



August 1, 2011

U.S. Nuclear Regulatory Commission
ATTN: Mr. James C. Shepherd, Project Manager
Decommissioning Branch
Division of Waste Management
11545 Rockville Pike
Two White Flint North
Rockville, Maryland 20852

Reference: License SMB-911; Docket No. 40-7580
License Conditions 37 c

Dear Mr. Shepherd:

Pursuant to License SMB-911 the licensee, FMRI, Inc. ("FMRI"), submits the following information in the attachment:

License Condition 37 c

In accordance with 10 CFR 40.42(g)(4)(ii), Licensee shall provide to NRC the following detailed plans, including work to be performed by contractors and the qualifications of all contractors, for remediating contamination at the site identified in the July 24, 2003 DP

All contaminated soil, buildings and equipment not later than August 1, 2011.

If you have any questions, please call me at (918) 687-6303.

Sincerely,

Robert Compennolle

Robert Compennolle
President, FMRI

by Jan Buz 8/1/2011

Enclosures

Copy to: (Region IV NRC)
(FMRI File (NRC-080111-01))

bcc: Curt Zamec (Fansteel Inc.)
James Burgess (FMRI)
Bill Thomas (IEM)



**Phase 3 Remediation Project
Implementation Work Plan**

USNRC Materials License Number SMB-911

License Condition 37.c

August, 2011

FMRI
#10 Tantalum Place
Muskogee, OK 74402
Docket No. 40-7580

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1 INTRODUCTION

1.1 Background

The FMRI site (site) is about 4 kilometers (2.5 miles) east of the city center of Muskogee, OK, with the Arkansas River (Mile 395) on the east, Highway US-62 on the south, and the Muskogee Turnpike on the west. The current site comprises about 38 ha (75 acres). The site produced tantalum and columbium metals from 1957 until it ceased operations in 1989. The raw materials (ore) used for tantalum and columbium production contained uranium and thorium as naturally occurring trace constituents. The concentrations of natural uranium and natural thorium were sufficient to cause the ores and slags to be classified as source materials by the Atomic Energy Commission, which originally issued License No. SMB-911 to Fansteel, Inc (Fansteel) in 1967.

In November, 2001, Fansteel suspended all operations at the Muskogee site. Fansteel subsequently filed for bankruptcy protection under Chapter 11 (reorganization). In conjunction with the bankruptcy proceedings, in July, 2003, Fansteel submitted a:

- revised decommissioning plan;
- request for exemption from financial assurance requirements; and
- request for authorization to transfer the site license to a subsidiary to be formed as part of the bankruptcy reorganization plan.

On November 17, 2003, the bankruptcy court approved Fansteel's corporate reorganization plan. FMRI, a new subsidiary of Reorganized Fansteel, became the licensee for the Muskogee site on the effective date of the reorganization. On December 4, 2003, the USNRC approved the revised decommissioning plan, the request for exemption to financial assurance requirements, and the license transfer authorization, subject to the bankruptcy reorganization.

The FMRI Muskogee, Oklahoma site is currently being decommissioned under the authority of the U.S. Nuclear Regulatory Commission (USNRC) pursuant to FMRI Source Materials License SMB-911 (License) and approved Decommissioning Plan.

1.2 Purpose

The purpose of this remediation project implementation work plan (Plan) is to comply with the FMRI Radioactive Materials License SMB-911, Condition 37.c:

- 37 In accordance with 10 CFR 40.42(g)(4)(ii), Licensee shall provide to NRC the following detailed plans, including work to be performed by contractors and the qualifications of all contractors, for remediating contamination at the site identified in the July 24, 2003 DP:

- a. WIP (Phase 1) not later than August 2, 2004.

- b. CaF (Phase 3) not later than January 2, 2007.
- c. All contaminated soil, buildings and equipment not later than August 1, 2011.
- d. Groundwater remediation (Phase 4) not later than January 5, 2012.

1.3 Objective

The objective of the Plan is to address applicable regulatory requirements and specific license conditions in order to remediate the contaminated soil, buildings and equipment at the FMRI site.

2 APPROACH TO REMEDIATING BUILDINGS AND SOIL

2.1 Radiological Condition

A radiological characterization survey was completed at the FMRI site in 1993. The scope of the characterization survey included interior and exterior of site structures, surface soils, subsurface soils, and groundwater. The characterization survey and associated results are described in the Decommissioning Plan. Radiologically impacted soils and residues from WIP are isolated to plant areas within and surrounding Pond Nos. 2, 3, 5, 6, 7, 8, and 9, and areas to the east of the Chemical "A" and Chemical "C" plant buildings. Soil contamination was also detected to the east of the wastewater treatment ponds and Pond No. 5, however, at levels typically lower than that exhibited in the areas of the site associated with manufacturing and ore processing. The total impacted land area to be remediated encompasses an estimated area of 180,000 square meters (m²).

Remediation will include decontamination of buildings and components using a variety of decontamination methods including selected solvents, cleaning solutions, high-power vacuum cleaners, pressure washers, vacuums, or others approved by FMRI. Multiple techniques may be employed, as necessary, in order to remove the impacted surface.

2.2 Requirement

The requirement for remediation of the buildings and soil is described in the USNRC Radioactive Materials License SMB-911, Condition 37 c.

2.3 Implementation

FMRI will complete the remediation of the buildings and soil described in this Plan with the assistance of contractors, subcontractors, and consultants. FMRI intends to complete remediation of the buildings and soil after the remediation of the ponds (Phase 2).

3 SITE PREPARATION

After the ancillary work plans, project plans and specifications, and contractor procurement activities have been completed, preparations must be made in the field to perform the Phase 3 Remediation Project tasks. These preparations are discussed below.

3.1 Security

The facility is completely enclosed by a security fence designed to prevent unauthorized entry. The fence is inspected and maintained by FMRI and its contractors to ensure the fence is not compromised and remains functional. A security gate is in place and will be operated by a Security Guard or FMRI to control site access. All personnel entering the active work area and will not gain access to active work areas unless they are 1) authorized to do so by FMRI or its agents, 2) appropriately trained, and 3) outfitted with required personal protective equipment (PPE). During non-working hours, the security gate will be locked. Access to the plant shall be gained through proper notification to the Security Guard or FMRI personnel.

3.2 Mobilization/Demobilization

Prior to the start of Phase 3 Remediation Project activities, resources must be mobilized to the site and established for work to begin. These resources include labor, equipment and supplies necessary to perform the required project tasks. For example, heavy or specialized equipment selected by the contractor to remove the impacted soil will be transported to the site, off-loaded, serviced, fueled if required, and placed in the active work area. Support facilities, such as, office trailers, staging locations, material processing areas, decontamination areas, sanitary facilities, etc., will be located on-site by the contractor as necessary. The contractor will be responsible for proper utility connections, including but not limited to, water, electric, and phone services. Monitoring equipment will be brought on-site, along with PPE and common field supplies including hand tools, power equipment, etc. The contractor will be responsible for all labor, equipment and supplies necessary to complete Phase 3 Remediation Project activities, unless agreed upon through prior arrangement with FMRI. These resources must be marshaled and be in-place prior to Phase 3 Remediation Project implementation.

At the project's end, the contractor will demobilize the remaining resources from the site based on the terms of the contract between the contractor and FMRI. The contractor will ensure that all equipment and supplies have been properly decontaminated, surveyed, and released if used in active work areas. Support facilities will also be surveyed and released prior to removal and utility connections will be terminated unless directed otherwise by FMRI. The site will be left in an improved condition as specified in the performance requirements contained with the project plans and specifications. The Decommissioning Plan, Section 3.0 *Facility Description*, summarizes the general-physical setting of the site, including general physical characteristics of the site and its proximity to people who could be affected by existing contamination or decommissioning activities.

3.3 Access/Roads/Haulage

The selected contractor will be responsible for the layout and construction of site access roads to allow for the efficient access of equipment and vehicles to and from the active work area. This layout, when developed, will be evaluated to ensure that traffic on the site moves without restriction while limiting the potential for cross-contamination. Prior to releasing vehicles leaving the work area, the vehicles will be decontaminated, if necessary, and surveyed to ensure they meet appropriate release criteria.

Hauling vehicles and/or railcars entering the site will be logged in and tracked by manifest number to determine the number of vehicles/railcars entering and leaving the site and to track material flow from the site to the designated off-site facility. Hauling weights will be determined via load cells or by other means determined by the contractor and approved by FMRI.

Existing access road and parking areas will be used to the extent practicable. Access road construction will be dictated by contractor needs and approved in advance by FMRI. For example, the contractor may construct a road by using a geotextile covered by a suitable thickness of coarse aggregate with fines to promote tight compaction. Vehicle speeds within the site perimeter will be limited to 15 mph maximum. Backup alarms will be required on all construction vehicles. All vehicles and equipment shall be in proper working order at all times.

3.4 Equipment

The majority of the construction equipment anticipated for the Phase 3 Remediation Project activities is commonly used in commercial and industrial earthwork and should be readily available to qualified contractors. Equipment used will most likely include; excavators, loaders, tractors, tractor-scrappers, trackhoses, dozers, forklifts, graders, compactors, trucks, tanker trucks, frac tanks, and possibly a crane with a clam shell bucket. The contractor will be responsible for selecting the equipment necessary to complete the project in a safe, cost effective, and timely manner.

Pumps may be required to manage accumulated surface waters. In addition, equipment needed to monitor site conditions and to provide adequate health physics and general health and safety coverage will be the responsibility of the selected contractor and/or FMRI designated agents for the project.

3.5 Decontamination Procedures

Equipment and personnel will be decontaminated as necessary through physical means either through mechanical removal or application of wet methods, as determined by the contractor to fulfill the performance specifications. Decontamination facilities will be established during mobilization and set up activities. These facilities will most likely include a decontamination station with utilities contained within a trailer or similar structure, appropriate supplies for remediation personnel and a decontamination pad for

larger equipment. Equipment and personnel will not be permitted to leave active work areas and the decontamination facilities until contaminated surfaces are no longer considered contaminated. Appropriate documentation of decontamination activities will be maintained by the contractor for record purposes. Any elevated survey or air monitoring results shall require immediate notification to the FMRI Radiation Safety Officer.

Contaminated materials and disposable supplies generated as a result of decontamination activities will be disposed of in accordance with the pertinent planning documents and applicable environmental regulations, including the contamination control program. The purpose of the contamination control program is to verify that radiological contamination on surfaces satisfies the requirements of the USNRC Radioactive Materials License SMB-911 and that impacted materials are removed from the facility. The contamination control program will be as follows:

- Control both access to contaminated areas by workers, as required by 10 CFR20.1702;
- Perform surveys to supplement personnel monitoring for workers during routine operations, maintenance, cleanup activities, and special operations;
- Perform surveys to determine the baseline of background radiation levels and radioactivity from natural sources for areas where decommissioning activities will take place;
- Follow the procedures for surveys as indicated in Regulatory Position C.1, Types of Surveys, in Regulatory Guide 8.21;
- Specify removable surface contamination action limits for both restricted and unrestricted areas. The applicable limits for contamination of surfaces and clothing included in Regulatory Position C. 1 of Regulatory Guide 8.21 and NRC FC 83-23 will be considered;
- Specify actions taken to decontaminate a person, place, item or area, or to restrict access, or to modify the type or frequency of radiological monitoring; and
- Require surveys of air quality based on Regulatory Guide 8.25.

3.6 Dust Control

Two factors should serve to limit the amount of dust generation at the site during Phase 3 Remediation Project activities. First, the soils to be removed are anticipated to be wet of optimum moisture content and therefore less subject to potential dusting concerns. Second, the site access roads will be constructed with coarser grained materials to alleviate this particular concern. However if dusting should become a problem, the contractor can dampen the problem areas with water to prevent fines from becoming airborne. The vehicle decontamination station will also serve to remove finer grained materials from the vehicles leaving the active work area, and the site in general. Finally, stockpiles may be covered with tarps when not in active use.

4 DECONTAMINATION OF BUILDING SURFACES

4.1 Approach

FMRI will complete the decommissioning with the assistance of contractors, subcontractors, and consultants. Removable contamination is located on surfaces throughout the Chemical “A” and Chemical “C” buildings. Decommissioning will include decontamination of building surfaces to below release criteria. It is expected that portions of the floor of the Chemical “A” and Chemical “C” buildings, and possibly parts of the ore storage pad, may be removed and disposed as radioactive waste.

4.2 Remediation Techniques

Specific remediation techniques and order of occurrence will be developed in conjunction with contractors for structures at the FMRI site. The sequence of remediation techniques is as follows:

- Installation of engineering and access controls;
- Cleaning of removable contamination from building surfaces starting at the highest part of each room and proceeding down to the floor;
- Scabbling of nonremovable contamination from concrete surfaces; and
- Maintenance of access controls on completed rooms and areas.

Decontamination of building surfaces will consist of cleaning with appropriate solvents, cleaning solutions, high-power vacuum cleaners, pressure washers, etc. Wet techniques will not be used on porous materials. Dry cleaning methods will be preferred. Further description of extent of contamination at the site is provided in the Decommissioning Plan.

It is expected that approximately ten percent (10%) of the floors in Chemical “A” and Chemical “C” buildings, and possibly parts of the ore storage pad, may be scabbled and disposed as radioactive waste. Such portions of structures or building facilities will be cut or broken down into the smallest practicable size for handling, shipping, and/or disposal purposes. Debris will be staged in on-site piles and subsequently loaded into disposal containers, or suitably packaged for transport. In addition to some concrete surfaces, other materials such as duct work, corroded sheet metal, porous materials, and flooring materials may be discarded as radioactive waste. Alternately, FMRI may consider scrapping of some material, depending on economic conditions.

4.3 Disposal of Waste

Solid material that meets unrestricted release criteria will be disposed off site as conventional construction/demolition debris in accordance with Oklahoma solid waste management regulations (OK 252:520-9). All surface materials and components that will

be disposed as LLR will be loaded onto Department of Transportation approved trucks or railcars for transportation to an approved off- site disposal facility. Some debris will require packaging before loading.

All effluents from cleaning will be recovered for appropriate disposal or treatment. Liquid and solid residues that would be hazardous wastes when discarded will be segregated from other wastes and disposed appropriately. Nonhazardous liquid and solid residues from building surface and facility decontamination will be analyzed for total activity prior to being discarded. Liquid wastes that meet USNRC's standard for discharge to unrestricted areas will be routed to the wastewater treatment plant located at the FMRI facility. Solid residues that are not hazardous waste will be packaged and disposed as radioactive waste.

5 DECONTAMINATION OF SYSTEMS AND EQUIPMENT

5.1 Approach

It is intended that all equipment presently at the FMRI facility will be cleaned for unrestricted release. Equipment that cannot be cleaned for unrestricted release will be cut or broken down into the smallest practicable size for handling, shipping, and/or disposal purposes. Disassembled equipment and debris will be staged in on-site piles and subsequently loaded into disposal containers, or suitably packaged for transport and disposal.

5.2 Remediation Techniques

Specific remediation techniques and order of occurrence will be developed in conjunction with contractors for systems and equipment at the FMRI site. Dry cleaning methods will be preferred. Removable material will be cleaned from site equipment by use of vacuum cleaners, hand scrubbing, steam cleaners, solvent washes, high-pressure power washers, etc., as may be compatible with the individual component's material(s) of construction. Effluents from the cleaning operation will be conveyed to a settling basin or designated tank where the particulates will settle out. The supernatant wash water will be sampled and analyzed for radioactivity. If the wash water is suitable for discharge, the supernatant will be pumped to the site treatment plant for eventual discharge. The solids from the washing operation will be tested for the presence of licensed materials and handled accordingly.

5.3 Disposal of Waste

Some equipment will be sold. Equipment for sale will be secured in appropriate packing and shipped in appropriate containers for transport to their destination. If the equipment is defined by the DOT as radioactive material following decontamination, all of the DOT requirements for transport of radioactive materials including packaging, placards, labeling, and routing, will be strictly followed. Equipment that cannot be cleaned for unrestricted release will be cut or broken down into the smallest practicable size for handling, shipping, and/or disposal purposes. Disassembled equipment and debris will be staged in on-site piles and subsequently loaded into disposal containers, or suitably packaged for transport. Alternately, FMRI may consider scrapping of some material, depending on economic conditions.

All effluents from cleaning will be recovered for appropriate disposal from the waste water treatment plant located at the FMRI facility. Liquid and solid residues that are hazardous wastes when discarded will be segregated from other wastes and disposed appropriately. Nonhazardous liquid and solid residues from building surface and facility decontamination will be analyzed for total activity prior to being discarded. Solid residues that are not hazardous waste will be packaged and disposed as radioactive waste.

6 REMOVAL OF IMPACTED SOILS

6.1 Approach

Radiologically impacted soils and residues are limited to areas in the FMRI plant within and surrounding Pond Nos. 2 3, 5, 6, 7, 8, and 9, and areas to the east of the Chemical “A” and Chemical “C” plant buildings. Soil contamination was also detected to the east of the wastewater treatment ponds and Pond No. 5, however, at levels typically lower than that exhibited in the areas of the site associated with manufacturing and ore processing. A supplemental characterization project is scheduled to be completed in 2011 in order to identify extent of the contaminants of concern.

The soil remediation task requires identifying soils with concentrations above the limiting derived concentration guideline level (DCGL), excavating, and segregating it on site. Soils that exhibit radioactivity in excess of the DCGLs will be shipped to a licensed or permitted facility in accordance with regulatory requirements. Materials that exhibit levels of radioactivity below the DCGLs will be returned to the excavation

6.2 Remediation Techniques

Excavation and disposal of soil from the surrounding plant area and beneath the ponds will be completed. . Prior to remediation activities, a segment of the site, such as, northwest of the Sodium Reduction Building, will be prepared as a stockpile and material processing area. The stockpile area will be lined with 60-mil high-density polyethylene geomembrane, or equivalent. Berms and ditches will be constructed at the perimeter to handle precipitation falling onto the stockpile. Haul roads, drainage channels, culverts, berms, E&S controls, and access controls will be constructed during the site preparation phase.

Soil remediation in the surrounding plant area will vary to up to a depth of approximately twenty (20) feet. Standard construction equipment will be used to complete soil remediation. This equipment will include, but not be limited to, equipment such as backhoes, scrapers, excavators, bulldozers, loaders, dump trucks, water trucks, and/or pickup trucks.

Radiation survey meters capable of detecting gamma radiation will be used to identify soils that exhibit radioactivity in excess of the DCGLs. Excavated material will be transported to a stockpile area where it will be air-dried and relocated to a feed pile.

Alternately, if economically feasible, FMRI may utilize other methods, such as natural gas-driven dryers, or the use of a filter press to further dry the soils. Oversize materials will be identified and removed before the materials are fed into the segregation system. Segregated materials that are below the DCGLs will be stockpiled temporarily and eventually returned to the excavations.

Soils that are below the DCGLs will be used to backfill the pond excavations. Additional off-site borrow material will be necessary to bring the site to the final grades. Backfill will be placed in approximately eight (8) inch loose lifts and suitably compacted.

6.3 Disposal of Waste

Soil that exhibits radioactivity in excess of the DCGLs will be transported to a licensed or permitted facility for disposal, in accordance with regulatory requirements. FMRI will select and approve the facility or facilities that are authorized to dispose of wastes from the FMRI site.

7 MATERIAL MANAGEMENT

7.1 Transportation Management

Soils and debris that exhibit radioactivity in excess of the DCGLs will either be loaded directly for transport off-site or stockpiled for processing as described in Section 6.0. Material tracking based on removal location, removal date and stockpile designation, as applicable, will continue until the material is loaded for transport. The material will be checked by the selected contractor prior to loading, as required by the project specifications, to ensure the material meets the appropriate acceptance criteria dictated by the receiving facility. The selected contractor is responsible for meeting acceptance criteria at the receiving facility.

Manifests and/or Bill of Ladings will be created for each unit of transport, such as a truck or rail car, to allow for complete material tracking. A copy of the signed manifests and/or Bill of Ladings as accepted by the disposal facility, with weight and tracking information included, will be maintained on site and provided to FMRI representatives. The contractor will be responsible for the logistics associated with transportation management, including the scheduling of the rail cars or transportation vehicles, and the coordination with the specified licensed disposal facility. The selected contractor shall be responsible for any DOT fees for the shipping hazardous materials.

7.2 Acceptance Criteria

FMRI will select a facility that is authorized to receive the soil and impacted debris segregated during the Phase 3 Remediation Project Activities. Current acceptance criterion as presented in the selected facility's license will be followed as part of the material management portion of the Phase 3 Remediation Project.

7.3 Remediation Waste Management Program

The selected contractor will implement a Remediation Waste Management Program (RWMP) during Phase 3 Remediation Project activities for the specific purpose of controlling radioactive wastes generated as part of the decommissioning process in accordance with USNRC, USEPA, and DOT requirements. FMRI, with contractor assistance, prepared a RWMP as part of the Phase 1 Remediation Project. In accordance with License Condition No. 52, FMRI representatives, in conjunction with the selected contractor for Phase 3, will update this program prior to the beginning Phase 3 site work. A copy of the updated program will be maintained on site by FMRI representatives. The selected contractor will be responsible for program implementation.

7.3.1 Solid Waste Material

The purpose of the solid waste management program is to ensure that controls on solid waste stream generation, storage, handling, and disposal or reclamation will be protective of the public health and safety and in accordance with USNRC requirements. The applicable NRC requirements are 10 CFR Part 20 (Subpart K), 10 CFR 61.55, 10 CFR

61.56, 61.57, and 10 CFR 71.5. The solid waste management program will be updated to include the following topics, including:

- The types and estimated volumes of solid radioactive waste that are expected to be generated during Phase 3 Remediation Project Activities, including but not limited to, soil, structural and component metal, concrete, impacted components, contaminated piping, wood, and plastic;
- The radionuclides in each estimated solid radioactive waste type expected to be generated during Phase 3 Remediation Project activities;
- On-site storage requirements for each solid radioactive waste type expected to be generated during decommissioning operations;
- A description of the treatment and packaging activities for stored wastes to conform to the waste acceptance criteria (WAC) for the intended disposal and/or reclamation facility;
- A description of the transportation and disposal (T&D) requirements to conform to DOT requirements; and
- The name and location of the intended disposal and/or reclamation facility for each solid radioactive waste type expected to be generated during Phase 3 Remediation Project activities.

7.3.2 Liquid Waste Material

The purpose of the liquid waste management program is to ensure that controls on liquid waste stream generation, storage, treatment, disposal or reclamation will be protective of the public health and safety and in accordance with USNRC requirements. The applicable USNRC requirements are 10 CFR Part 20 (Subpart K), 10 CFR 61.55, 61.56, 61.57, and 10 CFR 71.5. The liquid waste management program will be updated to include the following topics, including:

- The types and volumes of liquid radioactive waste that are expected to be generated during Phase 3 Remediation Project activities;
- The radionuclides in each liquid radioactive waste type expected to be generated during Phase 3 Remediation Project activities;
- On-site storage requirements for each liquid radioactive waste type expected to be generated during Phase 3 Remediation Project activities;
- A description of the treatment and packaging activities for liquid wastes to conform to the waste acceptance criteria for the intended treatment, disposal and/or reclamation facility;
- A description of the transportation and disposal T&D requirements to conform to DOT requirements.
- The name and location of the intended treatment, disposal and/or reclamation facility for each liquid radioactive waste type expected to be generated during Phase 3 Remediation Project activities.

7.3.3 Mixed Waste Material

The purpose of the mixed waste management program is to ensure that controls on mixed waste stream generation, storage, and disposal and/or reclamation will be protective of

the public health and safety and in accordance with USNRC and USEPA requirements. The applicable USNRC requirements are 10 CFR Part 20 (Subpart K), 10 CFR 61.55, 61.56, 61.57, and 10 CFR 71.5. The applicable USEPA requirements are 40 CFR 260-270. The mixed waste management program will be updated to include the following topics, including:

- The types and volumes of solid and liquid mixed waste that are expected to be generated during Phase 3 Remediation Project activities.
- The radionuclides in each type of mixed waste type expected to be generated during Phase 3 Remediation Project activities.
- On-site storage requirements for each mixed radioactive waste type expected to be generated during Phase 3 Remediation Project activities.
- A description of the treatment and packaging activities for mixed wastes to conform to the WAC for the intended disposal and/or reclamation facility.
- A description of the transportation and disposal (T&D) requirements to conform to DOT requirements.
- The name and location of the intended disposal and/or reclamation facility for each mixed radioactive waste type expected to be generated during Phase 3 Remediation Project activities.
- A description of the requirements of all other regulatory agencies having jurisdiction over the mixed waste expected to be generated during Phase 3 Remediation Project activities.
- Evidence that FMRI possesses the appropriate USEPA or state permits to generate, store, and/or treat the mixed wastes expected to be generated during decommissioning operations.
- Appropriate and applicable USEPA conditional exemptions (40 CFR 266 Subpart N and 40 CFR 261) for certain low-level mixed waste storage, treatment, transportation, and disposal and/or reclamation activities.

In accordance with License Condition No. 52, FMRI will provide the RWMP to the approved contractor and subsequent revisions and updates for review on-site by the USNRC. FMRI representatives, in conjunction with the selected contractor, will be responsible for updating the RWMP and the contractor will be responsible for program implementation. FMRI representatives will update and have available at the site the RWMP prior to the beginning of each phase of decommissioning.

8 FINAL STATUS SURVEY

FMRI will notify the USNRC at such time as the remediation of the buildings and soils is complete. The final status survey plan (FSSP), as described in the Decommissioning Plan, will be implemented to verify the remedial activities. The FSSP was developed in accordance with the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575 and submitted to the USNRC on February 25, 2011. The final plan was generated by a FMRI representative as required by License Condition 54. The FSS activities specified in the plan will be implemented by FMRI representatives.

In accordance with License Condition No. 51, minor or non-substantive changes to the FSSP may be implemented by FMRI without prior approval of the NRC. An example of this type of change would include changes in the equipment used and/or the personnel employed to perform the survey, provided FSSP requirements are still being met.

FMRI will conduct the final status surveys and submit reports to USNRC to demonstrate compliance with decommissioning criteria. Immediately following completion of remediation of all soils, buildings and equipment, FMRI will conduct a final status survey of all areas remediated and submit a Phase 3 Final Status Survey Report (FSSR) to the USNRC for review and approval.

9 SITE RESTORATION

After Phase 3 Remediation Project operations are complete, the selected contractor will restore the site in accordance with the project plans and specifications. The site restoration will include site grading to meet design site contours and the installation of permanent surface water and erosion and sedimentation controls. Designated disturbed areas will be prepared for seeding with the application of topsoil and the addition of soil conditioners as required. The designated areas will then be seeded and mulched to establish an appropriate vegetative stand to limit erosion and sedimentation. It is anticipated that the earthen pond structures will remain open, with proper controls, until final site characterization and site release is performed.

10 RADIATION PROTECTION METHODS

10.1 Radiation Health and Safety Program

The FMRI Radiation and Health and Safety Program (RHASP) to be implemented during the decommissioning phases is designed to conform to the following two fundamental performance objectives:

- Compliance with the regulatory requirements in 10 CFR Parts 19 and 20 as required by NRC materials license conditions, thus assuring adequate protection of workers from ionizing radiation during decommissioning activities; and
- Radiological safety measures, such as controls and monitoring, for workers will be commensurate with the risks associated with licensed activities at the Muskogee decommissioning site as required by 10 CFR 20.1101.

FMRI revised the site's RHASP and implementing procedures to include decommissioning activities prior to implementing the Phase 1 Remediation Project. In accordance with License Condition No. 52, FMRI representatives will update the RHASP as necessary prior to the beginning of each phase of decommissioning. A copy of the updated plan will be maintained on site by FMRI representatives. The selected contractor will be required to submit a supplemental Radiation Health and Safety Plan based substantially on the requirements contained within the FMRI RHASP.

10.2 Personnel Training and Monitoring

Training will be required for all personnel in order to focus on the objectives of the Decommissioning Plan. Annual training and refresher training, as needed, will also be required in order to comply with the USNRC Radioactive Materials License SMB-911 and 10 CFR 19. A training program will be established by the selected contractor to meet project specifications and the following goals, including:

- Meet or exceed the applicable training requirements specified by NRC, Occupational Safety and Health Administration (OSHA), and the USEPA;
- Ensure that all personnel are knowledgeable of job requirements and are competent in the operation of the equipment they use, are safe in their work practices, and understand the risks associated with their work environment;
- Ensure that personnel meet the requirements to work at the FMRI facility; and
- Indoctrinate new employees to ensure that they understand all requirements they are expected to meet.

The program will include general radiation safety training/monitoring, site orientation, site- and job- specific training, and training verification and documentation. At a minimum, all site personnel will be required to have appropriate basic radiation safety

training and to wear radiation-monitoring devices, as required by the radioactive materials license. The radiation safety training that will be provided to each employee will include pre-employment, annual/periodic training, and specialized training to comply with 10 CFR19.

Prior to escorted entry into any radiological restricted area at the FMRI site, visitors will be given a radiological orientation that may include orientation through a video provided by FMRI personnel. Objectives of this orientation will be to familiarize personnel and visitors to:

- Recognize labeled or posted radioactive materials and understand the meaning of radiological warning signs;
- Understand that as long as radiological control procedures and limits are followed, harmful effects to personnel and the environment from radioactivity will be minimized;
- Understand they are required to stay with host personnel at all times; and
- Recognize and understand the meaning of, and proper response to, emergency signals.

Site and job-specific training will be required of all contractor personnel involved in day-to-day operations of the remediation project, project and management personnel who visit the site regularly, and other personnel identified by FMRI. Prior to being allowed unescorted access to the site and issuance of radiation dosimetry, each person shall demonstrate a basic knowledge of radiation worker training, and/or shall be trained in accordance with facility requirements. Periodic worker jobsite or tailgate training will be provided to familiarize workers with job-specific procedures or safety requirements.

Personnel working on site will present evidence of general radiation safety training as required by 10 CFR 19 and pertinent refresher training including training certificates and letter of certification, prior to being permitted to perform in a restricted area. All contractor personnel will be required to have training for hazardous waste operations, equivalent to 29 CFR 1910.120. The contractor shall provide evidence of this training. In addition, all site personnel shall sign a statement certifying and acknowledging that they have received site-specific training and that they understand the potential site hazards and the necessary control measures to reduce and/or eliminate those hazards. Training documentation, including the content of site-specific training and any other subsequent training provided in periodic safety meetings and specific task safety meetings, will be submitted to FMRI and will be maintained over the course and completion of all remediation activities. This information will be available for inspection by FMRI and the agencies with jurisdiction over site operations.

10.3 Managing Radiation Exposures

FMRI's Radiation Health and Safety Program describes the radiation safety controls and types of monitoring to be used to ensure that internal and external exposures to workers are limited to as low as reasonably achievable (ALARA). These controls and types of monitoring will be implemented by the selected contractor using written procedures including a process for managing procedure change. The contractor will be responsible

for the generation of a supplemental Radiation Health and Safety Plan, in accordance with applicable regulator requirements and the project plans and specifications.

10.4 Contamination Control

FMRI is committed to maintaining occupational exposures to ALARA during all operations involving the management of radioactive materials. Dust controls will be established and air monitoring will be performed to verify that radioactive materials are maintained to concentrations below the limits in the Decommissioning Plan. Workers will wear PPE that is appropriate for the task being performed and designed to limit the spread of radioactive and hazardous materials. Access to and from the site and specific work areas will be controlled. Washing and cleaning of equipment will take place under controlled conditions. Health physics technicians will be used to monitor the equipment removed; the equipment left in place; as well as workers, equipment, and loaded cars/containers leaving the site.

When materials are being vacuumed to remove loose surface soil, the vacuum cleaning unit will be equipped with a High-Efficiency Particulate Air (HEPA) filter. In addition, the vacuum unit will be separated from the workers by a plastic curtain. The outside vent of the vacuum will be clearly marked. After loose material has been removed, bristles and/or wire brushes will be used to loosen any caked or otherwise hardened accumulations of ore or process material. Health physics technicians will be used to monitor all excavation material, the material left in place, workers, equipment, and loaded cars or containers leaving the site. Decommissioning activities will be conducted in accordance with written, approved procedures as outlined in the Decommissioning Plan, Chapters 10.0 through 14.0.

10.5 Environmental Monitoring Program

The selected contractor will implement an Environmental Monitoring Program (EMP) during Phase 3 Remediation Project activities for the specific purpose of evaluating whether the decommissioning activities comply with the regulatory requirements in USNRC Radioactive Materials License SMB-911, 10 CFR Part 20 and the applicable ODEQ permits, and are adequate to protect workers, the public, and the environment from radiation during decommissioning activities.

FMRI established the EMP for site decommissioning as part of the Phase 1 Remediation Project. In accordance with License Condition No. 52, FMRI representatives will review and update as necessary the EMP prior to the beginning of each phase of decommissioning. A copy of the updated program will be maintained on site by FMRI representatives.

11 QUALITY ASSURANCE PROGRAM

11.1 Program Elements

It is FMRI's intention to implement appropriate Quality Assurance (QA) Program controls for Phase 3 Remediation Project activities that may affect the health and safety of the public and personnel at the site, or the quality of the data generated. FMRI representatives have developed a written QA Program for decommissioning efforts to guide the performance of data gathering activities to assure that the results are accurate and that uncertainties have been considered adequately. This program will operate in all stages of the data gathering through final validation of the data, as applicable, and interpretation of results. The program is consistent with USNRC guidance, Regulatory Guide 4.15.

It should be noted that a distinction has been made between QC activities and QA activities, even though FMRI's QA Program covers both topics. QC activities are defined as the activities the contractor performs to ensure the work completed by the contractor is in accordance with applicable regulations and the project plans and specifications. The contractor will be required to submit a QC Plan for review and approval by FMRI representatives, based on the requirements of the FMRI QA Program. The contractor will be required to complete QC activities specified in the QC plan as part of the contractor's contractual obligations for the project. The contractor will also be required to designate a QC Officer for the project who will be principally responsible for QC activities. The QC Officer will interact with the QA Officer employed directly on behalf of FMRI.

QA activities are defined as oversight activities performed by a designated representative of FMRI to ensure that contractor QC activities satisfy project requirements. The QA Officer for the project will monitor the contractor's QC activities to confirm the project is being completed as intended and that defensible data is produced. The QA Officer will be also be responsible for independent data gathering and audits as required in order to independently validate that the project is being executed as intended.

The QA Program and associated implementing instructions and procedures, address the following program elements, as applicable for Phase 3 Remediation Project activities, including :

- Selection of radiation survey instruments. Instruments will be selected for various surveying and screening activities that have sensitivities sufficient to produce data that satisfy the applicable study objectives;
- Sensitivity of measurements. The QA Program will ensure that any measurement technique, laboratory analysis, or instrumentation is capable of generating data at the required limit of detection;
- Recording and management of data. The QA Program specifies the forms and methods for recording calibrations, performance checks, corrective actions, reports to management, exceptional circumstances, and all other information

gathered during the decommissioning activity relating to data quality. The QA Officer for the project will be responsible for producing a complete documentary record of the quality aspects of the decommissioning operation;

- Data validation requirements. The QA Program specifies the frequency and quantity of data validation to be performed. Data validation will be performed by a third party not otherwise involved in the generation or interpretation of the data;
- QA Program organizational structure. The QA function will operate independently of the data gathering and interpretation operations. Specific persons with QA/QC responsibility and their reporting relationships to the entire decommissioning staff organization are specified in the QA Program;
- Audits and inspections. The QA Program specifies a schedule of required audits and inspections. In addition, the QA Program specifically empowers the QA Officer to conduct other audits and inspections at his sole discretion. Persons performing self assessment activities are not to have direct responsibilities in the area they are assessing;
- Reporting requirements. The QA Officer will be required to submit periodic reports to project management and others involved in the conduct of the decommissioning operation. These reporting requirements are specified in the QA Program;
- Corrective actions. The QAIQC process is expected to identify data, procedures, and practices that are unsatisfactory for purposes of meeting the decommissioning objections. The QA Program specifies procedures for correcting or discarding data, recommending procedural changes, and modifying work practices that impact on overall data quality. Follow up and evaluation of modifications are required in the QA Program which also specifies how these evaluations will be conducted and documented;
- Certification. The QA Program provides for the QA Officer to certify all final reports and determinations relating to satisfaction of specific decommissioning criteria as based on data that have been collected, managed, reviewed, and validated; and
- Training. The QA Program provides for instruction of personnel responsible for performing activities affecting quality pertaining to the purpose, scope, and implementation of the quality-related manuals, instructions, and procedures. Provision will also be made for training and qualification of personnel verifying activities affecting quality in the principles, techniques, and requirements of the activity being performed. Formal training and qualification program documentation will include the objectives and content of the program, attendees, and date of attendance. Individuals who collect samples and/or operate survey instruments or analytical counting systems will be trained accordingly and such training documented. Training will be commensurate with the education, experience, and proficiency of the individual and the scope, complexity, and nature of the assigned activity.
 - Individuals who collect samples and/or operate survey instruments or analytical counting systems will be qualified and such qualification documented.

- Qualification requirements will be commensurate with the scope, complexity, and nature of the assigned activity.
- Steps of the process including, but not limited to, training, calibration of the instrumentation, daily checks, surveys, sampling, and results analysis and interpretation will be documented. Training records will be kept as part of the FMRI project file.

11.2 Implementing Procedures

The QA Program and associated implementing instructions and procedures for sample collection and analysis address the following areas, as applicable for Phase 3 Remediation Project activities, including:

- Sample Collection. Samples will be collected in accordance with written procedures and instructions. Sampling tools will be cleaned and monitored, as appropriate, after each use. Samples will be collected in clean/unused sealable containers;
- Sample Labeling. Sample containers will be permanently labeled/marked in the field at the time of collection by the technician collecting the sample. At a minimum, the following information will be recorded on the sample container: sample date/time, sample identification number, sample location, and name of person collecting the sample. Samples which may contain radionuclide levels in excess of 100 times the baseline concentration or which, because of their form, may be a potential laboratory contamination concern will be identified on the outside of the container with a “radioactive material” caution label. Written documentation on sample collection, analysis, and audits will be kept as part of the FMRI project file;
- Chain of Custody. An approved procedure will be used for strict chain of custody so that the integrity of the sample is maintained throughout sampling, transportation, analysis, and archiving;
- Analysis Requirements. For each type of laboratory analysis requested, specifications for the following statistics will be made, including, required analytical methodology, the required minimum detectable concentration (MDC) for each radionuclide, any result presentation requirements, sample disposition, and turnaround time require to support the project;
- Analytical Laboratory. For all analytical laboratories used, the following QA/QC principles will be applied: proper maintenance, storage, and archiving of samples after transfer to laboratory will be practiced; and an approved internal QA program will be in place; and
- Documentation. Written documentation on sample collection, analysis, and audits will be kept as part of the FMRI project file.

11.3 Review by the USNRC

In accordance with License Condition No. 52, FMRI will make available the QA Program and Contractor QC Plan for review on-site by the USNRC after contractor procurement activities are complete. Subsequent revisions and updates will also be made available to the USNRC. FMRI representatives will be responsible for

updating the QA Program prior to the beginning of each phase of decommissioning and both FMRI representatives and the contractor will be responsible for program implementation. No decommissioning activities subject to certification requirements will be performed prior to implementation of the updated QA Program.

The USNRC will be notified of changes in procedures and personnel that would impact the commitments of the Decommissioning Plan before implementation of the changes. Changes in organizational elements will require USNRC notification within thirty (30) days of implementation. Editorial changes or personnel reassignments of a non-substantive nature will not require USNRC notification.

12 CONTRACTOR INFORMATION

12.1 Personnel Qualifications

The contractor selected for this project by FMRI will possess a demonstrated track record of radiological remediation projects. The contractor should be fiscally solvent and possess the capability to obtain the required financial sureties required for a project of this type.

In response to License Condition No. 50, the following positions will be assigned to an individual with the following minimum qualifications, including:

Health Physics Supervisor:

- An advanced degree or commensurate training as determined appropriate by FMRI;
- A minimum of 1 year of demonstrated field experience in applied health physics, industrial hygiene, or similar work relevant to radiological hazards associated with site remediation; and
- A thorough knowledge of the proper application and use of all health physics equipment used for the radiological present at the site, the chemical and analytical procedures used for radiological sampling and monitoring, and methodologies used to calculate personnel exposure to the radionuclides present at the site.

Construction Supervisor:

- An advanced degree or commensurate training as determined adequate by FMRI;
- A minimum of 1 year of demonstrated field experience supervising projects of similar size and scope to the project at hand; and
- A thorough knowledge of earthwork techniques, construction equipment, field operations, labor supervision, in addition to radiological and environmental health and safety activities.

Quality Control Officer:

- An advanced degree or commensurate training as determined appropriate by FMRI;
- A minimum of 1 year of demonstrated field experience in applied health physics, industrial hygiene, or similar work relevant to radiological hazards associated with site remediation; and
- A thorough knowledge of the proper application and use of all health physics equipment used for the radiological present at the site, the chemical and analytical procedures used for radiological sampling and monitoring, and methodologies used to calculate personnel exposure to the radionuclides present at the site.

12.2 Contractor Responsibilities

The selected contractor's responsibilities will be as identified in the narrative of this Phase 3 Remediation Project WP and the project plans and specifications. The contractor will be tasked to complete the project based on performance plans and specification which dictate the anticipated results of the project rather than a design specifying the means. Consequently, the selected contractor will be tasked to be especially innovative in order to 1) be awarded the project in a cost competitive environment and 2) comply with project plans and specifications in addition to regulatory requirements.

13 SCHEDULE

The anticipated contractor procurement schedule for the Phase 3 Remediation Project is provided as Figure 13-1 to this document. A schedule for the Phase 3 Remediation Project activities has not been established.

14 REFERENCES

- 14.1 Fansteel, Inc., *Decommissioning Plan*, January 15, 2003. [ADAMS ML030240051]
- 14.2 U.S. Nuclear Regulatory Commission, *Safety Evaluation Report for License Amendment Application to Approve Decommissioning*, July 24, 2003, October 31, 2003. [ADAMS ML033250083]
- 14.3 U.S. Nuclear Regulatory Commission, *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)*, NUREG-1575, Revision 1, August, 2000.
- 14.4 U.S. Nuclear Regulatory Commission, *Consolidated Decommissioning Guidance, Characterization, Survey, and Determination of Radiological Criteria*, Final Report, NUREG-1757, Volume 2, Revision 1, September 2006. [ADAMS ML063000252]
- 14.5 U.S. Nuclear Regulatory Commission, *Termination of Byproduct, Source and Special Nuclear Material Licenses*, Policy and Guidance Directive FC 83-23, 1983.
- 14.6 U.S. Nuclear Regulatory Commission, *Quality Assurance for Radiological Monitoring Program-- Effluent Streams and the Environment*, Regulatory Guide 4.15, 1979.
- 14.7 U.S. Nuclear Regulatory Commission, *Health Physics Surveys for Byproduct Material at NRC-Licensed Processing and Manufacturing Plants*, Regulatory Guide 8.21, October, 1979.
- 14.8 U.S. Nuclear Regulatory Commission, *Air Sampling in the Workplace*, Regulatory Guide 8.25, June, 1992.

FIGURES

Figure 13-1 Anticipated Contractor Procurement Timeline for FMRI Phase 3 Remediation Project

