UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
612 EAST LAMAR BLVD, SUITE 400
ARLINGTON, TEXAS 76011-4125

March 6, 2009

E. Jonathan Jackson, President
FMRI (a subsidiary of reorganized Fansteel)
Number 10 Tantalum Place
Muskogee, Oklahoma 74403

SUBJECT: NRC INSPECTION REPORT 040-07580/2009-001

Dear Mr. Jackson:

This refers to the inspection conducted on February 2-4, 2009, at the FMRI facility located at Muskogee, 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 scope and results of the inspection. In summary, the inspectors determined that you were conducting decommissioning activities in accordance with license and regulatory requirements.

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 document system (ADAMS), accessible from the NRC's 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 at (817) 860-8234 or the undersigned at (817) 860-8197.

Sincerely,

/RA/

Jack E. Whitten, Chief
Nuclear Materials Safety Branch B

Docket: 040-07580
License: SMB-911

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NRC Inspection Report 040-07580/09-001

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SUNSI Review Complete: RJE ADAMS: ■Yes □No Initials: RJE
■Publicly Available □Non-Publicly Available □Sensitive ■Non-Sensitive

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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket:	040-07580
License:	SMB-911
Report:	2009-001
Licensee:	FMRI (a subsidiary of reorganized Fansteel)
Facility:	Muskogee Plant
Location:	Muskogee, Oklahoma
Date:	February 2-4, 2009
Inspectors:	Robert Evans, PE, CHP, Senior Health Physicist Nuclear Materials Safety Branch B
	Linda M. Gersey, Health Physicist Nuclear Materials Safety Branch B
Accompanied By:	Jack E. Whitten, Chief Nuclear Materials Safety Branch B
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Approved by:	Jack E. Whitten, Chief Nuclear Materials Safety Branch B
Attachments:	Groundwater Sample Results Supplemental Inspection Information

ENCLOSURE

EXECUTIVE SUMMARY

FMRI (a subsidiary of reorganized Fansteel)
NRC Inspection Report 040-07580/2009-001

This inspection was a routine, announced inspection of decommissioning activities in progress at the FMRI facility in Muskogee, Oklahoma. In summary, the licensee was conducting decommissioning in compliance with regulatory and license requirements.

Decommissioning Inspection Procedure; Management Organization and Controls

- The licensee and its contracted workforce were conducting decommissioning activities in accordance with license and regulatory requirements (Section 1).

Radiation Protection

- The licensee implemented a radiation protection program that was in compliance with 10 CFR Part 20 and the license (Section 2).

Environmental Protection

- The licensee continued to conduct environmental monitoring in accordance with license requirements. Monitor Well MW-74 sample results continued to exceed the reportability limit, and the licensee continued to report these exceedances to the NRC (Section 3).

Low-Level Radioactive Waste Storage, Radioactive Waste Management, and Onsite Construction

- The licensee was staging radioactive material for shipment in accordance with the requirements of the license (Section 4).

Transportation Activities

- The licensee was conducting transportation operations in accordance with U.S. Department of Transportation requirements (Section 5).

REPORTS DETAILS

Summary of Site Status

At the time of the inspection, the licensee was conducting Phase 1 decommissioning in accordance with the NRC-approved Decommissioning Plan (DP) dated January 14, 2003. Phase 1 consists of removal of work-in-progress (WIP) residue material from Ponds 2 and 3 and transfer of the material to an out-of-state uranium mill for use as alternate feed material.

The licensee originally estimated that Ponds 2 and 3 contained about 18,800 tons of WIP material. At the time of the inspection, the licensee had excavated and shipped about 13,200 tons of WIP material from Pond 3. The licensee estimated that approximately 363 tons of excavated Pond 3 WIP material was staged for shipment. In addition, about 200 tons of WIP material was staged in the drying bed, and about 100 tons of material remained in Pond 3. A contractor was used on an as needed basis to excavate, dry, bag, and load the WIP material into intermodal containers for shipment to an out-of-state uranium mill. The licensee has started reshaping Pond 3 as part of the pond restoration process. The licensee plans to begin removal of WIP material from Pond 2 at a later date.

To support Phase 1 decommissioning activities, the licensee constructed two WIP material drying beds and three staging areas. Since the previous inspection, the licensee discontinued the use of one drying bed and two staging areas. Staging Area 3 was still available for use, although the licensee was not storing WIP material in this area during the inspection.

1 Decommissioning Inspection Procedure; Management Organization and Controls (87104, 88005)

1.1 Inspection Scope

The objective of this portion of the inspection was to determine whether the licensee and its contracted workforce were conducting decommissioning activities in accordance with license and regulatory requirements.

1.2 Observations and Findings

Staffing requirements are provided in Section 2.0 of Part B to the license application. Site staffing included the plant operations manager, radiation safety officer, radiation protection technician, maintenance worker, and security staff. Since the last inspection, the president had conducted routine visits to the site. The licensee has routinely used contractors as needed for reclamation and site maintenance work. The inspectors concluded that the licensee had sufficient staff to ensure compliance with license, satisfy regulatory requirements, and ensure security of licensed materials.

Site tours were conducted to observe activities in progress. These activities were compared to license conditions and to commitments made in the NRC-approved DP. The inspectors observed field activities such as the storage of bagged wastes and the onsite processing of collected water. Inspectors determined that site operations were being conducted in accordance with licensee requirements. Adequate security and control were being maintained over the licensed material in accordance with 10 CFR 20.1801 requirements.

The inspectors performed independent radiological measurements during the site tours using a Ludlum Model 19 survey meter (NRC tag 015540, calibration due 02/14/2009). The average background measurement was 0.01 milliroentgens per hour (mR/hr). The edge of Pond 3 was approximately 0.055 mR/hr, the WIP material staging area (behind the Chem C building) was approximately 0.90 mR/hr, and the edge of Pond 2 ranged from 0.17-0.18 mR/hr. The inspectors noted that the ambient gamma radiation level adjacent to Pond 3 was significantly lower than the previous inspection, a result of the licensee's removal of the majority of the WIP material from the pond.

License Conditions 10 and 14 specify the requirements for the Radiation Safety Committee. The inspectors reviewed the minutes for the 2008 Radiation Safety Committee meetings and discussed the results of the meetings with the licensee's staff. One function of the committee is to identify negative trends and to review proposed changes to the radiation protection program. One negative trend identified by the committee involved the contamination of the floor at an entry point into the radiologically restricted area in the Chem C building. Corrective actions taken by the licensee included cleaning the floor. A second trend involved the identification of a high number of incoming intermodal containers that were contaminated. The licensee's staff worked with an offsite vendor to resolve this problem.

The licensee issued 19 conditions reports since the last inspection to document radiological or safety problems. The inspectors reviewed the condition reports and found that all reports included corrective actions taken by the licensee to prevent recurrence. The inspectors determined that the use of condition reports was an effective mechanism for documenting and resolving issues that may have an impact on safety.

1.3 Conclusions

The licensee and its contracted workforce were conducting decommissioning activities in accordance with license and regulatory requirements.

2 Radiation Protection (83822)

2.1 Inspection Scope

The inspectors reviewed the licensee's implementation of its radiation protection program to ensure compliance with 10 CFR Part 20 and the license.

2.2 Observations and Findings

a. Occupational Exposures

Occupational radiation exposure monitoring requirements are specified in Section 3 of Part B to the license and Section 10 of the DP. To monitor for external radiation, the licensee previously assigned thermoluminescent dosimeters to site workers. As allowed by the provisions of 10 CFR 20.1502, the licensee, after a thorough evaluation, suspended external personnel monitoring based on historical results. The licensee continued to monitor ambient gamma exposure rates to ensure that external radiation levels remained low in designated work areas.

The licensee continued to monitor internal exposures based on the results obtained from portable lapel air samples. During 2008, 11 individuals were monitored, and six individuals were assigned an occupational dose. The highest total effective dose equivalent was 0.461 rems with a regulatory limit of 5 rems per year. The inspectors noted that the individual with the highest dose was a contractor who was responsible for bagging WIP material.

In previous years, the licensee conducted routine air sampling at three locations in the Chem A and Chem C buildings. Although this sampling was not required by the license, the licensee routinely used these sample results for trending purposes. During March 2008, the licensee elected to discontinue area air sampling in the two buildings. The Radiation Safety Committee reviewed and approved this change. The inspectors reviewed the licensee's area air sample results collected during January-March 2008. These sample results did not exceed the licensee's administrative action level during this time frame.

b. Radon Monitoring

Radon monitoring requirements are provided in Section 3.5.4 of Part B to the license. The licensee conducted radon monitoring in areas where source material was handled and stored. During 2008, the licensee monitored radon in five onsite locations—Chem A building laboratory, Chem C building, the "white house" building that housed the contractors' break room and change area, the WIP staging area, and the WIP drying bed. Radon samples collected by the licensee were analyzed quarterly by an outside vendor.

During the third quarter of 2008, the radon concentration in the Chem C building was found to be 38.2 picocuries per liter (pCi/L), a value that exceeded the 30 pCi/L action level. A condition report was generated by the licensee to determine the cause of the exceedance, and the licensee elected to begin monthly radon monitoring until the radon concentration was confirmed to be below the action limit.

When questioned by the inspectors, the licensee indicated that the cause of the exceedance had not clearly been identified. However, the licensee's staff believed that the high radon concentrations were attributed to the storage of WIP material on three sides of the Chem C building. The radon sample for the Pond 3 drying bed also exceeded the action level during the third quarter of 2008. This elevated radon level from Pond 3 outside of the Chem C building may have contributed to the high radon concentration measured inside the building.

Monthly sampling was conducted in the Chem C building during the fourth quarter of 2008. The sample results obtained by the licensee ranged from 1.9-2.9 pCi/L, indicating that the radon concentration had dropped significantly from the previous quarter. Radon levels may have dropped in the Chem C building as a result of the shipment of staged WIP material from the site having occurred.

c. Contamination Control

Contamination control techniques used by the licensee include radiation surveys of plant areas, equipment, trash, and laundry. The contamination control requirements are provided in Section 3.5 of Part B to the license and License Condition 33. Area surveys

included weekly surface surveys and biweekly swipe surveys for alpha contamination. The licensee conducted routine surveys of plant trash to ensure that material did not leave the site with contamination greater than the action level. In addition, radiation surveys were conducted on uniforms to verify the clothing was not contaminated prior to release for offsite cleaning.

Equipment was surveyed by the licensee prior to being released from the restricted area. The licensee maintained records for equipment released during the inspection interval. The equipment released from the site since January 2008 included scrap wire, a tank, two pumps, and excavation equipment used by the contractor. The inspectors randomly reviewed the equipment release records, and based on these records, the inspectors concluded that no equipment had been released with contamination greater than the action level.

d. Training

The training requirements are provided in Section 3.3 of Part B to the license. Annual general employee training was provided to site workers during 2008. This training included both hazardous material and radiation safety training. Respirator fit testing was conducted during July 2008. Hazardous material transportation training was provided during July 2007. This training was conducted by the licensee to meet U.S. Department of Transportation (DOT) requirements and remains valid for 3 years.

2.3 Conclusions

The licensee implemented a radiation protection program that was in compliance with 10 CFR Part 20 and the license.

3 Environmental Protection (88045)

3.1 Inspection Scope

The inspectors reviewed the licensee's environmental monitoring program for compliance with regulatory and license requirements.

3.2 Observations and Findings

a. Liquid Effluents

The licensee uses four outfalls for discharge of waters from the site. Liquid effluents originating from the plant wastewater treatment system were discharged from Pond 6 to the Arkansas River through Outfall 001. Three other outfalls were used for the discharge of stormwater runoff.

Liquids were released through Outfall 001 in batch modes. Water samples were collected during each batch release. Several samples collected during 2008 contained slightly elevated gross alpha and beta radioactivity concentrations. The licensee reported the water sample results to the State of Oklahoma in accordance with its National Pollutant Discharge Elimination System permit requirements.

b. Environmental Air Sampling

The licensee sampled airborne alpha radioactivity at six locations. The sample stations included four perimeter stations, one background station, and one offsite station. Airborne particulates were continuously collected and analyzed weekly. The air sample filters obtained by the licensee were analyzed for gross alpha activities. Based on the licensee's 2008-2009 records, none of the sample results obtained by the licensee exceeded the administrative action level.

The inspectors conducted an in-depth review of the licensee's protocol for measuring and calculating air sample results. The inspectors verified that the licensee was correctly measuring the radioactivity on the filters and was correctly calculating the effluent concentrations based on air sampler flow rates. The inspectors verified that the measuring equipment was included in the licensee's instrument calibration program.

c. Groundwater Monitoring

The licensee sampled 19 monitoring wells and 4 sumps on a quarterly frequency. The inspectors reviewed the sample results for 2008, with the exception of the fourth quarter sample results which were not available during the inspection. The results indicate that samples collected from one monitoring well exceeded the reporting requirements.

Water samples collected from Monitoring Well MW-74 have exceeded the uranium concentration reporting level since March 2006. This well is located down-gradient of Pond 3 but up-gradient of the intercept trench that runs parallel to the Arkansas River. The results for samples collected from MW-74 since March 2006 are provided in Attachment 1 to this inspection report. The sample results may suggest that the uranium concentrations in the groundwater have stabilized, and no upward trend is apparent. In addition, the inspectors confirmed that the licensee had continued to report the sample results for MW-74 to the NRC as stipulated by the license.

The licensee previously concluded that subsurface contaminant disturbance caused by the reclamation of Pond 3 was the most likely reason for the elevated uranium concentrations in Monitoring Well MW-74. Phase I decommissioning commenced in June 2005, and a negative trend was first identified in MW-74 samples during September 2005. The reclamation of Pond 3 is scheduled to be completed during 2009. The licensee indicated that uranium concentrations in samples collected from MW-74 are expected to trend downward after reclamation of Pond 3 has been completed.

3.3 Conclusions

The licensee continued to conduct environmental monitoring in accordance with license requirements. Monitor Well MW-74 sample results continued to exceed the reportability limit, and the licensee continued to report these exceedances to the NRC.

4 Low-Level Radioactive Waste Storage, Radioactive Waste Management, and Onsite Construction (84900, 88035, 88001)

4.1 Inspection Scope

The inspectors conducted a review of onsite handling and storage of radioactive wastes to ensure compliance with license requirements.

4.2 Observations and Findings

The requirements for the temporary storage of licensed materials are provided in License Condition 25. The inspectors conducted a review of the licensee's onsite radioactive waste staging operations. At the time of the inspection, about 363 tons of material was staged for shipment, while about 200 tons of material was temporarily stored in the drying bed. The staged material was packaged within approximately 220 2-ton supersacks. The licensee stated that the material stored in the drying bed will eventually be bagged after the material has sufficiently dried. Staged material collected by the licensee was destined for use as alternate feed material at a Utah uranium mill.

The inspectors observed the staged material during site tours. The staged material was being stored on a concrete pad located adjacent to the Chem C building. The material was covered with thick plastic covering to protect the bags from sun and rain. The inspectors determined that the thickness of plastic sheeting (cover material) was in agreement with license requirements. The inspectors observed that the amount of staged material was significantly less than the material staged during the previous inspection. Staging Area 3A was still available for use by the licensee but, at the time of the inspection, the staging area was empty. The licensee indicated that they had shipped the WIP material that was previously staged in Staging Area 3A to Utah to a uranium mill as alternate feed material. In the near future, the licensee plans to continue removing and bagging the residual WIP material from Pond 3. The licensee also was in the process of shaping the walls and the bottom of Pond 3 as part of the restoration process.

4.3 Conclusions

The licensee was staging radioactive material for shipment in accordance with the requirements of the license.

5 Inspection of Transportation Activities (86740)

5.1 Inspection Scope

The inspectors reviewed the licensee's program for packaging, shipping, and transporting radioactive material.

5.2 Observations and Findings

During the inspection, there were no loaded intermodals onsite. The last shipment which occurred prior to the inspection was completed by the licensee on January 7, 2009. Therefore, the inspectors were unable to observe the licensee's protocols for shipping intermodals. The inspectors reviewed the licensee's shipping papers for recent

shipments, and the papers were found to be complete and in agreement with DOT requirements.

Based on the licensee's records, approximately 3886 tons of WIP material was shipped during 2008. During the first week of 2009, the licensee shipped an estimated 434 tons of WIP material. Since 2006, when shipment operations began, the licensee estimated that it has shipped 13,204 tons of WIP material in 672 individual shipments.

During a previous inspection, the NRC staff noted that the shipping papers appeared to underestimate the amount of radioactivity in the shipments. The inspectors concluded that the licensee was using uranium-238 and thorium-232 as surrogate radionuclides in lieu of natural uranium and natural thorium, respectively. This surrogate pair used by the licensee resulted in the underestimation of the radioactivity in manifested shipments. During this inspection, the inspectors reviewed the licensee's procedure for estimating natural uranium and natural thorium concentrations. The licensee elected to begin using the results of WIP samples collected from Pond 3. This change allowed the total radioactivity included on manifests to be based on actual pond sample results. The inspectors reviewed the licensee's methodology and found it to be acceptable.

5.3 Conclusions

The licensee was conducting transportation operations in accordance with DOT requirements.

6 Exit Meeting

The inspectors reviewed the scope and findings of the inspection during an exit meeting conducted at the conclusion of the onsite inspection on February 4, 2009. The licensee did not identify as proprietary any information provided to, or reviewed, by the inspectors.

GROUNDWATER SAMPLE RESULTS

MONITORING WELL MW-74 SAMPLE RESULTS
(units of pCi/L)

Sample Date	Uranium-238	Uranium-235	Uranium-234	Reporting Level
March 15, 2006	5460	Not Detected	4740	3000
June 28, 2006	9040	Not Detected	8620	3000
July 14, 2006	3800	Not Detected	3360	3000
July 28, 2006	4100	Not Detected	4180	3000
August 10, 2006	8240	Not Detected	7890	3000
August 24, 2006	6080	Not Detected	5240	3000
September 20, 2006	11,300	Not Detected	10,300	3000
October 25, 2006	4610	83	4280	3000
November 15, 2006	9110	121	8320	3000
December 14, 2006	9660	24	8680	3000
March 23, 2007	8320	39	7160	3000
June 13, 2007	9070	299	8180	3000
September 12, 2007	6480	142	6280	3000
December 19, 2007	6740	69.8	6550	3000
March 26, 2008*	1050	75.4	1050	3000
June 11, 2008	7840	157	7450	3000
September 24, 2008	9810	1220	9200	3000

*Sample results did not exceed reporting limit and were not reported to the NRC

SUPPLEMENTAL INSPECTION INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

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Oklahoma Department of Environmental Quality

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INSPECTION PROCEDURES USED

IP 83822	Radiation Protection
IP 88045	Environmental Protection
IP 84900	Low-Level Radioactive Waste Storage
IP 88035	Radioactive Waste Management
IP 88001	Onsite Construction
IP 87104	Decommissioning Inspection Procedure for Materials Licensees
IP 88005	Management Organization and Controls
IP 86740	Inspection of Transportation Activities

ITEMS OPENED, CLOSED, AND DISCUSSED

Open

None

Closed

None

Discussed

None

LIST OF ACRONYMS AND ABBREVIATIONS USED

CFR	Code of Federal Regulations
DOT	U.S. Department of Transportation
DP	Decommissioning Plan
IP	Inspection Procedure
mR/hr	milliroentgens per hour
pCi/L	picocuries per liter
WIP	Work-in-Progress