsite reclamation activities. Apparently, the dust created by onsite construction work was causing some increase in gross alpha radioactivity at certain times, although the measured radioactivity remained below the action level. With an action level of 1.0 of the effluent concentration limit for uranium, the highest sample result, collected during October 2011, was 0.41 of the effluent concentration limit.

The licensee composited the environmental air sample filters quarterly and analyzed the samples for uranium, radium-226, and thorium-230 concentrations. During 2011, the

sample results were less than one percent of the respective effluent concentration limits provided in Appendix B to 10 CFR Part 20.

Although radon sampling was not required by the license, the licensee elected to collect quarterly radon samples at eight locations. Radon samples were collected at five fence line locations, the main gate, inside the raffinate bagging (laundry) building, and the yellowcake storage pad. The highest sample result was 5 picocuries per liter, collected during the second quarter of 2011. This sample was obtained at the yellowcake storage pad, the location where bagged raffinate sludge was being stored. The radon sample results for 2011 remained below the effluent concentration limit of 30 picocuries per liter.

The licensee collected three sediment samples during September 2011 from the local rivers. The samples were analyzed for uranium, radium-226, and thorium-230 concentrations. The results of these samples were comparable to background levels.

Finally, the licensee collected samples of the lined impoundment underdrains. The licensee collected these samples monthly from five impoundments that were still in service. The samples were analyzed for uranium and nitrate concentrations. The licensee is aware that some of the impoundments have leaked in the past but, overall, the concentrations were down because the raffinate sludge has been removed from the ponds and because the liners of the ponds have been repaired in the past. As part of site decommissioning, the licensee plans to permanently close the leaking clarifier ponds in the next few years.

3.3 Conclusions

The licensee implemented its effluent and environmental monitoring programs in accordance with license and regulatory requirements, and releases were less than regulatory limits. Elevated concentrations of radioactive material continued to be identified in selected groundwater monitoring wells. In response, the licensee continued to implement its groundwater corrective action program.

4 **Exit Meeting**

The inspector reviewed the scope and findings of the inspection during an exit meeting that was conducted at the conclusion of the onsite inspection on March 7, 2012. During the inspection, the licensee did not identify any information reviewed by the inspector as proprietary.

Supplemental Inspection Information

PARTIAL LIST OF PERSONS CONTACTED

John Ellis, President
Scott Munson, Environmental Manager
Billy Reid, Quality Assurance Manager

INSPECTION PROCEDURES USED

IP 83822	Radiation Protection
IP 88005	Management Organization and Controls
IP 88045	Effluent Control and Environmental Protection

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

040-08027/1102-01 VIO Failure of PRC to review changes prior to implementation

Discussed

None

LIST OF ACRONYMS

CFR	<i>Code of Federal Regulations</i>
DUF ₄	depleted uranium tetrafluoride
IP	NRC Inspection Procedure
µg/l	micrograms of uranium per liter of urine
PRC	Plant Review Committee
VIO	NRC Notice of Violation