FKC4
I-51000040

STEVEN A. THOMPSON
Executive Director

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

BRAD HENRY
Governor

July 2, 2008

Jon Jackson, President
FMRI, Inc.
#10 Tantalum Place
Muskogee, Oklahoma 74403

Re: Liner Variance Request - Pond Nos. 6 and 7
FMRI, Inc.
OPDES Permit No. OK0001643
Facility ID: I-51000040

Dear Mr. Jackson:

OPDES Permit No. OK0001643 contains a compliance schedule requiring the installation of impoundment liners which are more protective than the native clay soil liners present in Pond Nos. 6 and 7. Pond Nos. 6 and 7 are identified in the current OPDES permit as F01 and F02, respectively. This compliance schedule required the installation of the new liners by December 12, 2005. To date, this work has not been completed.

On November 26, 2007 and also on February 7, 2007, the Department of Environmental Quality (DEQ) received written requests seeking a variance to the liner requirements identified in the compliance schedule of OPDES Permit No. OK0001643. Specifically, the facility requested that the clay soil liners present in Pond Nos. 6 and 7 be approved for use with a Class I wastewater.

Consideration of the liner variance request must be based on a determination of whether or not a less protective liner will result in an increased risk to waters of the state. In particular, this determination must be based on the wastewater risk and the probability of discharge to groundwater from Pond Nos. 6 and 7.

1. Wastewater Risk

The wastewater contained in Pond Nos. 6 and 7 is determined to be a Class I wastewater. As specified in OAC 252:616-1-2, Class I is defined as "containing or suspected to contain pollutants for which the toxicity, concentration and volume pose a significant risk of harm to humans, aquatic life, wildlife or the environment, either through high potential to migrate in groundwater or the likelihood, if discharged, to significantly degrade the beneficial uses of the receiving water as designated in the Oklahoma Water Quality Standards. These wastewaters require the most restrictive environmental protection measures."

Since the wastewater in Pond Nos. 6 and 7 is determined to be Class I, the most restrictive environmental protection measures must be implemented. Liners more protective than clay liners must be installed in Pond Nos. 6 and 7.

2. Probability of Discharge from Pond Nos. 6 and 7

In accordance with OAC 252:616-7-3(a), clay liners, of native or imported clay soils compacted in lifts, are moderately protective liners appropriate for compatible Class II, III, and V wastewaters. In addition, OAC 252:616-7-3(c)(1) requires the clay soil liners to have a maximum saturated hydraulic conductivity of 1×10^{-7} cm/sec.

Review of the fact sheet shows that the liners in Pond Nos. 6 and 7 are comprised of clay soil having hydraulic conductivities of 1×10^{-6} cm/sec. This result shows that the clay soil liners in Pond Nos. 6 and 7 are not acceptable for an impounded Class I wastewater. Furthermore, the liner hydraulic conductivities are not acceptable for a Class II wastewater.

b-1

As a result, the less protective liners in Pond Nos. 6 and 7 increase the probability of a discharge to groundwater of a Class I wastewater.

In conclusion, based on the high probability of discharge of a Class I wastewater from Pond Nos. 6 and 7, the DEQ will not approve the use of clay soil liners. The liner variance request is denied.

3. Action Required for Regulatory Compliance

The DEQ shall require the permittee to choose one (1) of the following three (3) compliance options:

a. Closure of Pond Nos. 6 and 7

The following schedule shall be met if the permittee decides to close Pond Nos. 6 and 7.

- The permittee shall have until November 1, 2008 to submit a closure plan for Pond Nos. 6 and 7.
- The permittee shall have until May 1, 2010 to complete the closure of Pond Nos. 6 and 7

Closure activities require the design, seal, and signature of an engineer registered to practice in the State of Oklahoma.

b. Modification of Impoundment Liners – Pond Nos. 6 and 7

The following schedule shall be met if the permittee decides to modify the surface impoundment liners.

- The permittee shall have until November 1, 2008 to submit a plan for modifying the liners in Pond Nos. 6 and 7.
- The permittee shall have until May 1, 2010 to complete the liner modifications of Pond Nos. 6 and 7.

Modification of the impoundment liners requires the design, seal, and signature of an engineer registered to practice in the State of Oklahoma.

c. Installation of Groundwater Monitoring Wells East of the Interceptor Trench

Contaminated groundwater is prevented from being discharged to the Arkansas River via the following methods: 1) interceptor trench for containment/capture of contaminated shallow groundwater; and 2) an 11.3 to 27.7 feet layer of dry shale[1] beneath the facility for protection of deep groundwater. Failure and/or reduced performance of either of these methods can lead to contaminated groundwater being passed east of the interceptor trench and possibly discharged to the Arkansas River.

(1) Interceptor Trench

Results of the pre-closure sampling and analysis report for Pond Nos. 6 and 7 showed significant shallow groundwater contamination west of the interceptor trench. This contamination increases from west to east across the facility towards the Arkansas River. Furthermore, no chemical specific data was determined for shallow groundwater east of the interceptor trench. As a result, no direct comparison of groundwater data east and west of the interceptor trench can be made. Consequently, the effectiveness of the interceptor trench in capturing contaminated shallow groundwater is unknown.

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[1] June 21, 1994 correspondence from Mr. John J. Hunter, Corporate Manager, Process Engineering and Facility Construction, Fansteel Metals to Mr. Dominick Orlando, Project Manager, Low Level Waste and Decommissioning Project Branch, U.S. Nuclear Regulatory Commission.

(2) Bedrock Underlying the Facility

On April 14, 1995 the DEQ granted approval to close the four (4) deep groundwater monitoring wells at the facility. This approval was based on deep well groundwater monitoring test results, which showed results below drinking water Maximum Contaminant Levels (MCLs). Deep well closures were completed on August 24, 1995.

Since closure, approximately 13 years ago, the following factors have occurred, which may lead to contamination of the deep aquifer:

- Storage of bagged Work in Progress (WIP) in Pond No. 3;
- Subsurface contaminant disturbance caused by reclamation of Pond No. 3[2], resulting in elevated uranium concentrations in MW-74.

Since no deep groundwater monitoring wells are available, no determination can be made on whether or not the deep aquifer is contaminated.

Justification for installation of deep groundwater monitoring wells is shown in the October 14, 1994 correspondence from Mr. John J. Hunter, Corporate Manager, Process Engineering and Facilities Construction to Mr. Amar Datta, U.S. Nuclear Regulatory Commission, Licensing Section 2, Licensing Branch, Division of Fuel Cycle Safety & Safeguards, NMSS which stated "it is also recognized by Fansteel that deep well analysis may be required in future site investigations necessary for plant closure after processing is concluded. Nothing discussed herein precludes the installation of deep wells at that time." In addition, the April 14, 1995 from Mr. Steve Thompson, Assistant Executive Director, Oklahoma Department of Environmental Quality to Mr. John J. Hunter, Fansteel, Inc., also stated "it should be understood that this approval does not relieve Fansteel from the responsibility for future assessment, monitoring, and remediation of RCRA constituent contamination in soil and groundwater at the site. Future monitoring of the deep aquifer may be required, consistent with the closure plan for the surface impoundments, or other activities associated with general closure and/or remediation of the site."

In conclusion, based on significant groundwater contamination which increases from west to east across the facility, i.e., towards the Arkansas River and the lack of chemical specific data to demonstrate capture and/or containment of the contaminated groundwater, the DEQ shall require the installation of groundwater monitoring wells east of the interceptor trench in both the shallow and deep aquifer.

The following schedule shall be met if the permittee decides to install groundwater monitoring wells east of the interceptor trench.

- The permittee shall have till November 1, 2008 to submit a detailed groundwater monitoring plan.
- The groundwater monitoring plan shall include a minimum of six (6) groundwater monitoring wells: three (3) shallow groundwater monitoring wells and three (3) deep groundwater monitoring wells.
- Groundwater monitoring wells shall be installed east of the interceptor trench and opposite the following locations: 1) Pond No. 3, 2) Chem A Building, and 3) Pond Nos. 6, 7, 8, and 9.
- The monitoring plan shall include the following items:

  (1) Location of all wells, boreholes, sumps, and clean-outs on a map including the rationale used to determine the locations.

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[2] April 16, 2008 correspondence from Mr. Jack E. Whitten, Chief, Nuclear Materials Safety Branch B, United States Nuclear Regulatory Commission to Mr. E. Jonathan Jackson, President, FMRI.

(2) Description of the depth and direction of groundwater flow.
(3) Groundwater shall be monitored for the parameters shown in Table 1 below;

Table 1
Groundwater Monitoring Parameters

Monitoring Location	Monitoring Point	Ammonia (as N)	Arsenic, total	Cadmium, total	Chromium, total	Fluoride, total	Lead, total	Total Dissolved Solids	pH	Volatile Organic Compounds[1]
Sumps	Depth to groundwater at which pump starts in sump	X	X	X	X	X	X	X	X	X
Clean-outs	Depth to groundwater from measuring point (e.g., top of casing)	X	X	X	X	X	X	X	X	X
Monitoring Wells[2]	Depth to water from measuring point (e.g., top of casing)	X	X	X	X	X	X	X	X	X

[1] Test method 8260.
[2] Shallow and deep groundwater monitoring wells which are located east of the interceptor trench.

(4) Groundwater parameters shall be determined in accordance with analytical methods shown in Table 2 on the following page;

Table 2
Groundwater Monitoring Parameters – Detection Limits and Analytical Methods

Parameter	Required MQL (µg/L)	EPA Method
Ammonic nitrogen (as N)	40 CFR 136	
Arsenic, total	10	206.2
Cadmium, total	1	213.2
Chromium, total	10	200.7
Fluoride, total	40 CFR 136	
Lead, total	5	239.2
Total Dissolved Solids	40 CFR 136	
Volatile Organic Compounds	40 CFR 136	
Acrolein	50	8260
Acrylonitrile	50	8260
Benzene	10	8260
Bromoform	10	8260
Carbon Tetrachloride	10	8260
Chlorobenzene	10	8260
Chlorodibromomethane	10	8260
Chloroethane	50	8260
2-Chloroethyl vinyl ether	10	8260
Chloroform	10	8260
Dichlorobromomethane	10	8260
1,1-Dichloroethane	10	8260
1,2-Dichloroethane	10	8260
1,1-Dichloroethylene	10	8260
1,2-Dichloropropane	10	8260
1,3-Dichloropropylene	10	8260
Ethylbenzene	10	8260
Methyl Bromide	50	8260
Methyl Chloride	50	8260
Methylene Chloride	20	8260
1,1,2,2-Tetrachloroethane	10	8260
Tetrachloroethylene	10	8260
Toluene	10	8260
1,2-trans-Dichloroethylene	10	8260
1,1,1-Trichloroethane	10	8260
1,1,2-Trichloroethane	10	8260
Trichloroethylene	10	8260
Vinyl Chloride	10	8260
pH	40 CFR 136	

(5) Groundwater monitoring frequency shall be semi-annual;
(6) Description of the statistical methodology and actions to be taken if the detection monitoring program indicates a statistically significant increase for one or more of the monitoring parameters, or is inconclusive in its results.

- The groundwater monitoring plan must receive DEQ approval before construction or installation of any permanent wells or boreholes.

- WQD industrial permits section is to be notified in writing five (5) days before installation of any groundwater monitoring wells.

- The permittee shall have till May 1, 2009 to complete the installation of the groundwater monitoring wells and begin groundwater monitoring.

Please let the DEQ know which option FMRI selects for Pond Nos. 6 and 7 no later than July 31, 2008. This option shall also be placed in the permit renewal. Thank you for your cooperation. If you have any questions or comments please contact Paul Johnson at 405-702-8205.

Sincerely,

Leslie Smith, P.E., Manager
Industrial Permits Section
Water Quality Division

CDP/DM/MC/ED/LS/WC/SG/PJ/ST/ab KH

c. Muskogee County DEQ Office
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Martha Penisten, Deputy General Counsel, Legal Division
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