



December 22, 2006

SENT VIA OVERNIGHT CARRIER

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 Condition 37(b) – Phase 2 Work Plan

Dear Mr. Shepherd:

Pursuant to License SMB-911 Condition 37(b), FMRI, Inc. ("FMRI") submits the enclosed information. As discussed in my letter to you dated December 14, 2006, FMRI has not yet established a schedule for the Phase II activities.

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

Sincerely,

A handwritten signature in black ink, appearing to read 'E. Jonathan Jackson'. The signature is fluid and cursive, with a large, stylized 'E' and 'J'.

E. Jonathan Jackson
President, FMRI

Copy to: Keyton Payne, Blair Spitzberg
File (NRC-122206-01)

Enclosure: Phase 2 Remediation Project Implementation Work Plan, January 2007

Phase 2 Remediation Project Implementation Work Plan
USNRC Materials License No. SMB-911
Amendment No. 12
FMRI, Inc.
Muskogee, Oklahoma

Prepared For:

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January 2007

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Penn E&R
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INTRODUCTION

On behalf of FMRI, Inc. (FMRI), Penn Environmental & Remediation, Inc. (Penn E&R) has prepared this Phase 2 Remediation Project Implementation Work Plan (Phase 2 Remediation Project WP) to address applicable regulatory requirements and specific license conditions in U.S. Nuclear Regulatory Commission (NRC) Materials License No. SMB-911, Amendment No. 12, Docket No. 40-7580 (License). In particular, Condition No. 37(b) of the License requires that a plan be submitted to the NRC by January 2, 2007, in accordance with 10 CFR 40.42(g)(4)(ii), to describe the planned decommissioning activities associated with calcium fluoride (CAF) materials contained in Pond Nos. 8 and 9 at the FMRI Muskogee, Oklahoma facility. These activities are identified in the January 14, 2003 Decommissioning Plan (DP) (amended May 8 and July 24, 2003) as Phase 2 of the decommissioning effort. Subsequent plans will be submitted to the NRC for the remaining two phases of decommissioning as the schedule in Condition No. 37 dictates.

This Phase 2 Remediation Project WP is also intended to address Condition No. 52 of the License which requires updates to the Radiation Waste Management Plan (RWMP) and Quality Assurance (QA) Plan prior to the beginning of each phase of decommissioning. These conditions are addressed to the extent practicable in **Chapters 5.0, 7.0, and 8.0** of this plan. However, the procurement and preplanning activities for the Phase 2 Remediation Project are pending. Therefore, information regarding contractor specific data, along with project details to be developed in conjunction with the selected contractor, will be supplemented at a later date.

As stated, Phase 2 of the decommissioning activities involves remediation work associated with Pond Nos. 8 and 9, which are located in Area I per the DP. Process water from the Wastewater Treatment Plant (WWTP), Pond No. 3 French drain supernatant, groundwater collected from the interceptor trench as well as stormwater from impacted site areas were treated and then passed on to Pond Nos. 8 and 9 for solids precipitation prior to passing through a Oklahoma Pollutant Discharge Elimination System (OPDES) permitted outfall. The residual materials stored in the ponds contain low-level radioactive species in a calcium fluoride (CAF) precipitate matrix.

Characterization surveys in 1993 identified the concentration of radiological contaminants in the Pond Nos. 8 and 9 residues as follows:

Pond No. 8

- Th-232 – 4.5 to 23 pCi/g
- U-238 – 9.9 to 73 pCi/g

Pond No. 9

- Th-232 – 0 to 5.4 pCi/g
- U-238 – 7.6 to 57 pCi/g

Survey data indicate that the Th-232 and U-238 are present with their radioactive progeny in secular equilibrium. The U-235 decay series is also present, because U-235 constitutes 0.7 percent by weight (approximately 2.3 percent by radioactivity) of naturally occurring uranium.

During Phase 2 Remediation Project activities, the residual materials contained within Pond Nos. 8 and 9 will be removed for off-site disposition or beneficial reuse. Accumulated surface water in each pond will be processed through the facility's WWTP and discharged through the OPDES-permitted Outfall 001.

According to plant records, Pond Nos. 8 and 9 were constructed and placed into service in 1978 and 1985 respectively. Pond Nos. 8 and 9 were constructed through a process of minor site excavation of the native soils and a build-up of pond embankments with on-site borrow materials. A single 30-mil synthetic liner was installed in each pond with the intent to retain all fluids and residues discharged to the structures.

Pond No. 8 is approximately 350 feet in length (top of berm), 350 feet in width (top of berm), and 31 feet deep. The leak detection system for Pond No. 8 consists of a 16-inch wide by 12-inch deep trench containing a 4-inch diameter slotted PVC pipe positioned north to south beneath the middle of the lined pond bottom with a sump and associated pipe penetrating through the north bank of the pond.

Pond No. 9 is approximately 600 feet in length (top of berm), 250 feet in width (top of berm), and 25 feet deep. The leak detection system for Pond No. 9 consists of a 18-inch wide by 18-inch deep trench containing a 4-inch diameter slotted PVC pipe positioned east to west beneath the middle of the lined pond bottom with a sump and associated pipe penetrating through the west bank of the pond.

Based on existing pond construction information in conjunction with the findings of pond characterization activities, FMRI developed estimated volumes and quantities of the residual materials contained in Pond Nos. 8 and 9. This information is summarized below.

Pond	Specific Gravity of Solids	Pond - % Solids	Average Residue Depth (ft)	Average Width (ft)	Average Length (ft)	Residue Volume (cu yd)	Material - Wet Weight (tons)	Material - Dry Weight(1) (tons)
No. 8	2.8	30	25	350	350	83,333	86,932	26,079
No. 9	2.8	30	24	215	565	84,170	87,804	26,341
TOTALS						167,503	174,736	52,421

(1) The dry weight is based on 80 percent solids.

This Phase 2 Remediation Project WP and all contractor specific implementation plans are to be developed using applicable NRC regulations and FMRI's policies, programs and procedures.

1.0 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 2 Remediation Project tasks. These preparations are discussed below.

1.1 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 will be logged in and out 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.

1.2 Mobilization/Demobilization

Prior to the start of Phase 2 Remediation Project activities, resources must be mobilized to the site and established to allow 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 residue material from the ponds will be transported to the site, off-loaded, serviced, fueled if required, and placed in the active work area. Support facilities (office trailers, staging locations, material processing (dewatering) 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 2 Remediation Project activities, unless agreed upon through prior arrangement with FMRI. These resources must be marshaled and be in-place prior to Phase 2 Remediation Project implementation.

At the project's end (based on the terms of the contract between the contractor and FMRI), the contractor will demobilize the remaining resources from the site. The contractor will ensure that all equipment and supplies have been properly decontaminated, surveyed, and released if used in active work areas. Support facilities (decontamination pads, office trailers, etc.) 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.

1.3 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 but will most likely involve the placement of a geotextile followed 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.

1.4 Equipment

The majority of the construction equipment anticipated for the Phase 2 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-scrapers, trackhoes, 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.

More specialized equipment may be required to dredge and dewater the residues from the two ponds. 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.

1.5 Decontamination Procedures

The focus of the contamination control program is on surveys of skin, protective and personal clothing, fixed and removable surface contamination, transport vehicles, equipment, and supplies. The contamination control program will be as follows:

- Control both access to (and work hours in) contaminated areas by workers, as required by 10 CFR 20.1702.

- 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 (i.e., actions taken either to decontaminate a person, place, item or area, or to restrict access, or to modify the type or frequency of radiological monitoring) for restricted and unrestricted areas. The applicable limits for contamination of surfaces and clothing included in Regulatory Position C.1 of Regulatory Guide 8.21, NRC FC 83-23, and NUREG-1660 will be considered.
- Require surveys of air quality based on Regulatory Guide 8.25.
- Test sealed sources and ensure that sealed sources are leak tested at appropriate intervals in accordance with the guidance in Annex A.2.1 of ANSI/HPS N43.6-1997 (for Part 70 licenses, as indicated in NRC's Branch Technical Positions for Leak Testing, April 1993).

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 and appropriate supplies for remediation personnel (contained within a trailer or similar structure) 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.

1.6 Water Management

Remediation of groundwater is not a component of Phase 2 Remediation Project activities. However, management of groundwater, surface water, decontamination water, and interstitial water within affected material will be necessary during Phase 2 Remediation Project activities. It is anticipated that the existing groundwater treatment program, utilizing the existing waste water treatment plant, will be maintained during Phase 2 decommissioning activities. Surface water will be managed so that contact with affected materials is controlled and surface water run-on into affected areas is minimized.

The existing waste water treatment plant at the site will be used to process contaminated surface water present in the ponds, residue dewatering, decontamination activities, and surface water that

may collect in open remedial excavations, unless other means or processes are approved by FMRI. Contaminated water may be collected in portable tanks or other constructed facilities, as determined necessary by the contractor. The water will then be transferred from temporary storage, or directly from the ponds, to the treatment plant for processing (at rates and times approved by FMRI) and eventual discharge through FMRI's OPDES permitted outfall.

The construction of storm water diversion structures is anticipated in order to prevent the introduction of storm water into the active work area, and to prevent the loss of potentially contaminated storm water from the active work area. Diversion channels and berms will serve this purpose. The contractor will be responsible for the design, construction, and maintenance of the storm water management controls at the site. Stormwater discharge will be controlled in accordance with the requirements of FMRI's OPDES Permit.

1.7 Dust Control

Two factors should serve to limit the amount of dust generation at the site during Phase 2 Remediation Project activities. First, the residual materials 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.

1.8 Erosion and Sedimentation Controls

The selected contractor will be responsible for the generation and approval of the project Erosion and Sedimentation (E&S) Control Plan in accordance with current Oklahoma Department of Environmental Quality regulations. E&S control measures must be in place and operational before Phase 2 Remediation Project operations can begin. Storm water discharges from the site must meet permitted discharge limits. E&S control measures shall be properly constructed and maintained until the disturbed areas are adequately stabilized. These measures may include:

- diversion channels and berms,
- sediment traps,
- temporary covers (such as plastic sheeting or tarps),
- silt fence and/or hay bale barriers,
- riprap linings,
- erosion control matting, and
- vegetative strips.

An inspection schedule and reporting protocol shall be prescribed in the selected contractor's plan. A record of inspection and all repairs made will be noted and kept on site. At a minimum, all E&S control measures will be inspected weekly during Phase 2 Remediation Project activities, every 2 weeks during inactive periods, and within 24 hours after each rainfall event exceeding 0.5 inch.

During periods when rain is occurring continuously for days, control measures will be inspected at least daily. Repairs and maintenance will be performed as soon as practical.

2.0 POND RESIDUE REMOVAL

The removal and disposition of residual materials from Pond Nos. 8 and 9 are the primary focus of the Phase 2 Remediation Project. It is anticipated that approximately 52,421 tons (80 percent solids by weight) of residues will be removed from Pond Nos. 8 and 9. The synthetic liner for each pond may be removed during the Phase 2 Remediation Project or a subsequent decommissioning phase.

It is anticipated that the contractor will perform the pond residue removal action through excavation or dredging techniques. For purposes of this work plan, excavation is defined as removal of dewatered pond residue using typical earth moving heavy equipment such as hydraulic excavators and trackhoes operating from exposed land. Dredging is defined as the removal of residues in the presence of overlying water utilizing mechanical or hydraulic removal methods operating from a floating device. Mechanical dredges generally function by excavating into the residue with a bucket (clamshell, trackhoe, dragline, dipper, or bucket ladder), similar to the land based process. Hydraulic dredges function by loosening residues with a mechanical device, and the pumping the residue in the form of a low-density slurry.

The Phase 2 Remediation Project will be staged in a logical manner so that materials will be removed without compromising the ponds stability or the flow of equipment and transportation vehicles. Double handling of the materials will be limited to the extent practicable. Materials removed from the ponds will be transported using on-site transport vehicles to the designated processing area for processing, as required by the project plans and specifications. Groundwater, residual pore water, and collected storm water that may be encountered during the Phase 2 Remediation Project will be collected and handled as described in Section 1.6.

3.0 POND RESIDUE PROCESSING

After the residue materials are removed from the ponds, they will be transported to an on-site material processing area for dewatering (drying), depending on their condition. It is anticipated that the Phase 1 Remediation Project Temporary Staging Area No. 3 will be upgraded as necessary for use as a material processing area. The area is currently lined with a 60-mil high-density polyethylene geomembrane to prevent migration of contamination to the subsurface. A working surface of common fill exists on the liner to facilitate heavy equipment operations. Berms and ditches have been constructed at the perimeter of Temporary Staging Area 3 to contain precipitation falling within the area and to prevent storm water intrusion from exterior areas. A collection sump was also constructed within the confines of the staging area for storm water management. Other similarly constructed staging areas may be used during the Phase 2 Remediation Project.

The material transported to the Material Processing Area will be tracked by removal location, date of removal, and by stockpile identification, if applicable. The contractor will be responsible for documenting material movement during this process. Once an acceptable quantity of material is ready, the material will be passively dewatered (gravity dewatered or air dried) or, if economically feasible, mechanically dewatered (pressed, centrifuged, or hydrocycloned) to reduce the water content as required. Radiological controls shall be used to eliminate or control the potential spread of contamination including the potential spread of airborne contamination. After dewatering, the material will be loaded and transported off-site for final disposition.

4.0 EARTHEN POND STRUCTURE MAINTENANCE

Backfilling of the earthen pond structures associated with Phase 2 Remediation Project activities will not take place until additional site characterization is completed at a future date. The earthen pond structures will be maintained by FMRI and/or FMRI's designated contractor after the Phase 2 Remediation Project is complete to ensure a secure and stable work environment. The selected contractor will be required to leave the earthen pond structures in a suitable condition with allowances for appropriate site controls. All alterations to the Site will be repaired and returned to original state by the contractor. Site controls may include construction fencing, site access restrictions, water management facilities, and the like. These controls will be specified further during the contractor procurement process.

5.0 MATERIAL MANAGEMENT

5.1 Transportation Management –Pond Residues

Residual materials removed from Pond Nos. 8 and 9 will either be loaded directly for transport off-site or stockpiled for processing as described in **Section 3.0**. 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 (anticipated to be 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 shipping hazardous materials (annual fees).

5.2 Acceptance Criterion – Pond Residues

FMRI is currently negotiating with Waste Control Specialist, LLC of Andrews, Texas for the disposition of the Phase 2 Remediation Project pond residues. FMRI also has had discussions with possible vendors (e.g., Cement Kilns) regarding the beneficial re-use of the CaF material. In any case, the selection of the facility will be subject to FMRI approval. Current acceptance criterion as presented in the selected facility's license will be followed as part of the material management portion of the Phase 2 Remediation Project.

5.3 Remediation Waste Management Program (RWMP)

The selected contractor will implement a Remediation Waste Management Program (RWMP) during Phase 2 Remediation Project activities for the specific purpose of controlling radioactive wastes generated as part of the decommissioning process in accordance with NRC, 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 2, will update this program prior to the beginning Phase 2 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.

5.3.1 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 and/or reclamation will be protective of the public H&S

and in accordance with NRC requirements. The applicable NRC requirements are 10 CFR Part 20 (Subpart K), 10 CFR 61.55, 61.56, 61.57, and 71.5.

The solid waste management program will be updated to include the following:

- The types and estimated volumes of solid radioactive waste that are expected to be generated during Phase 2 Remediation Project Activities, including (but not limited to) pond residues, structural and component metal, concrete, activated components, contaminated piping, wood, and plastic.
- The radionuclides (including the estimated activity of each radionuclide) in each estimated solid radioactive waste type expected to be generated during Phase 2 Remediation Project activities.
- On-site storage (prior to disposal and/or reclamation) 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.
- The name and location of the intended disposal and/or reclamation facility for each solid radioactive waste type expected to be generated during Phase 2 Remediation Project activities.

5.3.2 Liquid Waste Material

The purpose of the liquid waste management program is to ensure that controls on liquid waste stream generation, storage, treatment, disposal and/or reclamation will be protective of the public H&S and in accordance with NRC requirements. The applicable NRC requirements are 10 CFR Part 20 (Subpart K), 10 CFR 61.55, 61.56, 61.57, and 71.5.

The liquid waste management program will be updated to include the following:

- The types and volumes of liquid radioactive waste that are expected to be generated during Phase 2 Remediation Project activities.
- The radionuclides (including the estimated activity of each radionuclide) in each liquid radioactive waste type expected to be generated during Phase 2 Remediation Project activities.
- On-site storage (prior to treatment, disposal and/or reclamation) requirements for each liquid radioactive waste type expected to be generated during Phase 2 Remediation Project activities.
- A description of the treatment and packaging activities for liquid wastes to conform to the WAC 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 2 Remediation Project activities.

5.3.3 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 H&S and in accordance with NRC and USEPA requirements. The applicable NRC requirements are 10 CFR Part 20 (Subpart K), 10 CFR 61.55, 61.56, 61.57, and 71.5. The applicable USEPA requirements are 40 CFR 260-270.

The mixed waste management program will be updated to include the following:

- The types and volumes of solid and liquid mixed waste that are expected to be generated during Phase 2 Remediation Project activities.
- The radionuclides (including the estimated activity of each radionuclide) in each type of mixed waste type expected to be generated during Phase 2 Remediation Project activities.
- On-site storage (prior to disposal and/or reclamation) requirements for each mixed radioactive waste type expected to be generated during Phase 2 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 2 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 2 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 261.3[h]) for certain low-level mixed waste storage, treatment, transportation, and disposal and/or reclamation activities.

In accordance with License Condition No. 52, FMRI will make available (after contractor procurement activities are complete) the RWMP and subsequent revisions and updates for review on-site by the NRC. 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.

6.0 SITE RESTORATION

After Phase 2 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 as part of Phase 3 of the decommissioning activities.

7.0 RADIATION PROTECTION METHODS

7.1 Personnel Training and Monitoring

Training focused on the objectives of the DP will be required. Annual training and refresher training, as needed, will also be required (in order to comply with 10 CFR 19 and 10 CFR 20). A training program will be established by the selected contractor to meet project specifications and the following goals:

- 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 of FMRI to work at the Muskogee site.
- 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. 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 CFR 19.

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 20 and pertinent refresher training (e.g., training certificates and letter of certification) prior to being permitted to perform in a restricted area. All contractor personnel will be required to have OSHA 1910.120 training, and the contractor shall meet all the requirements in OSHA 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 (e.g., 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.

7.2 ALARA

FMRI's Radiation Health and Safety Program as discussed in Section 7.6 of this work plan, describes the radiation safety controls and types of monitoring to be used to ensure that internal and external exposures to workers are as low as reasonable 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.

7.3 Environmental Monitoring Program (EMP)

The selected contractor will implement an Environmental Monitoring Program (EMP) during Phase 2 Remediation Project activities for the specific purpose of evaluating whether the decommissioning activities comply with the regulatory requirements in 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.

7.4 Quality Assurance (QA) Program

It is FMRI's intention to implement appropriate Quality Assurance (QA) Program controls for Phase 2 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 guidance contained in the following document: NRC Regulatory Guide 4.15, Quality Assurance for Radiological Monitoring Program-- Effluent Streams and the Environment (NRC, 1979).

The QA Program (and associated implementing instructions and procedures) addresses the following areas, as applicable for Phase 2 Remediation Project activities:

- Selection of 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 QA/QC 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.
- 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.
 - Qualification. 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.
 - Documentation. 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. Records will be kept as part of the FMRI project file.

The QA Program (and associated implementing instructions and procedures) for sample collection and analysis address the following areas, as applicable for Phase 2 Remediation Project activities:

- 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, a specification for the following (at a minimum) will be made: required analysis and/or analytical methodology, the required MDC value for each radionuclide, any result presentation requirements, sample disposition, and turnaround time required to support the project.
- **Analytical Laboratory.** For all analytical laboratories (vendors) used, at a minimum, 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.
- **Documentation.** Written documentation on sample collection, analysis, and audits will be kept as part of the FMRI project file.

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 also be responsible for independent data gathering and audits as required in order to independently validate that the project is being executed as intended.

In accordance with License Condition No. 52, FMRI will make available (after contractor procurement activities are complete) the QA Program and Contractor QC Plan (as well as subsequent revisions and updates) for review on-site by the NRC. 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 NRC will be notified of changes in procedures and personnel that would impact the commitments of the DP before implementation of the changes. Changes in organizational elements will require NRC notification within 30 days of implementation. Editorial changes or personnel reassignments of a non-substantive nature will not require NRC notification.

7.5 Final Status Survey Plan (FSSP)

The FSSP will be written in accordance with the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575. An outline of the FSSP design is presented in Section 14.4 of the DP. The final plan will be generated by a FMRI representative for submittal to the NRC prior to the initiation of Phase 3 decommissioning activities. 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.

7.6 Radiation Health and Safety Program (RHASP)

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.
- Radiological safety measures (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.

8.0 CONTRACTOR INFORMATION

8.1 Contractor and Select 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 should be considered the minimum qualification requirements for the select personnel listed below:

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.

8.2 Contractor Responsibilities

The selected contractor's responsibilities will be as identified in the narrative of this Phase 2 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.

9.0 SCHEDULE

The anticipated contractor procurement schedule for the Phase 2 Remediation Project is provided as **Figure 9-1** to this document. A schedule for the Phase 2 Remediation Project activities has not been established.

FIGURE 9-1

Figure 9-1 - Anticipated Contractor Procurement Timeline for FMRI Phase 2 Remediation Project

