STATEMENT OF WORK
FOR REMEDIAL DESIGN/REMEDIAL ACTION
EPA - Region IV

APPENDIX B

STATEMENT OF WORK FOR THE MAXEY FLATS DISPOSAL SUPERFUND SITE

FLEMING COUNTY, KENTUCKY

********** FINAL **********

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

STATEMENT OF WORK FOR
REMEDIAL DESIGN AND REMEDIAL ACTION
AT THE MAXEY FLATS DISPOSAL SUPERFUND SITE

I. INTRODUCTION

This Statement of Work (SOW) outlines the Work Settling Defendants shall perform at the Maxey Flats Disposal Superfund Site in Fleming County, Kentucky ("the Site") to implement the remedy for the Site as described in the Record of Decision (ROD), dated September 30, 1991, and to achieve the cleanup levels and other Remedial Standards set forth in the ROD, Consent Decree, and this SOW. The requirements of this SOW will be further detailed in work plans and other documents Settling Defendants shall submit for approval as required in the Consent Decree and in this SOW. It is not the intent of this document to provide task-specific engineering or geological guidance. The terms defined in the Consent Decree shall have the same meanings when used in this SOW unless expressly provided otherwise herein.

The Work shall be performed in five tasks:

Task I	Project Planning
Task II	Initial Remedial Phase Remedial Design
Task III	Initial Remedial Phase Remedial Action
Task IV	Interim Maintenance Period, Final Closure Period and Associated Remedial Activities
Task V	Performance Monitoring

Except for the Commonwealth's Initial Remedial Phase Obligations, tasks I, II and III of the Work to implement the remedy required in the Consent Decree shall be performed by the Settling Private Parties[1]. Task IV of the Work shall be performed by the

[1]As part of Task I, the Commonwealth shall prepare and submit to EPA for review and approval an Initial Remedial Phase Monitoring and Maintenance Plan which describes the Commonwealth's monitoring and maintenance obligations during the Initial Remedial Phase.

Commonwealth of Kentucky[2]. Task V will be performed by the Commonwealth , except as otherwise specified in Task V. The Settling Private Parties and the Commonwealth shall assist EPA in conducting oversight activities of their respective tasks.

EPA review or approval of a task or deliverable shall not be construed as a guarantee as to the adequacy of such task or deliverable. If EPA modifies a deliverable pursuant to Section XIV of the Consent Decree, such deliverable as modified shall be deemed approved by EPA for purposes of this SOW. A summary of the major deliverables that Settling Defendants shall submit for the Work is attached.

II. OVERVIEW OF THE REMEDY

The objectives of the remedy for the Site are to:

Prevent or mitigate the continued release of hazardous substances, pollutants and contaminants from the Site to underlying bedrock formations and groundwater aquifers;

Prevent or mitigate the continued release of hazardous substances, pollutants and contaminants from the Site to surface water bodies and sediments;

Reduce the risks to human health associated with direct contact with hazardous substances, pollutants or contaminants within the Site;

Eliminate or reduce the risks to human health from inhalation of hazardous substances, pollutants or contaminants from the Site;

Eliminate or minimize the threat posed to human health and the environment from current and potential migration of hazardous substances from the Site in the surface water, ground water, and subsurface and surface soil and rock;

Minimize the infiltration of rainwater and ground water into the trench areas and migration from the trenches;

Allow natural stabilization of the Site to provide a foundation for a final cap over the trench disposal area

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[2]In the event that, after EPA issuance of the Certificate of Completion of the Initial Remedial Phase but prior to 10 years after EPA issuance of the Certificate of Completion of the Initial Remedial Phase, EPA determines that a Horizontal Flow Barrier is necessary, the design and implementation of the Horizontal Flow Barrier shall be performed by the Settling Private Parties.

that will require minimal care and maintenance over the long term;

Minimize the mobility of trench contaminants by extracting trench leachate to the extent practicable and by solidifying the leachate in earth mounded concrete bunkers;

Control Site drainage and minimize the potential for erosion to protect against natural degradation;

Implement institutional controls to permanently prevent unrestricted use of the Site;

Implement a Site performance and environmental monitoring program.

III. REMEDY COMPONENTS

This Statement of Work shall include the following three categories of Remedial Standards which shall be achieved by the Settling Defendants in performing the Work: 1) "Remedial Measures[3]"; 2) "Construction Standards"; and, 3) "Performance Standards", as described below. In addition, the remedy shall achieve all ARARs. All ARARs expressed in dose or numeric concentrations of particular hazardous substances or radiation, as set forth in Section 8.0 of the Record of Decision, shall be Performance Standards.

A. SOURCE CONTROL

1. The major source control components of the remedy to be performed pursuant to the Consent Decree shall include:

Extraction of trench leachate for treatment and disposal pursuant to general dewatering guidelines for the Site such as described in Reference 29;

Solidification of extracted and stored trench leachate using a grout mix from a topical report that has been approved for commercial application by the U.S. Nuclear Regulatory Commission;

Disposal of solidified leachate in earth mounded concrete (EMC) bunkers, such as described in Reference 27, on-Site within the area of contamination;

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[3]Installation of remedial measures constitutes compliance with the "as low as reasonably achievable" (ALARA) principle of 902 KAR 100:015 Section 2.

Installation of an initial cap to prevent infiltration of precipitation into the trench disposal area. The initial cap will consist of compacted soil and a synthetic liner and shall be contoured to provide drainage, in conjunction with the alignment of perimeter drainage channels and pipes, to assure cap drainage and to eliminate channeled high velocity flows that could potentially cause a cap failure;

Installation of a final cap during the Final Closure Period (FCP) to minimize, to the extent practicable, water infiltration into the disposal area.

2. Treatment of contaminated liquids

Extracted leachate shall be treated as follows:

The solidification process shall commence upon accumulation of a sufficient volume of extracted trench leachate. Leachate shall be extracted simultaneously from multiple trench sumps and batched. Once batched in tanks (25,000 gallons or less in leachate volume) on-Site, representative samples of the batched leachate shall undergo testing that meets the process control program of the topical report. Once analyzed, the leachate shall be solidified using a grout mix from a topical report that has been approved for commercial application by the U.S. Nuclear Regulatory Commission.

Liquids containing radioactive contaminants, other than leachate extracted from existing trenches, may be released from the area of contamination without treatment if the release complies with the requirements of 10 CFR §§ 20.1301 and 20.1302 (902 KAR 100:015 Section 2 and 100:019 Sections 10 and 11 (as amended))[4]. If it does not, then the liquid will be treated in the manner described in the preceding paragraph.

3. Remedial Standards

All Remedial Standards related to source control shall be met. Those Remedial Standards that have been

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[4] The Record of Decision identifies the federal standards for protection against radiation in unrestricted areas as the governing ARARs, since at the time of issuance of the ROD those standards were more stringent than the corresponding Kentucky requirements. In early 1994, Kentucky amended its radiation protection standards to match the federal ones. For convenience, both regulations are cited.

identified are as follows:

a. Leachate Extraction:

Performance Standards

Trench leachate shall be extracted from all Site trenches where extraction is determined by EPA, after a reasonable opportunity for review and comment by the Commonwealth, to be necessary and technically feasible. The trench leachate extraction program shall, to the extent practicable, feasible and necessary as determined by EPA, after a reasonable opportunity for review and comment by the Commonwealth, and in keeping with general dewatering guidelines in Reference 29, mitigate continued releases of hazardous constituents to underlying bedrock and ground water aquifer formations.

b. Leachate Solidification:

Construction Standards

Extracted leachate shall be mixed with solidification agents to form a grout which meets the requirements of 902 KAR 100:021 Sections 6 and 7 (Kentucky Standards for the Disposal of Radioactive Material as amended) and 10 CFR Parts 61.55 - .56 (Federal Licensing Requirements for Land Disposal of Radioactive Waste as amended) and the NRC Branch Technical Position on Waste Form dated January 1991.

Solidified leachate shall be in a form that meets the requirements of 902 KAR 100:021 Section 8(2)(b). In no case shall the free-standing liquid in the solidified form exceed five-tenths percent of the volume of the waste when the waste is processed in stable form.

In keeping with 902 KAR 100:021 Section 8(2)(c) void spaces within the waste and between the waste and its package shall be reduced to the extent practicable.

c. Leachate Disposal:

Construction Standards

EMC bunkers constructed for the purpose of solidified leachate disposal shall meet the

requirements of 902 KAR 100:022, Sections 19, 20, 21, and 24(1) - (11) (Kentucky Licensing Requirements for Land Disposal of Radioactive Waste). These requirements specify that closure shall be designed to achieve long-term stability and isolation of the radioactive waste, to protect against inadvertent intrusion, and to eliminate, to the extent practicable, the need for on-going, active maintenance of the disposal Site so that only surveillance, monitoring, and minor custodial care is required. The EMC bunkers described in Reference 27 satisfy these regulatory requirements.

d. Initial Cap:

Remedial Measures

Upon completion of the leachate extraction, solidification, and disposal operation, an initial cap ("cap") shall be placed over the trench and EMC bunker disposal area. The initial cap shall be maintained and repaired during the Interim Maintenance Period so as to assure proper drainage away from the trenches and to provide an effective infiltration barrier. Cap maintenance shall include backfilling to maintain proper grade and repairing and replacing the synthetic liner, as needed.

Replacement of the synthetic liner shall be conducted as the liner condition requires. Any rips, tears or cracks shall be repaired promptly upon detection. Likewise, subsided areas, which may allow ponding on the cap, shall be repaired promptly upon detection.

Construction Standards

The design criteria presented in Reference 28 shall be applied to aid in the determination of the areal extent of the cap.

A soil fill of suitable quality compacted to approximately 85 percent ASTM Proctor density shall be placed over the trench disposal area. A synthetic liner shall be placed over this compacted soil having a minimum manufacturer's warranty of 20 years and a permeability no greater than 1×10^{-7} cm/sec. The synthetic liner shall be installed in accordance with the manufacturer's specifications. The liner shall be

tested in accordance with quality assurance procedures developed during the Remedial Design.

The initial cap shall be designed and constructed with drainage contouring, in conjunction with the alignment of perimeter drainage channels and pipes, to provide finished grades that assure cap drainage and eliminate channeled high velocity flows that could potentially cause a cap failure. The drainage contouring will be designed utilizing the criteria presented in Reference 28.

The cap will be designed to eliminate, to the extent practicable, the flow of ground water to the disposal trenches by extending the cap beyond the trench area and by contouring and vegetating the unlined ground surface at the perimeter of the cap to drain surface water away from the cap. This cap will be designed such that it intercepts the Lower Marker Bed along its north side (North Channel) unless there is a sound technical basis for not doing so.

Performance Standards

The cap shall cover the trench disposal area and adjacent areas and eliminate, to the extent practicable, recharge of the disposal trenches.

The cap shall assure proper drainage away from the trenches.

e. Horizontal Flow Barrier:

Remedial Measures

Ground water modeling and analysis studies shall be performed during IRP Remedial Design to determine whether the cap extends far enough to minimize the likelihood that ground water will infiltrate the disposal trenches.

If it is determined that ground water is re-entering the disposal trenches in such significant amounts that a barrier to such recharge is required, a horizontal ground water flow barrier shall be installed to mitigate the flow of ground water to the trenches. The determination as to whether a horizontal flow barrier is necessary shall be made by EPA, after a reasonable opportunity for review and

comment by the Commonwealth, based on factors such as infiltration monitoring system data, trench water level data, historical trench leachate level monitoring data maintained by the Commonwealth, ground water modeling and criteria established during the Remedial Design. Such determination shall be made by EPA no later than 10 years after EPA issues the Certificate of Completion for the IRP.

Performance Standards

The Horizontal Flow Barrier, if constructed, shall mitigate the flow of ground water to the disposal trenches such that static trench leachate levels in trench sumps do not rise 25% or more of the level at the time of sump pumping termination, in accordance with the general trench dewatering guidelines in Reference 29, or other alternative Horizontal Flow Barrier Performance Standards as may be developed during the Initial Remedial Phase Remedial Design or Performance Standards as may be developed at the time the Horizontal Flow Barrier is designed.

f. Final Cap:

Remedial Measures

The trench stabilization criteria, to be defined in the Interim Maintenance Period Work Plan, shall be achieved. Upon achieving the trench stabilization criteria, a final cap shall be designed and constructed to optimize drainage away from the trench disposal area, to eliminate erosion of the cover to the extent practicable, and to eliminate trench leachate migration to the extent practicable.

Performance Standards

The final cap shall cover the trench disposal area and adjacent areas and eliminate, to the extent practicable, recharge of the disposal trenches.

The final cap shall assure proper drainage away from the trenches and provide an effective infiltration barrier.

The final cap shall be designed and constructed in accordance with all ARARs.

4. Compliance Testing/Monitoring

The following testing, monitoring and review shall be conducted to ensure that all Construction and Performance Standards related to source control are met:

a. Waste form testing for criteria such as compressibility, leachability, free-standing liquids, and chemical and microbial degradation parameters to demonstrate compliance with the NRC Branch Technical Position on Waste Form dated January 1991;

b. Initial cap testing for physical soil properties such as gradation, moisture and maximum densities to demonstrate compliance with gradation, maximum density and moisture requirements;

c. Initial cap liner testing in accordance with the manufacturer's recommendations;

d. Final cap testing for physical soil properties such as permeability, gradation and maximum density and moisture requirements to demonstrate compliance with those requirements developed during the Balance of Remedial Phase, if applicable;

e. Surveillance monitoring to ensure detection of radionuclide releases within the Site boundary prior to release beyond the Site boundary as required by 902 KAR 100:022 Section 25(2);

f. Well monitoring at the base of the hillslopes surrounding the Site for chemical constituents or suitable indicators using appropriate data evaluation methods to ensure compliance with Kentucky Hazardous Waste Management Regulations (401 KAR Chapter 34:060) and chemical and radionuclide testing to determine compliance with Kentucky Drinking Water Standards - Maximum Contaminant Levels (401 KAR 6:015) and Federal Drinking Water Regulations (40 CFR Parts 141, 142, and 143). The Settling Private Parties will install 15 wells at the base of the hillslope for monitoring chemical and radiological constituents. The location of these wells will be established during the IRP Remedial Design. If it is determined that more than 15 wells should be installed at the base of the hill, the Commonwealth will install any additional wells.

The Commonwealth will be responsible for performing the chemical and radiological sampling and analysis at all of these wells, including those installed by Settling Private Parties;

g. Surface water and air monitoring at appropriate locations to demonstrate compliance with 10 CFR §§ 20.1301, 20.1302 and 10 CFR Part 20, Appendix B, Table II (902 KAR 100:019 Sections 10 and 11 and Table II of KAR Section 44 (as amended)) regarding general and isotope-specific radiation protection standards for individuals in unrestricted areas;

h. Surface water testing of waters of the Commonwealth as defined by 401 KAR 5:029 Section 1(bb), to determine compliance with Kentucky Surface Water Quality Standards (401 KAR 5:031) and the criteria established under Section 304(a)(1) of the Clean Water Act. Waters of the Commonwealth are Drip Springs Hollow, No Name Hollow, Rock Lick Creek and the discharge channel below the East Detention Basin. Samples will be taken within the defined banks of the stream. Intermittent streams will be sampled during those periods of time when discernible flows occur at least 30 minutes following rainfall of 0.1 inches;

i. Air monitoring to determine compliance with the 10 mrem/year effective dose equivalent standard contained in the National Emissions Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR Part 61);

j. Air, surface water, ground water and soil monitoring at the current licensed Site property boundary to determine compliance with the 25 mrem/year dose limit found in Section 18 of 902 KAR 100:022. (Monitoring will be performed to assess whether the combined effective dose equivalent from these pathways exceeds 25 mrem/year.)

B. SURFACE WATER AND EROSION CONTROL

1. Surface water and erosion control measures shall include the following major components:

a. Lined drainage ditches shall be incorporated in the initial cap to channel all surface water runoff to the east detention basin (See Section III. A ("Source Control") of this SOW).

b. Improvements to and maintenance of the existing east main drainage channel shall also be performed as necessary. Measures for drainage channel stabilization shall include, but not be limited to:

The discharge flow from the east detention basin (and any other designed channel outlet) will be controlled to be equal to or less than the discharge for the pre-development condition for all storms up to and including the 100-year 24-hour design storm (100-year event). (The pre-development flows are discussed in Reference 28.) The outlet structure will be designed so that adjustments can be made in the discharge controls if deemed necessary during the Interim Maintenance Period.

From the discharge side of the east detention basin principal spillway at approximately elevation 1000 feet mean sea level (MSL) to the ledge rock at approximately elevation 975 feet MSL, the outlet channel (i.e., the east main drainage channel) will be designed to be rock-lined. Below elevation 975 feet MSL, the existing steeply-sloped, rock-paved outlet channel will not be disturbed and will serve as the design channel.

At approximately elevation 760 feet MSL, the potential for a concentrated overfall or headcut exists at the termination of the shale in the channel. The potential for this erosive condition will be mitigated by the installation of a small headwall structure across the channel at the termination of shale rock.

In the valley portion of the east main drainage channel, the existing sandstone armored channel will be used without modification to its existing condition except for approximately a 200-foot length that shall be improved in either of the following ways as determined during the IRP Remedial Design. From a point approximately 200 feet upstream from the confluence of the east main drain and No-Name Creek, the channel may be improved by either: (1) redirecting the channel to its previous natural course, if the natural course is determined to be stable; or (2) fully riprapping this 200-foot length of the channel, if the natural course is determined to be unstable.

c. The existing east detention basin shall be enlarged and modified to provide for an increased volume of storm water runoff which will result from installation of the initial cap and to control the discharge to the east main drainage channel to flows less than pre-development flows (defined in Reference 28) for storms up to and including a 100-year event.

d. Permanent surface water and erosion control features to be installed during Remedial Action to control surface water runoff and to minimize hillslope and cap erosion shall include:

The flows from the drainage channels and pipes along the cap perimeter will be discharged into the east detention basin by the use of paved chutes, with energy dissipators, that carry the flows to the bottom of the basin and dissipate the flow energy to minimize soil erosion in the basin.

The east detention basin will be designed for all storms up through the 100-year event as tabulated in the U.S. Weather Bureau Technical Report No. 40. The hydrograph distribution will be the SCS Type II that includes short duration storms (such as 30 minutes, 1 hour, etc.) as specified in the U.S. Soil Conservation Service National Engineering Handbook, Section 4, Hydrology.

The east detention basin embankment design will consist of compacted soil fill and rock fill, or equivalent design, with a multi-stage reinforced concrete principal spillway. The structure will be designed for at least a 100-year life with minimal maintenance. The principal spillway will consist of a multi-stage rectangular drop inlet, pipe conduit, and an energy dissipation outlet structure. A means will be included in the principal spillway to measure discharge flows.

The emergency spillway crest elevation will be set at the routed basin water level for the 100-year event. The size of the emergency spillway will be based on the routing of the Standard Project Storm rainfall of 15 inches within a 24-hour duration (reference Army Corps of Engineers CE Bulletin 52-8) and the SCS Type II distribution.

2. Remedial Standards

All Remedial Standards related to surface water and erosion control shall be met. Those Remedial Standards that have been identified are as follows:

Performance Standards

The initial cap and surface water and erosion control features, such as the east detention basin and east main drainage channel, shall be designed and maintained such that the erosion of the trench disposal area and the surrounding hillslopes is eliminated to the extent practicable so that slope stability and the integrity of the remedy is maintained over the long term.

The initial cap and surface water and erosion control features, such as the east detention basin and east main drainage channel, shall be designed and maintained such that downslope surface water runoff velocities do not exceed pre-development velocities, and siltation is eliminated to the extent practicable throughout the Interim Maintenance Period. The detention basin shall be designed to detain storm water runoff which would result from a 100-year, 24-hour storm.

The existing west detention basin and the south weir shall be closed. Cap runoff shall primarily flow to the east detention basin for controlled release into the east main drainage channel at a rate that does not exceed pre-development flows from the area of the cap.

3. Compliance Testing/Monitoring

The following testing, monitoring and review shall be conducted to ensure that all Performance Standards related to surface water and erosion control are met:

a. General Erosion Monitoring:

Erosion control monitoring shall consist of implementing a formal program of measurements and observations to determine erosion of the east, west and south main drainage channels and mass material movement in the adjacent hillsides that drain toward the channels (hereinafter called "drainage basins"). The purpose of erosion control monitoring is to establish a data base for determining potential ramifications in the event there is (1) a statistically valid trend toward an unacceptable erosive condition and (2) a

statistically valid upward trend in the concentration of radioactive materials detected in soil or soil moisture samples within the area being monitored for erosion such that the 25 millirem site boundary release limit of 902 KAR 100:022 Section 18 may be exceeded.[5] If these two conditions exist, an engineering evaluation of the measured data and site conditions will be performed to determine if any adjustments to a drainage channel or associated drainage basin is warranted. The plans and procedures for the monitoring program shall be a part of the Initial Remedial Phase Remedial Design to be prepared in Task II.

Erosion control monitoring of the drainage channels shall include the installation of surveyed monuments to provide fixed points for measuring the drainage channel profile and cross sections. The number and location of the surveyed monuments shall be determined during the IRP Remedial Design. Erosion control monitoring of mass material movement shall include the placement of known reference points for detecting mass material movement in the drainage basins. In selected locations where radiological monitoring is performed with soil moisture collectors (lysimeters), a secondary function of the lysimeters will be to provide the known reference points. Alternative methods may be used to monitor mass material movement if the use of lysimeters at selected locations is determined to be inadequate. The number and location of the selected lysimeters, or other indicators of mass material movement, will be determined during the IRP Remedial Design. Monuments and mass material movement indicators shall be surveyed annually. The resulting data base shall be evaluated as part of each five-year review by comparing mass material movement indicator positions and drainage channel profile/cross section data with baseline measurements taken before the completion of the IRP Remedial Action.

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[5]"Site boundary " or "current licensed Site property boundary" means the area delineated in the map which serves as Appendix H to the Consent Decree.

b. East Main Drainage Channel and Drainage Basin:

Since the cap will be designed to drain all cap runoff to the east detention basin, the majority of the erosion control monitoring will be of the east main drainage channel and its associated basin. The east main drainage channel and drainage basin monitoring area shall extend from the outlet of the east detention basin to the confluence of the east main drainage channel with No-Name Creek.

c. West and South Drainage Channels and Drainage Basins:

Since only minimal runoff from the area of contamination will drain down the south and west hillsides, a formal, but less extensive program of measurements and observations will be performed along the principal drainage channels of these areas. Along the south drainage channel and its associated drainage basin, monitoring shall extend from the point where the drainage from the south perimeter road flows into the south drainage channel to the point where the south drainage channel crosses Rock Lick Creek Road.

On the west hillside, monitoring shall be performed along two drainage channels and their associated drainage basins. One channel extends from the west perimeter road of the restricted area, at a point adjacent to Trench 33, to the access road of the Lambert property in a direction approximately perpendicular to the west perimeter road[6]. The other channel extends from the outlet of the existing west detention basin to Drip Springs Creek on the Lambert property.

C. ACCESS CONTROL, SECURITY AND NOTIFICATION

1. The major components of access control, security and notification to be implemented by Settling Defendants shall include the following:

a. Access to the disposal area shall be physically controlled to prevent inadvertent intrusion onto the Site;

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[6] The Lambert property is Parcel #36 on Fleming County Property Identification Map No. 97, Revised June 1981.

b. Acquisition and establishment of a buffer zone adjacent to the Site, as described more fully in Section 10.0 of the ROD;

c. Installation of permanent surface monuments and markers warning against intrusion;

d. In conjunction with fulfillment of Section V.10 of the Consent Decree, notification of the approximate quantity and nature of the waste disposed of at the Site and general description of the Restricted Area shall be submitted to the Fleming County Judge/Executive within 15 days of entry of the Consent Decree and this SOW.

2. Performance Standards

Access control and buffer zone acquisition measures shall be implemented, as required by the ROD, Consent Decree and this SOW.

IV. TASKS AND DELIVERABLES

The specific scope of the Work to be performed by the Settling Defendants shall be documented in the Initial Remedial Phase Monitoring and Maintenance Plan, Initial Remedial Phase Remedial Design (IRP RD) Work Plan, Initial Remedial Phase Remedial Action (IRP RA) Work Plan, Interim Maintenance Period Work Plan, Final Closure Period Work Plan, Final Closure Period RA Work Plan, Institutional Control Work Plan, and Post-Institutional Control Work Plan. Plans, specifications, submittals, and other deliverables shall be subject to EPA review and approval in accordance with Section XIV of the Consent Decree. Upon approval, all deliverables and the approved schedules contained therein shall be deemed incorporated by reference into the Consent Decree and this SOW, as binding requirements upon the Settling Defendants.

In the interest of facilitating the timely implementation of the leachate removal/disposal (LR/D) activities, one or more portions of the IRP RD/RA deliverables, which are described in Tasks II and III below, may be submitted in advance of the complete deliverables. EPA will review and comment on or approve these deliverables as they are submitted.

Settling Defendants shall perform the following tasks:

TASK I - PROJECT PLANNING

A. IRP MONITORING AND MAINTENANCE PLAN

Within 45 days of the entry of the Consent Decree, the Commonwealth shall submit an IRP Monitoring and Maintenance Plan to EPA for review and approval. The IRP Monitoring and Maintenance Plan shall describe the specific tasks to be performed by the Commonwealth during the IRP RD and RA, frequency of task, and proposed location of sample collection. Sample collection procedures, laboratory identification, analysis procedures and designated Commonwealth personnel performing these tasks shall also be specified in the plan. This plan shall include, but not be limited to, the following tasks:

- Chemical and radiological monitoring of ground water and surface water
- Airborne radioactivity monitoring
- Gamma radiation monitoring
- Vegetation monitoring
- Colluvial soil monitoring
- Site surveillance
- Site maintenance activities such as grass cutting, ditch cleaning, fence repair, routine cap repair, and subsidence monitoring and repair
- Access control and security

B. SITE BACKGROUND

Settling Private Parties shall gather and evaluate the existing relevant information regarding the Site and shall conduct a visit to the Site, as necessary, to assist in planning the IRP RD/RA as follows:

1. Collect and Evaluate Existing Data and Document the Need for Additional Data

Before planning IRP RD/RA activities, relevant, existing Site data shall be thoroughly compiled and reviewed by Settling Private Parties. Specifically, this shall include the ROD, RI/FS, and other available data related to the Site. Based on this information, the Settling Private Parties shall prepare and submit a technical memorandum documenting any need, or lack thereof, for additional data needed for implementation of the IRP along with the proposed Data Quality Objectives (DQOs). Final decisions on the necessary data, DQOs and verification studies shall be made by EPA. Implementation of Task II below by Settling

Private Parties shall not be contingent upon EPA approval of the technical memorandum.

2. Conduct Site Visit

If determined to be necessary by EPA, Settling Private Parties shall visit the Site with the EPA Remedial Project Manager (RPM) during the project planning phase to assist in developing a conceptual understanding of the requirements for performing the IRP. Information gathered during this visit shall be utilized to plan the project and to determine the extent of the additional data necessary to implement the IRP.

C. PROJECT PLANNING

Once Settling Private Parties have collected and evaluated existing data and visited the Site, the specific project scope shall be planned in accordance with Task II below. Settling Private Parties shall meet with EPA during this evaluation regarding the remaining Work under this SOW.

TASK II - IRP REMEDIAL DESIGN

The IRP Remedial Design (IRP RD) shall provide the technical details for implementation of the IRP Remedial Action (IRP RA) in accordance with currently accepted environmental protection technologies and standard professional engineering and construction practices. The IRP RD shall include clear and comprehensive design plans and specifications.

A. IRP REMEDIAL DESIGN PLANNING

At the conclusion of the project planning activities, Settling Private Parties shall submit an IRP RD Work Plan, which shall include a Sampling and Analysis Plan (SAP). These two plans are described in more detail in Paragraphs 1 and 2 below, respectively. The IRP RD Work Plan shall include, but not be limited to:

- leachate removal
- leachate temporary storage
- leachate solidification
- solidified leachate disposal
- trench design and construction (for other than solidified leachate disposal)
- EMC bunker design and construction
- on-Site facilities for RD and RA data acquisition
- initial cap design and construction
- grading and contouring of initial cap to enhance surface water flow

- cap and hillslope surface water control and erosion control measures
- demolition and disposal of structures, equipment, and solid waste
- institutional control measures
- Site monitoring
- establishment of monitoring/surveillance systems

Upon approval of the IRP RD Work Plan, Settling Private Parties shall implement the IRP RD Work Plan in accordance with the design management schedule contained therein.

In the interest of facilitating timely implementation of the leachate removal/disposal (LR/D) activities, one or more portions of the IRP RD Work Plan may be submitted in advance of the complete IRP RD Work Plan. Should Settling Private Parties submit some deliverables in advance of the complete IRP RD Work Plan, Settling Private Parties shall submit the complete IRP RD Work Plan no later than 90 days following initiation of leachate removal and solidification.

In conjunction with each partial submittal of the IRP RD Work Plan, Settling Private Parties shall submit a corresponding partial Quality Assurance Project Plan (QAPP), Sampling and Analysis Plan (SAP) and Health and Safety Plan (HASP), which shall be sufficient to cover the planned Work. The IRP RD Work Plan, HASP, SAP and the QAPP must be reviewed and approved by EPA, and a reasonable opportunity provided for review and comment by the Commonwealth, prior to the initiation of field activities. Plans, specifications, submittals, and other deliverables shall be subject to EPA review and approval in accordance with Section XIV of the Consent Decree. Review and/or approval of design submittals shall only permit Settling Private Parties to proceed to the next step of the design process. Approval does not imply acceptance of later design submittals that have not been reviewed, nor does it imply that the remedy, when constructed, will meet Performance Standards.

1. <u>IRP RD Work Plan</u>

Settling Private Parties shall submit a IRP RD Work Plan to EPA for review and approval. The IRP RD Work Plan shall be developed in conjunction with the IRP Health and Safety Plan (HASP), IRP Sampling and Analysis Plan (SAP) and an IRP Quality Assurance Project Plan (QAPP), although each plan may be delivered under separate cover. The IRP RD Work Plan shall include a comprehensive description of the additional data collection and evaluation activities to be performed, and the plans and specifications to be

prepared pertaining to trench leachate removal, temporary leachate storage, leachate solidification, earth mounded concrete bunker design and construction, trench design and construction, solidified leachate disposal, on-Site facilities for RD and RA data acquisition, initial cap construction, grading and contouring of initial cap to enhance surface water flow, cap and hillslope surface water control features and erosion control measures, demolition and disposal of structures, equipment and solid waste, institutional controls, and monitoring systems and maintenance and surveillance activities. A comprehensive design management schedule for completion of these major activities shall also be included.

Specifically, the IRP RD Work Plan shall include the following:

a. A statement of the problems and potential problems posed by the Site and the objectives of the IRP phase of the RD/RA.

b. An updated version of the background summary in the RI Report, including:

   - A brief description of the Site including the geographic location and the physiographic, hydrologic, geologic, demographic, ecological, and natural resource features;

   - A brief synopsis of the history of the Site including a summary of past disposal practices and a description of previous responses that have been conducted by local, State, Federal, or private parties;

   - A summary of the existing data, including physical, radiological and chemical characteristics of the contaminants identified and their distribution among the environmental media at the Site.

c. A list and detailed description of the tasks to be performed to complete the IRP, information needed for each task, information to be produced during and at the conclusion of each task, and a description of the Work products that shall be submitted to EPA and the Commonwealth in connection with those tasks. This description shall include the deliverables set forth in the remainder of Task II which are related to IRP

Activities.

d. A schedule with specific dates for completion of each required activity and submission of each deliverable required by the Consent Decree and this SOW for performance of the IRP. This schedule shall also include information regarding timing, initiation and completion of all critical path milestones for each such activity and/or deliverable.

e. A project management plan, including a data management plan, and provision for monthly reports to EPA and the Commonwealth, and meetings and presentations to EPA and the Commonwealth at the conclusion of each major phase of the overall IRP RD/RA. The data management plan shall address the requirements for project management systems, including tracking, sorting, and retrieving the data along with an identification of the software to be used, minimum data requirements, data format and backup data management. The plan shall address both data management and document control for all activities conducted during the IRP RD/RA.

f. A description of the on-Site office and facilities provided by Settling Private Parties for use by EPA and the Commonwealth during the IRP.

g. A description of the community relations support activities to be conducted during the RD. At EPA's request, Settling Private Parties shall assist EPA in preparing and disseminating information to the public regarding the RD Work to be performed.

2. Sampling and Analysis Plan (SAP)

The Sampling and Analysis Plan (SAP) required to be prepared by Settling Private Parties shall ensure that sample collection and analytical activities are conducted in accordance with technically acceptable protocols and that the data generated will meet the DQOs established in the SAP. The SAP shall include a Quality Assurance Project Plan (QAPP) for the portion of the RD/RA addressed by the SAP.

The SAP shall define in detail the sampling and data gathering methods that shall be used on the project. They shall include sampling objectives, sample locations (horizontal and vertical) and frequency, sampling equipment and procedures, and sample handling and analysis. The QAPP shall describe the project objectives and organization, functional activities, and quality assurance and quality control (QA/QC) protocols that shall be used to achieve the desired DQOs. The DQOs shall, at a minimum, reflect use of analytical methods for obtaining data of sufficient quality to meet National Contingency Plan (NCP) requirements as identified at 300.435(b) of the NCP. In addition, the QAPP shall address personnel qualifications, sampling procedures, sample custody, analytical procedures, and data reduction, validation, and reporting. All other procedures must be consistent with the Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual and the guidances specified in Section XI of the Consent Decree.

Settling Private Parties shall demonstrate in advance and to EPA's satisfaction that each laboratory it may use is qualified to conduct the proposed Work and meets the requirements specified in Section XI of the Consent Decree. EPA may require Settling Private Parties to submit detailed information to demonstrate that the laboratory is qualified including information on personnel qualifications, equipment and material specification, and laboratory analyses of performance samples (blank and/or spike samples). In addition, EPA may require submittal of data packages equivalent to those generated by the EPA Contract Laboratory Program (CLP). Laboratories conducting radionuclide analyses shall participate in the U.S. EPA cross-check program.

3. Health and Safety Plan

A HASP shall be developed for the remedial activities at the Site. The HASP shall be prepared in conformance with Settling Private Parties health and safety program, and in compliance with OSHA regulations and all Kentucky regulations relating to worker exposure to radiation. The HASP shall include a health and safety risk analysis, a description of monitoring and personal protective equipment, medical monitoring, and provisions for Site control. EPA, after a reasonable

opportunity for review and comment by the Commonwealth, will review and approve the HASP to ensure that all necessary elements are included and to ensure that all health and safety procedures are fully described and in compliance with OSHA and Commonwealth regulations relating to worker exposure to radiation and hazardous substances, including the Commonwealth's Site-specific safety training and monitoring requirements.

B. IRP REMEDIAL DESIGN FIELD DATA ACQUISITION

Prior to commencement of the IRP, and concurrent with performance of the IRP RD, Settling Private Parties shall conduct field data acquisition in accordance with the approved IRP RD Work Plan and Sampling and Analysis Plan described above. Field data shall include, but not be limited to:

1. Geophysical Surveys

a. Prepare field survey specifications;
b. Perform surveys.

2. Topographic Survey

Prepare a topographic map from aerial photographs of the Site taken in March 1992.

3. Site Equipment Inventory

Log the location, physical dimensions, radiological characteristics and condition of:

- wells
- trench sumps
- lysimeters
- buildings and structures
- equipment
- drummed waste and uncontained solid waste.

4. Baseline Radiological/Chemical Sampling and Analysis Program

Sampling of:

- trench leachate
- food crops and trees
- surface water, soil water, and ground water
- stream sediment and soil
- air

to the extent necessary to supplement information already available as a result of the Remedial Investigation and the Commonwealth's ongoing monitoring at the Site.

C. IRP PRELIMINARY REMEDIAL DESIGN

IRP Preliminary Remedial Design shall begin with initial design and shall end with the completion of approximately 30 percent of the design effort. At this stage, Settling Private Parties shall field verify, as necessary, the existing conditions of the Site. The technical requirements of the IRP RA shall be addressed and outlined so that they may be reviewed to determine if the final design will provide an effective remedy. Supporting data and documentation shall be provided with the design documents defining the functional aspects of the project. EPA, after a reasonable opportunity for review and comment by the Commonwealth, shall review and comment on the IRP Preliminary Remedial Design Report. In accordance with the design management schedule established in the approved IRP Remedial Design Work Plan, Settling Private Parties shall submit to EPA and the Commonwealth the IRP Preliminary RD which shall consist of the following:

1. Results of IRP Data Acquisition Activities

Data gathered during the project planning phase shall be compiled, summarized, and submitted along with an analysis of the impact of the results on remedial design activities. In addition, surveys conducted to establish topography, rights-of-way, easements, and utility lines shall be documented. Utility requirements and acquisition of access, through purchases or easements, that are necessary to implement the IRP shall also be discussed.

2. IRP Remedial Design Criteria Report

The concepts supporting the technical aspects of the remedial design shall be defined in detail and presented in this report. Specifically, the IRP Remedial Design Criteria Report shall include the preliminary design assumptions and parameters, including:

a. Batched leachate characterization
b. Pumping rate, volume, and storage capacity requirements
c. Waste form, mixing/pumping rate and volume
d. Earth mounded concrete bunker design,

quantity, and location
e. Trench design, quantity and location
f. Initial cap design parameters including cap materials, permeabilities, thicknesses and liner requirements and surface water and erosion control measures
g. Monitoring systems
h. Performance standards

3. IRP Preliminary Remedial Design Plans and Specifications

Settling Private Parties shall submit to EPA and the Commonwealth an outline of the required drawings, including preliminary sketches and layouts, describing conceptual aspects of the IRP RD, unit processes, etc. In addition, an outline of the required specifications, including Performance Standards, shall be submitted. Construction drawings shall reflect organization and clarity, and the scope of the technical specifications shall be outlined in a manner reflecting the final specifications.

D. IRP PREFINAL AND FINAL REMEDIAL DESIGN

Settling Private Parties shall submit the IRP Prefinal Remedial Design Report when it is approximately 90 percent complete in accordance with the approved design management schedule. Settling Private Parties shall address comments generated from the review of the IRP Preliminary Remedial Design Report and subsequent review comments in meetings and informal reviews by EPA and the Commonwealth and clearly show any modification of the design resulting from incorporation of the comments. The IRP Prefinal Remedial Design Report shall function as the draft version of the IRP Final Remedial Design Report. After EPA review and comment on the IRP Prefinal Remedial Design Report, Settling Private Parties shall submit the IRP Final Remedial Design Report along with a memorandum indicating how the IRP Prefinal Remedial Design Report comments were incorporated into the IRP Final Remedial Design Report. All IRP Final Remedial Design documents shall be certified by a Professional Engineer registered in the Commonwealth of Kentucky. EPA must approve the IRP Final Remedial Design Report before Settling Private Parties may initiate the IRP, unless specifically authorized by EPA. Settling Private Parties shall submit the following with, or as part of, the IRP Prefinal and Final Remedial Design Reports:

1. Complete Remedial Design Analyses

The selected IRP RD along with an analysis supporting the IRP RD approach. Design calculations shall be included.

2. Final IRP RD Plans and Specifications

A complete set of construction drawings and specifications which describe the selected remedial design.

3. Final IRP RA Construction Schedule

A final IRP RA construction schedule for EPA approval.

TASK III - IRP REMEDIAL ACTION

The IRP Remedial Action performed by Settling Private Parties pursuant to the Consent Decree shall include the following components: trench leachate removal and solidification, trench construction, earth mounded concrete bunker construction, solidified leachate disposal, surface water and erosion control measures, initial cap construction, initial cap grading and contouring, demolition and disposal of structures and equipment and solid waste, and establishment of maintenance, monitoring and surveillance systems.

A. IRP REMEDIAL ACTION PLANNING

Concurrent with the submittal of the draft IRP final Remedial Design Report, Settling Private Parties shall submit a draft IRP RA Work Plan, an IRP Construction Management Plan, an IRP Construction Quality Assurance Plan, and an IRP Construction Health and Safety Plan/Contingency Plan for review and comment by EPA, and a reasonable opportunity provided for review and comment by the Commonwealth. Within 30 days after approval of the IRP Final Remedial Design Report, Settling Private Parties shall submit a final IRP RA Work Plan, IRP Construction Management Plan, IRP Construction Health and Safety Plan/Contingency Plan and IRP Construction Quality Assurance Plan for review and approval prior to initiation of the IRP Work.

Upon approval of the IRP Final Remedial Design Report and the IRP RA Work Plan, Settling Private Parties shall implement the IRP RA Work Plan in accordance with the approved construction management schedule. Significant field changes to the IRP as set forth in the IRP RA Work Plan and IRP Final Remedial Design Report shall not be undertaken without the approval of EPA, after a reasonable

opportunity for review and comment by the Commonwealth. The IRP shall be documented in enough detail to produce as-built construction drawings after the IRP is complete. Deliverables shall be submitted to EPA for review and approval in accordance with Section XIV of the Consent Decree. Review and/or approval of IRP submittals shall only permit Settling Private Parties to proceed to the next step of the remedial action process. Approval does not imply acceptance of later IRP submittals that have not been reviewed, nor does it imply that the remedy, when constructed, will meet Performance Standards.

1. IRP RA Work Plan

Settling Private Parties shall submit a Work Plan which provides a detailed plan of action for completing the IRP RA activities to EPA for review and approval. This Work Plan shall provide for the safe and efficient completion of the IRP. The Work Plan shall be developed in conjunction with the IRP Construction Management Plan, the IRP Construction Quality Assurance Plan, and the IRP Construction Health and Safety Plan/Contingency Plan, although each plan may be delivered under separate cover. The IRP RA Work Plan shall include a comprehensive description of the IRP activities to be performed and a construction schedule for completion of each major IRP activity and submission of each IRP deliverable.

Specifically, the IRP RA Work Plan shall include the following:

a. A detailed description of the IRP tasks to be performed and a description of the work products to be submitted to EPA, including the deliverables set forth in the remainder of Task III which pertain to IRP activities;

b. A schedule for completion of each required activity and submission of each IRP deliverable required by this Consent Decree, including those in this SOW;

c. A project management plan, including provision for monthly reports to EPA and the Commonwealth and joint meetings and presentations to EPA and the Commonwealth at the conclusion of each major phase of the IRP (EPA's Project Coordinator, the Settling Private Parties Project Coordinator and a representative of the Commonwealth will meet, at a minimum, on a quarterly basis, unless EPA determines that such meeting is unnecessary);

d. A description of the community relations support activities to be conducted during the IRP. At EPA's request, Settling Private Parties shall assist EPA in preparing and disseminating information to the public regarding the IRP to be performed.

e. A description of the strategy for delivering the project. This section shall address the management approach for implementing the IRP, including procurement methods and contracting strategy, phasing alternatives, and contractor and equipment availability concerns.

2. IRP Construction Management Plan

Settling Private Parties shall develop an IRP Construction Management Plan to indicate how the construction activities are to be implemented and coordinated with EPA and the Commonwealth during the IRP. Settling Private Parties shall designate a person to be an on-Site Project Coordinator and their representative on-Site during the IRP, and identify this person in the Construction Management Plan. The Construction Management Plan shall also identify other key project management personnel comprising the IRP Construction Project Team along with the lines of authority, and provide descriptions of the duties of the key personnel along with an organizational chart. In addition, a plan for the administration of construction changes and EPA review and approval of those changes shall be included.

3. IRP Construction Quality Assurance Plan

Settling Private Parties shall develop and implement an IRP Construction Quality Assurance Program to ensure, with a reasonable degree of certainty, that the completed IRP meets or exceeds all design criteria, plans and specifications, and Remedial Standards. At a minimum, the IRP Construction Quality Assurance Plan shall include the following elements:

a. A description of the quality control organization, including a chart showing lines of authority, identification of the members of the Independent Quality Assurance Team (IQAT), and acknowledgment that the IQAT will implement the control system for all aspects of the Work specified and shall report to the project coordinator and EPA. The IQAT members shall be representatives from testing

and inspection organizations and/or the Supervising Contractor and shall be responsible for the QA/QC of the IRP RA. The members of the IQAT shall have a good professional and ethical reputation, previous experience in the type of QA/QC activities to be implemented, and demonstrated capability to perform the required activities. They shall also be independent of the construction contractor.

b. The name, qualifications, duties, authorities, and responsibilities of each person assigned a QC function.

c. Description of the observations and control testing that will be used to monitor the construction and/or installation of the components of the IRP. This includes information which certifies that personnel and laboratories performing the tests are qualified and the equipment and procedures to be used comply with applicable standards. Any laboratories to be used shall be specified. Criteria for acceptance or rejection of laboratories shall be listed and plans for implementing corrective measures shall be addressed.

d. A schedule for managing submittals, testing, inspections, and any other QA functions (including those of contractors, subcontractors, fabricators, suppliers, purchasing agents, etc.) that involve assuring quality workmanship, verifying compliance with the plans and specifications, or any other QC objectives. Inspections shall verify compliance with all environmental requirements and include, but not be limited to, air quality and emissions monitoring records and waste disposal records.

e. Reporting procedures and reporting format for QA/QC activities including such items as daily summary reports, schedule of data submissions, inspection data sheets, problem identification and corrective measures reports, evaluation reports, acceptance reports, and final documentation. Documents prepared by IQAT members shall be made available to representatives of EPA, the Commonwealth and Settling Private Parties.

f. A list of definable features of the Work to be performed. A definable feature of Work is a task which is separate and distinct from other tasks and has separate control requirements.

4. IRP Construction Health and Safety Plan/Contingency Plan

Settling Private Parties shall prepare a IRP Construction Health and Safety Plan/Contingency Plan in conformance with Settling Private Parties' health and safety program, and in compliance with OSHA regulations as well as Kentucky regulations relating to worker exposure to radiation. The IRP Construction Health and Safety Plan/Contingency Plan shall include a health and safety risk analysis, a description of monitoring and personal protective equipment, medical monitoring, and Site control. EPA will review, and provide a reasonable opportunity for review and comment by the Commonwealth, the Construction Health and Safety Plan/Contingency Plan to ensure that all of the necessary elements are included and to ensure that all health and safety procedures are fully described and in compliance with OSHA and Commonwealth regulations relating to worker exposure to radiation and hazardous substances, including the Commonwealth's Site-specific safety training and monitoring requirements. This plan shall include a Contingency Plan and incorporate Air Monitoring and Spill Control and Countermeasures Plans. The Contingency Plan shall be written to ensure protection of on-Site construction workers and the local population potentially affected. It shall include the following items:

a. Name of person who will be responsible in the event of an emergency incident, as well as at least two alternates.

b. Plan for Site safety indoctrination and training for all employees, name of the person who will give the training and the topics to be covered.

c. Plan and date for meeting with the local community, including local, state and federal agencies involved in the cleanup, as well as the local emergency squads and the local hospitals.

d. A list of the first aid and medical facilities including location of first aid kits, names of personnel trained in first aid, a clearly marked map with the route to the nearest medical facility, all necessary emergency phone numbers conspicuously posted at the Site (i.e., fire, rescue, and the Kentucky Disaster Emergency Services (KDES)).

e. Plans for protection of public and visitors to the Site.

f. Air and Radiation Monitoring Plan which incorporates the following requirements:

- Air and radiation monitoring shall be conducted on-Site, at the restricted area boundary and at the Site boundary. The radiological constituents that were identified during the Risk Assessment shall serve as a basis of the sampling and measurement of pollutants in the atmosphere and radiological control areas. Settling Private Parties shall clearly identify these compounds along with the required detection and notification levels for the restricted and unrestricted areas. Air and radiation monitoring shall include personnel monitoring where applicable.

- Personnel monitoring shall be conducted according to 10 CFR §§ 20.1501 and 20.1502 (902 KAR 100:019 Sections 12 and 13), OSHA, NIOSH and NRC regulations (as amended).

- On-Site area monitoring shall consist of continuous real-time monitoring performed immediately adjacent to any waste excavation areas, treatment areas, and any other applicable areas when work is occurring. Measurements shall be taken in the radiological control areas to include, but not be limited to: on-Site worker bioassays, contamination surveys, radiation surveys, high volume air sample surveys, and tritium air sample surveys. Additionally, the breathing zones of personnel immediately upwind and downwind of the work areas shall be surveyed for hazardous chemical constituents. Equipment shall include the following, at a minimum: self reading dosimeters, portable alpha, beta and gamma radiation survey meter, scintillation probes (alpha and gamma detector), hand probe (beta detector), tritium monitor, organic vapor meter, explosivity meter, particulate monitoring equipment, and on-Site windsock.

- Monitoring shall consist of monitoring airborne radiological contaminants at the boundary of the restricted area and

the Site boundary to determine whether harmful concentrations of toxic constituents are migrating off-Site. EPA approved methods shall be used for sampling and analysis of air. The results of the air monitoring and the on-Site meteorological monitoring shall be used to assess the potential for off-Site exposure to toxic materials. The air monitoring program shall include provisions for notifying nearby residents, local, state and federal agencies in the event that unacceptable concentrations of airborne contaminants are migrating off-Site. Settling Private Parties shall report detection of levels of airborne contaminants above the limits of 40 CFR Part 61 to EPA in accordance with Section XVIII of the Consent Decree.

g. A plan for instituting a medical surveillance program which shall address medical requirements for Site workers, physician examinations, personnel dosimetry records and summary reports, and transfer of personnel monitoring records to the appropriate state and federal agencies.

h. A Spill Control and Countermeasures Plan which shall include the following:

- Contingency measures for potential spills and discharges from materials handling and/or transportation.

- A description of the methods, means, and facilities required to prevent contamination of soil, water, atmosphere, and uncontaminated structures, equipment, or material by spills or discharges which could potentially occur during the pumping and solidification operations.

- A description of the equipment and personnel necessary to perform emergency measures required to contain any spillage and to remove spilled materials and soils or liquids that become contaminated due to spillage. This collected spill material must be properly disposed of.

- A description of the equipment and personnel to perform decontamination measures that may be required for previously

uncontaminated structures, equipment, or material.

B. PRECONSTRUCTION CONFERENCE

Settling Private Parties and federal, state and local government agencies shall hold a Preconstruction Conference which shall take place after selection of the construction contractor but before initiation of IRP construction. The Preconstruction Conference agenda shall include:

1. Defining the roles, relationships, and responsibilities of all parties;

2. Reviewing methods for documenting and reporting inspection data;

3. Reviewing methods for distributing and storing documents and reports;

4. Reviewing work area security and safety protocols;

5. Reviewing the approved construction schedules;

6. Conducting a Site reconnaissance to verify that the design criteria and the plans specifications are understood and to review material and equipment storage locations.

The Preconstruction Conference must be documented, including, at a minimum, names of people in attendance, issues discussed, clarifications made, special instructions issued.

C. IRP PREFINAL CONSTRUCTION INSPECTION

Upon preliminary completion of the IRP, Settling Private Parties shall notify EPA for the purpose of conducting a Prefinal Construction Inspection. Participants should include the Project Coordinators, Supervising Contractor, Construction Contractor, and other federal, state, and local agencies with a jurisdictional interest. The Prefinal Construction Inspection shall consist of a walk-through inspection of the entire project Site. The objective of the inspection is to determine whether the IRP is complete and consistent with the Consent Decree. Any outstanding construction items discovered during the inspection shall be identified and noted on a punch list. Additionally, monitoring equipment shall be operationally tested by Settling Private Parties. Settling Private Parties shall certify that the equipment has performed to effectively meet the purpose and intent of the specifications. Retesting

shall be completed where the initial testing reveals deficiencies. A Prefinal Construction Inspection Report shall be submitted by Settling Private Parties for the Prefinal Construction Inspection which outlines the outstanding construction items, actions required to complete the items, completion date for the items, and an anticipated date for the IRP Final Construction Inspection.

D. IRP FINAL CONSTRUCTION INSPECTION

EPA will perform a Final Construction Inspection for the IRP, consisting of a walk-through inspection of the entire project Site. Upon Settling Private Parties' completion of all outstanding construction items for the IRP, Settling Private Parties shall notify EPA for the purpose of conducting a Final Construction Inspection. The IRP Prefinal Construction Inspection Report shall be used as a checklist with the Final Construction Inspection focusing on the outstanding construction items identified in the Prefinal Construction Inspection. All tests that were originally unsatisfactory shall be conducted again. Confirmation shall be made during the IRP Final Construction Inspection that all outstanding items have been resolved. Any outstanding construction items discovered during the inspection still requiring correction shall be identified and noted on a punch list. If any items are found unresolved during the IRP Final Construction Inspection, then that inspection shall be considered to be a Prefinal Construction Inspection, requiring another IRP Prefinal Construction Inspection Report and subsequent IRP Final Construction Inspection.

E. IRP FINAL CONSTRUCTION INSPECTION REPORT

Within sixty (60) days following the conclusion of the IRP Final Construction Inspection, Settling Private Parties shall submit an IRP Final Construction Inspection Report for the IRP. EPA, after a reasonable opportunity for review and comment by the Commonwealth, will provide comments to Settling Private Parties. The IRP Final Construction Inspection Report shall include the following:

1. Brief description of how outstanding items noted in the Prefinal Inspection were resolved;

2. Explanation of modifications made during the IRP Work to the original IRP RD and IRP RA Work Plans and why these changes were made;

3. As-built drawings;

4. Synopsis of the construction work defined in the SOW and certification that the construction work has been completed.

F. IRP REMEDIAL ACTION REPORT

As provided in Section XVII of the Consent Decree, within 90 days after Settling Private Parties conclude that the IRP has been fully performed and the Performance Standards have been achieved, Settling Private Parties shall so certify to the United States and shall schedule and conduct a pre-certification inspection to be attended by EPA, the Commonwealth and Settling Private Parties. If after the pre-certification inspection Settling Private Parties still believe that the IRP has been fully performed and the Performance Standards have been achieved, Settling Private Parties shall submit an IRP RA Report to EPA in accordance with Section XVII of the Consent Decree. The IRP RA Report shall include the following:

1. A copy of the IRP Final Construction Inspection Report;

2. A synopsis of the Work defined in this SOW and a demonstration in accordance with the Performance Standards Verification Plan that Performance Standards have been achieved; and

3. Certification that the IRP has been completed in full satisfaction of the requirements of the Consent Decree.

After review by EPA, and after a reasonable opportunity for review and comment by the Commonwealth, Settling Private Parties shall address any comments and submit a revised report. As provided in Section XVII of the Consent Decree, the IRP shall not be considered complete until EPA approves the IRP RA Report.

TASK IV - INTERIM MAINTENANCE PERIOD, FINAL CLOSURE PERIOD, AND ASSOCIATED REMEDIAL ACTIVITIES

The remainder of the selected remedy includes the Interim Maintenance Period and Final Closure Period, collectively referred to as the Balance of Remedial Phase (BoRP). The BoRP contains two separate and distinct periods of action: 1) an Interim Maintenance Period (IMP), which commences upon issuance of the Certificate of Completion for the IRP and ends when EPA concludes, in consultation with the Commonwealth, that the trench stabilization criteria have been achieved. The IMP includes initial cap maintenance, trench leachate management, installation of a horizontal flow barrier, if necessary, and site maintenance and monitoring; and, 2) a Final Closure Period (FCP), which commences upon EPA determination that the trench stabilization

criteria, as defined in the IMP Work Plan, have been achieved and concludes when EPA issues the Certificate of Completion for the BoRP. The FCP includes installation of the final cap and burial of remaining Site waste and debris.

acquisition of 3 buffer properties

A. INTERIM MAINTENANCE PERIOD

Six months prior to completion of the IRP RA, the Commonwealth shall submit to EPA the Interim Maintenance Period (IMP) Work Plan. A copy of the IMP Work Plan shall also be provided to the Settling Parties. Settling Parties shall provide technical assistance to the Commonwealth in preparing the IMP Work Plan. Because of the 100-year period estimated for completion of the IMP, all work plans and schedules must be considered preliminary and tentative. All Work conducted during the IMP shall be based on the most appropriate technology then available. For example, it will be impossible to determine a schedule for subsidence repair, additional pumping, and cap replacement; therefore, all elements and schedules of the IMP Work Plan, if appropriate, shall be considered of a preliminary nature. All documents must be dynamic and clearly reflect current scientific and technical approaches required to protect human health and the environment. The IMP shall include, but not be limited to, the following activities:

- Periodic surveys and subsidence monitoring
- Initial cap maintenance and replacement as necessary
- Improvements to, and maintenance of, Site drainage and erosion control features, as needed
- Trench leachate management and monitoring
- Installation of a horizontal flow barrier (if necessary)
- Waste burial
- Maintenance and monitoring activities

Upon approval of the IMP Work Plan, the Commonwealth shall implement the IMP Work Plan. In the event EPA has not approved the IMP Work Plan before Certification of Completion of the IRP, the Commonwealth shall undertake the activities specified in the IMP Work Plan it submitted to EPA, until EPA approves an IMP Work Plan, and upon approval of the IMP Work Plan, shall continue such activities as finally approved in the IMP Work Plan.

In conjunction with submittal of the IMP Work Plan, the Commonwealth shall submit a IMP Quality Assurance Project Plan (IMP QAPP), IMP Sampling and Analysis Plan (SAP) and a IMP Health and Safety Plan (IMP HASP), all of which will essentially be revised versions of the Initial Remedial Phase QAPP and HASP. The IMP QAPP and SAP shall follow the format outlined in Section IV, Task II.A of

this SOW for SAPs and QAPPs and the IMP HASP shall follow the format for HASPs outlined in Section IV, Task III.A of this SOW. The IMP Work Plan and the IMP QAPP must be reviewed and approved by EPA and the IMP Health and Safety Plan must be reviewed and commented on by EPA. Plans, specifications, submittals, and other deliverables shall be subject to EPA review and approval in accordance with Section XIV of the Consent Decree. Review and/or approval of design submittals only allows the Commonwealth to proceed to the next step of the design process. Approval does not imply acceptance of later design submittals that have not been reviewed, nor does it imply that the remedy, when constructed, will meet Performance Standards.

1. Interim Maintenance Period Work Plan

Six months prior to scheduled completion of the IRP RA, the Commonwealth shall submit a IMP Work Plan to EPA for review and approval. The IMP Work Plan shall be developed in conjunction with the IMP QAPP, SAP and HASP. The IMP Work Plan shall include a description of the potential data collection and evaluation activities that may be necessary during the IMP. The IMP Work Plan should conceptually address IMP data acquisition and analysis, initial cap maintenance, leachate management, installation of a horizontal flow barrier (if determined to be necessary), equipment, and solid waste disposal, and improvements to, or construction of, permanent surface water and erosion control measures. The IMP Work Plan should also conceptually address maintenance, monitoring and surveillance systems.

The IMP Work Plan shall be revised, as necessary, as part of EPA's five-year review or more frequently if it is determined to be necessary. Modifications will be made to reflect the changing Site conditions and changes in available technologies. The IMP Work Plan should address the following:

a. A statement of the problems and potential problems posed by the Site following completion of the IRP RA and the objectives of the IMP;

b. An abbreviated background summary setting forth the following:

- A brief description of the Site after completion of the IRP;

- As-built drawings and documents from the IRP RA;

- A summary of the existing data including physical, radiological and chemical characteristics of the contaminants identified and their distribution among the environmental media at the Site.

c. A preliminary list of the tasks to be performed during the IMP, information needed for each task if available, information which may be produced during and at the conclusion of each task, and a description of Work products that will be submitted to EPA;

d. Because of the 100-year period of time estimated to implement the IMP, submission of deliverables will be established and/or adjusted by the Commonwealth, as approved by EPA, at the time of EPA's five-year reviews of the remedy.

e. Project management plans, including data management plans and provision for periodic reports to EPA, shall be revised at EPA's direction in conjunction with EPA five-year reviews. Data management plans shall address the requirements for project management including sorting and retrieving the data. The best available data analysis techniques will be utilized.

f. Community relations support activities to be conducted during the IMP should be addressed as part of each five-year review. The Commonwealth shall assist EPA in preparing and disseminating information to the public regarding IMP Work.

g. Methodologies included in the IMP Work Plan should be reviewed as part of the five-year review. Methodologies chosen at those times should describe start-up procedures, operation, troubleshooting, training, and evaluation activities to be carried out by the Commonwealth during the IMP;

h. The IMP Work Plan shall be a flexible document anticipating possible changes in scientific and technical information available throughout the estimated 100-year period of the IMP.

2. Interim Maintenance Period Operations

The initial IMP Work Plan shall also include start-up procedures, operations, troubleshooting,

training, and evaluation activities. The initial IMP Work Plan shall address the following elements:

a. Custodial care activities including grass cutting, ditch cleaning, fence repairing, and minor repair of the erosion control systems, trench cap, and monitoring instruments.

b. Equipment start-up and operator training:

- Technical specifications governing monitoring and erosion control systems;

- Requirements for providing appropriate visits by experienced personnel to oversee installation, adjustment, start-up and operation of systems; and,

- Training personnel regarding appropriate operational procedures once start-up has been successfully completed.

c. Description of normal operation and maintenance:

- Description of tasks required for system operation;

- Description of tasks required for system maintenance;

- Description of prescribed treatment or operating conditions; and

- Frequency for each IMP operations task, if appropriate.

d. Description of potential operating problems:

- Description and analysis of potential operating problems;

- Sources of information regarding problems; and

- Common remedies or anticipated corrective actions.

e. Description of routine monitoring and laboratory testing:

- Description of monitoring tasks;

- Description of required laboratory tests and

their potential interpretation;

- Required QA/QC; and
- Monitoring frequency.

f. Description of alternate IMP procedures:

- Should systems fail, alternate procedures; and,
- Analysis of vulnerability of the system and a description of additional resource requirements should systems fail.

g. Safety Plan:

- Description of precautions to be taken and required health and safety equipment, etc., for personnel protection.

h. Description of equipment:

- Equipment identification;
- Installation of monitoring components;
- Maintenance of Site equipment; and
- Equipment replacement, as necessary, and its installation components.

i. Records and reporting:

- Daily field logs;
- Laboratory records;
- Database for Site records;
- Mechanisms for reporting emergencies;
- Database for personnel and maintenance records; and
- Yearly reports to state/federal agencies.

j. Description of access control, security and notification measures;

- Description of institutional control requirements to be performed during the IMP;

- Description of the legal procedures and mechanisms for administering deed and notice requirements of access control, security and notification requirements of this SOW as well as the location of storing legal notices and Site conditions.

B. FINAL CLOSURE PERIOD

1. Final Closure Period Remedial Design Work Plan

A Final Closure Period (FCP) Remedial Design Work Plan shall be developed by the Commonwealth and submitted to EPA within 60 days of EPA determination that the trench stabilization criteria have been achieved (the Interim Maintenance Period has concluded).

The FCP RD Work Plan shall be developed in conjunction with the FCP QAPP, SAP and HASP. The QAPP and SAP shall follow the format outlined in Section IV, Task II.A for SAPs and QAPPs and the IMP HASP shall follow the format for HASPs outlined in Section IV, Task III.A of this SOW. The FCP RD Work Plan shall include a description of the potential data collection and evaluation activities that may be necessary during the FCP. The FCP RD Work Plan should conceptually address FCP data acquisition and analysis, final cap maintenance, improvements to surface water and erosion control measures (as needed), leachate management, equipment, and solid waste disposal. The FCP RD Work Plan should also conceptually address maintenance, monitoring and surveillance systems.

The FCP RD Work Plan should address the following:

a. A statement of the problems and potential problems posed by the Site and the objectives of the Final Closure Period;

b. An abbreviated background summary setting forth the following:

- A brief description of the Site;

- As-built drawings and documents from the IRP;

- A summary of the existing data including physical, radiological and chemical characteristics of the contaminants identified and their distribution among the environmental media at the Site.

c. A preliminary list of the tasks to be performed during the Final Closure Period, information needed for each task if available, information which may be produced during and at the conclusion of each task, and a description of work products that will be submitted to EPA;

2. Final Closure Period Preliminary Design

FCP Preliminary Remedial Design shall begin with initial remedial design and shall end with the completion of approximately 30 percent of the remedial design effort. At this stage, the Commonwealth shall field verify, as necessary, the existing conditions of the Site. The technical requirements of the IRP shall be addressed and outlined so that they may be reviewed to determine if the final remedial design will provide an effective remedy. Supporting data and documentation shall be provided with the design documents defining the functional aspects of the project. EPA approval of the FCP Preliminary Remedial Design Report is required before the Commonwealth may proceed with further design work, unless specifically authorized by EPA. In accordance with the design management schedule established in the approved FCP RD Work Plan, the Commonwealth shall submit to EPA the FCP Preliminary Remedial Design Report which shall consist of the following:

a. Results of Data Acquisition Activities

Data gathered during the project planning phase shall be compiled, summarized, and submitted along with an analysis of the impact of the results on design activities.

b. Final Closure Period Preliminary Remedial Design Plans and Specifications

The Commonwealth shall submit to EPA an outline of the required drawings, including preliminary sketches and layouts, describing conceptual aspects of the design, unit processes, etc. In addition, an outline of the required specifications, including Performance Standards, shall be submitted. Construction drawings shall reflect organization and clarity, and the scope of the technical specifications shall be outlined in a manner reflecting the final specifications.

3. Final Closure Period Prefinal and Final Remedial Design

The Commonwealth shall submit the FCP Prefinal Remedial Design Report when the design work is approximately 90 percent complete in accordance with the approved design management schedule. Concurrent with submittal of the FCP Prefinal Remedial Design Report, the Commonwealth shall also submit an Institutional Control Work Plan and Institutional Control Operations and Maintenance Manual. The Commonwealth shall address comments generated from the FCP Preliminary Remedial Design Report review and subsequent comments in meetings and informal reviews by EPA and the Commonwealth and clearly show any modification of the design as a result of incorporation of the comments. The FCP Prefinal Remedial Design Report shall function as the draft version of the FCP Final Remedial Design Report. After EPA review and comment on the FCP Prefinal Remedial Design Report, the FCP Final Remedial Design Report shall be submitted along with a memorandum indicating how the Prefinal Remedial Design Report comments were incorporated into the Final Remedial Design Report. All FCP Final Remedial Design documents shall be certified by a Professional Engineer registered in the Commonwealth of Kentucky. EPA written approval of the FCP Final Remedial Design Report is required before initiating construction of the final cap, unless specifically authorized by EPA. The following items shall be submitted with or as part of the FCP Prefinal and Final Remedial Design Reports:

a. Complete Final Closure Period Design Analyses

The selected design shall be presented along with an analysis supporting the FCP design approach. Design calculations shall be included.

b. Final Closure Period Final Plans and Specifications

A complete set of construction drawings and specifications shall be submitted which describe the selected design.

c. Final Construction Schedule

A final construction schedule shall be submitted for EPA approval.

d. Final Overall Construction Cost Estimate

An estimate within +15 percent to -10 percent of

actual, overall remedial construction costs shall be submitted.

4. FCP RA Planning

Concurrent with the submittal of the FCP Prefinal Remedial Design Report, the Commonwealth shall submit a draft FCP RA Work Plan for review and comment by EPA. Within 30 days after approval of the FCP Final Remedial Design Report, the Commonwealth shall submit a final FCP RA Work Plan which must be reviewed and approved by EPA prior to construction of the final cap.

Upon approval of the FCP Final Remedial Design Report and the FCP RA Work Plan, the Commonwealth shall implement the FCP Work Plan in accordance with the approved construction management schedule. Significant field changes to the construction as set forth in the FCP RA Work Plan shall not be undertaken without the approval of EPA. The construction shall be documented in enough detail to produce as-built construction drawings after the construction is complete. Deliverables shall be submitted to EPA for review and approval in accordance with Section XIV of the Consent Decree. Review and/or approval of submittals only allows the Commonwealth to proceed to the next step of the remediation process. Approval does not imply acceptance of later project submittals that have not been reviewed, nor does it imply that the remedy, when constructed, will meet Performance Standards.

a. FCP RA Work Plan

The Commonwealth shall submit a Work Plan which provides a detailed plan of action for completing the FCP RA activities to EPA for review and approval. This Work Plan shall provide for the safe and efficient completion of the FCP. The Work Plan shall be developed in conjunction with the FCP Construction Management Plan, the FCP Construction Quality Assurance Plan, and the FCP Construction Health and Safety Plan/Contingency Plan, although each plan may be delivered under separate cover. The FCP RA Work Plan shall include a comprehensive description of the FCP activities to be performed and a construction schedule for completion of each major FCP activity and submission of each FCP deliverable.

Specifically, the FCP RA Work Plan shall include the following:

- A detailed description of the FCP tasks to be performed and a description of the work products to be submitted to EPA, including the deliverables set forth in the remainder of Task IV which pertain to FCP activities;

- A schedule for completion of each required activity and submission of each FCP deliverable required by the Consent Decree, including those in this SOW;

- A project management plan, including provision for monthly reports to EPA;

- A description of the community relations support activities to be conducted during the FCP. At EPA's request, the Commonwealth shall assist EPA in preparing and disseminating information to the public regarding the FCP to be performed.

- A description of the strategy for delivering the project. This section shall address the management approach for implementing the FCP, including procurement methods and contracting strategy, phasing alternatives, and contractor and equipment availability concerns.

b. FCP Construction Management Plan

The Commonwealth shall develop an FCP Construction Management Plan (Plan) to indicate how the construction activities are to be implemented and coordinated with EPA during the FCP. The Commonwealth shall designate a person to be an on-Site Project Coordinator and their representative on-Site during the FCP, and identify this person in the Work Plan. The Work Plan shall also identify other key project management personnel comprising the FCP Construction Project Team along with the lines of authority, and provide descriptions of the duties of the key personnel along with an organizational chart. In addition, a plan for the administration of construction changes and EPA review and approval of those changes shall be included.

c. FCP Construction Quality Assurance Plan

The Commonwealth shall develop and implement an FCP Construction Quality Assurance Program to ensure, with a reasonable degree of certainty, that the completed FCP meets or exceeds all design criteria, plans and specifications, and Performance Standards.

At a minimum, the FCP Construction Quality Assurance Plan shall include the following elements:

- The name, qualifications, duties, authorities, and responsibilities of each person assigned a quality control function.

- Description of the observations and control testing that will be used to monitor the construction and/or installation of the components of the FCP. This includes information which certifies that personnel and laboratories performing the tests are qualified and the equipment and procedures to be used comply with applicable standards. Any laboratories to be used shall be specified. Criteria for acceptance or rejection of laboratories shall be listed and plans for implementing corrective measures shall be addressed.

- A schedule for managing submittals, testing, inspections, and any other QA functions (including those of contractors, subcontractors, fabricators, suppliers, purchasing agents, etc.) that involve assuring quality workmanship, verifying compliance with the plans and specifications, or any other QC objectives. Inspections shall verify compliance with all environmental requirements and include, but not be limited to, air quality and emissions monitoring records and waste disposal records.

- Reporting procedures and reporting format for QA/QC activities including such items as daily summary reports, schedule of data submissions, inspection data sheets, problem identification and corrective measures reports, evaluation reports, acceptance reports, and final documentation.

- A list of definable features of the Work to be performed. A definable feature of Work is a task which is separate and distinct from other tasks and has separate control requirements.

d. <u>FCP Construction Health and Safety Plan/Contingency Plan</u>

The Commonwealth shall prepare a FCP Construction Health and Safety Plan/Contingency Plan in conformance with the Commonwealth's health and safety program administered under the Site license, and in compliance with OSHA regulations. The FCP Construction Health and Safety Plan/Contingency Plan shall include a health

and safety risk analysis, a description of monitoring and personal protective equipment, medical monitoring, and Site control. EPA will not approve the Commonwealth's FCP Construction Health and Safety Plan/Contingency Plan, but rather EPA will review it to ensure that all necessary elements are included and safety procedures are fully described. This plan shall include a Contingency Plan and incorporate Air Monitoring and Spill Control and Countermeasures Plans. The Contingency Plan shall be written to ensure protection of on-Site construction workers and the local population potentially affected. It shall include the following items:

- Name of person who will be responsible in the event of an emergency incident, as well as at least two alternates.

- Plan for Site safety indoctrination and training for all employees, name of the person who will give the training and the topics to be covered.

- Plan and date for meeting with the local community, including local, state and federal agencies involved in the cleanup, as well as the local emergency squads and the local hospitals.

- A list of the first aid and medical facilities including location of first aid kits, names of personnel trained in first aid, a clearly marked map with the route to the nearest medical facility, all necessary emergency phone numbers conspicuously posted at the Site (i.e., fire, rescue, and the Kentucky Disaster Emergency Services (KDES)).

- Plans for protection of public and visitors to the Site.

- Air and Radiation Monitoring Plan which incorporates the following requirements:

    i) Air and radiation monitoring shall be conducted on-Site, at the restricted area boundary and at the Site boundary. The radiological constituents that were identified during the Risk Assessment shall serve as a basis of the sampling and measurement of pollutants in the atmosphere and radiological control areas. Settling Private Parties shall clearly identify these compounds along with the required detection

and notification levels for the restricted and unrestricted areas. Air and radiation monitoring shall include personnel monitoring where applicable.

ii) Personnel monitoring shall be conducted according to 10 CFR §§ 20.1501 and 20.1502 (902 KAR 100:019 Sections 12 and 13), OSHA, NIOSH and NRC regulations (as amended).

iii) On-Site area monitoring shall consist of continuous real-time monitoring performed immediately adjacent to any waste excavation areas, treatment areas, and any other applicable areas when work is occurring. Measurements shall be taken in the radiological control areas to include, but not be limited to: on-Site worker bioassays, contamination surveys, radiation surveys, high volume air sample surveys, and tritium air sample surveys. Additionally, the breathing zones of personnel immediately upwind and downwind of the work areas shall be surveyed for hazardous chemical constituents. Equipment shall include the following, at a minimum: self reading dosimeters, portable alpha, beta and gamma radiation survey meter, scintillation probes (alpha and gamma detector), hand probe (beta detector), tritium monitor, organic vapor meter, explosivity meter, particulate monitoring equipment, and on-Site windsock.

iv) Monitoring shall consist of monitoring airborne radiological contaminants at the boundary of the restricted area and the Site boundary to determine whether harmful concentrations of toxic constituents are migrating off-Site. EPA approved methods shall be used for sampling and analysis of air. The results of the air monitoring and the on-Site meteorological monitoring shall be used to assess the potential for off-Site exposure to toxic materials. The air monitoring program shall include provisions for notifying nearby residents, local, state and federal agencies in the event that unacceptable concentrations of airborne contaminants are migrating off-Site. The Commonwealth shall report detection of levels of airborne contaminants above the limits of 40 CFR Part 61, Subpart H to EPA in

accordance with Section XVIII of the Consent Decree.

- A plan for instituting a medical surveillance program which shall address medical requirements for Site workers, physician examinations, personnel dosimetry records and summary reports, and transfer of personnel monitoring records to the appropriate state and federal agencies.

- A Spill Control and Countermeasures Plan which shall include the following:

  i) Contingency measures for potential spills and discharges from materials handling and/or transportation.

  ii) A description of the methods, means, and facilities required to prevent contamination of soil, water, atmosphere, and uncontaminated structures, equipment, or material by spills or discharges which could potentially occur during the pumping and solidification operations.

  iii) A description of the equipment and personnel necessary to perform emergency measures required to contain any spillage and to remove spilled materials and soils or liquids that become contaminated due to spillage. This collected spill material must be properly disposed of.

  iv) A description of the equipment and personnel to perform decontamination measures that may be required for previously uncontaminated structures, equipment, or material.

5. Preconstruction Conference

The Commonwealth and federal, state and local government agencies shall hold a Preconstruction Conference prior to initiation of FCP construction. The Preconstruction Conference agenda shall include:

a. Defining the roles, relationships, and responsibilities of all parties;

b. Reviewing methods for documenting and reporting inspection data;

c. Reviewing methods for distributing and storing documents and reports;

d. Reviewing work area security and safety protocols;

e. Reviewing the approved construction schedules;

f. Conducting a Site reconnaissance to verify that the design criteria and the plans specifications are understood and to review material and equipment storage locations.

The Preconstruction Conference must be documented, including, at a minimum, names of people in attendance, issues discussed, clarifications made, special instructions issued.

6. Final Closure Period Prefinal Construction Inspection

Upon preliminary completion of the FCP construction, the Commonwealth shall notify EPA for the purpose of conducting a Prefinal Construction Inspection. Participants should include the Project Coordinators, Supervising Contractor, Construction Contractor, and other federal, state, and local agencies with a jurisdictional interest. The Prefinal Construction Inspection shall consist of a walk-through inspection of the entire project Site. The objective of the inspection is to determine whether the construction is complete and consistent with the Consent Decree. Any outstanding construction items discovered during the inspection shall be identified and noted on a punch list. Additionally, monitoring equipment shall be operationally tested by the Commonwealth. The Commonwealth shall certify that the equipment has performed to effectively meet the purpose and intent of the specifications. Retesting shall be completed where the initial testing reveals deficiencies. A Prefinal Construction Inspection Report shall be submitted by the Commonwealth for the Prefinal Construction Inspection which outlines the outstanding construction items, actions required to complete the items, completion date for the items, and an anticipated date for the Final Construction Inspection.

7. Final Closure Period Final Construction Inspection

EPA will perform a Final Construction Inspection for the FCP, consisting of a walk-through inspection of the entire project Site. Upon the Commonwealth's completion of all outstanding construction items, the Commonwealth shall notify EPA for the purpose of

conducting a Final Construction Inspection. The Prefinal Construction Inspection Report shall be used as a check list with the Final Construction Inspection focusing on the outstanding construction items identified in the Prefinal Construction Inspection. All tests that were originally unsatisfactory shall be conducted again. Confirmation shall be made during the Final Construction Inspection that all outstanding items have been resolved. Any outstanding construction items discovered during the inspection still requiring correction shall be identified and noted on a punch list. If any items are found unresolved during the Final Inspection, then that inspection shall be considered to be a Prefinal Construction Inspection, requiring another Prefinal Construction Inspection Report and subsequent Final Construction Inspection.

8. Final Closure Period Final Construction Inspection Report

Within sixty (60) days following the conclusion of the Final Construction Inspection, the Commonwealth shall submit a Final Construction Inspection Report for the FCP. EPA will review the draft report and will provide comments to the Commonwealth. The Final Construction Inspection Report shall include the following:

a. Brief description of how outstanding items noted in the Prefinal Construction Inspection were resolved;

b. Explanation of modifications made during the FCP construction to the original FCP Design and FCP Construction Work Plan and why these changes were made;

c. As-built drawings;

d. Synopsis of the construction work defined in the SOW and certification that the construction work has been completed.

C. BoRP REMEDIAL ACTION REPORT

As provided in Section XVII of the Consent Decree, within 90 days after the Commonwealth concludes that the Remedial Action has been fully performed and the Performance Standards have been achieved, the Commonwealth shall so certify to the United States and shall schedule and conduct a pre-certification inspection to be attended by EPA and the Commonwealth. If after the pre-certification inspection the Commonwealth still believes that the Remedial Action has been fully performed and the Performance

Standards have been achieved, the Commonwealth shall submit a BoRP RA Report to EPA in accordance with Section XVII of the Consent Decree. The BoRP RA Report shall include the following:

1. A copy of the BoRP Final Construction Inspection Report;

2. A synopsis of the Work defined in this SOW and a demonstration in accordance with the Performance Standards Verification Plan that Performance Standards have been achieved; and

3. Certification that the BoRP has been completed in full satisfaction of the requirements of the Consent Decree.

After review by EPA, the Commonwealth shall address any comments and submit a revised report. As provided in Section XVII of the Consent Decree, the BoRP shall not be considered complete until EPA approves the BoRP RA Report.

D. INSTITUTIONAL CONTROL PERIOD

1. Institutional Control Work Plan

An Institutional Control Work Plan shall be developed by the Commonwealth during the FCP and submitted to EPA for approval no later than six months prior to scheduled completion of FCP construction. Implementation of the Institutional Control Work Plan shall commence upon completion of the FCP Final Construction Inspection and EPA approval of the Institutional Control Work Plan. Operation and Maintenance activities under the Institutional Control Work Plan shall be conducted in accordance with the Institutional Control Operations and Maintenance Manual which shall be submitted in conjunction with the Institutional Control Work Plan. The Institutional Control O & M Manual will, in essence, be a revised version of the Interim Maintenance Period Operations specified in Section IV, Task IV.A.2 of this SOW. Operation and Maintenance under the Institutional Control Work Plan shall be conducted for 100 years following EPA issuance of the Certification of Completion of the Remedial Action. This period for Institutional control conforms to 902 KAR 100:022 Section 27. Work Plans for this period will be dynamic documents which shall reflect the most appropriate technologies then available.

E. POST-INSTITUTIONAL CONTROL PERIOD

1. Post-Institutional Control Work Plan

A Post-Institutional Control Work Plan shall be developed by the Commonwealth during the Institutional Control Period and submitted to EPA for approval no later than six months prior to conclusion of the Institutional Control Period. Implementation of the Post-Institutional Control Work Plan shall commence upon completion of the Institutional Control Period and EPA approval of the Post-Institutional Control Work Plan. Operation and Maintenance activities under the Post-Institutional Control Work Plan shall be conducted in accordance with the Post-Institutional Control Operations and Maintenance Manual which shall be submitted in conjunction with the Post-Institutional Control Work Plan. The Post-Institutional Control O & M Manual will, in essence, be a revised version of the Institutional Control O & M Manual specified above. Operation and Maintenance under the Post-Institutional Control Work Plan shall be conducted in perpetuity. Work Plans for this period will be dynamic documents which shall reflect the most appropriate technologies then available.

TASK V - PERFORMANCE MONITORING

Performance monitoring shall be conducted by the Commonwealth throughout the Initial Remedial Phase, Balance of Remedial Phase and Institutional Control Period to ensure that all Performance Standards are met.

A. PERFORMANCE STANDARDS VERIFICATION PLANS

The purpose of the Performance Standards Verification Plans is to provide a mechanism to ensure that both short-term and long-term Performance Standards for the Remedial Action are met. Guidances used in developing the Sampling and Analysis Plans during the Initial Remedial Phase Remedial Design and Balance of Remedy Phase shall be used. Settling Private Parties shall submit a Performance Standards Verification Plan with the Initial Remedial Phase Prefinal and Final Remedial Design Reports. The Commonwealth shall submit a Performance Standards Verification Plan with the Interim Maintenance Period Work Plan and with the FCP Prefinal and Final Remedial Design Reports. Once approved, the Performance Standards Verification Plans shall be implemented by the Commonwealth on the approved schedule. The Performance Standards Verification Plans shall include:

1. The Performance Standards Verification Field Sampling and Analysis Plan that provides guidance for all field work by defining in detail the sampling and data gathering methods to be used.

2. The Performance Standards Verification Quality Assurance/Quality Control Plan that describes the quality assurance and quality control protocols which will be followed in demonstrating achieving Performance Standards and that the remedy is expected to continue to achieve all Performance Standards.

3. Specification of those tasks to be performed to demonstrate compliance with the Performance Standards and a schedule for the performance of these tasks.

REFERENCES

The following list, although not comprehensive, comprises many of the regulations and guidance documents that apply to the RD/RA process.

1. "National Oil and Hazardous Substances Pollution Contingency Plan, Final Rule", Federal Register 40 CFR Part 300, March 8, 1990.

2. "Superfund Remedial Design and Remedial Action Guidance," U.S. EPA, Office of Emergency and Remedial Response, June 1986, OSWER Directive No. 9355.0-4A.

3. " Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties," U.S. EPA, Office of Emergency and Remedial Response, April, 1990, OSWER Directive No. 9355.5-01.

4. "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final," U.S. EPA, Office of Emergency and Remedial Response, October 1988, OSWER Directive No. 355.3-01.

5. "A Compendium of Superfund Field Operations Methods," Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, EPA/540/P-87/001a, August 1987, OSWER Directive No. 9355.0-14.

6. "EPA NEIC Policies and Procedures Manual," EPA-330/9-78-001-R, May 1978, revised November 1984.

7. "Data Quality Objectives for Remedial Response Activities," U.S. EPA, Office of Emergency and Remedial Response and Office of Waste Programs Enforcement, EPA/540/G-87/003, March 1987, OSWER Directive No. 9335.0-7B.

8. "Guidelines and Specifications for Preparing Quality Assurance Project Plans," U.S. EPA, Office of Research and Development, Cincinnati, OH, QAMS-004/80, December 29, 1980.

9. "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans," U.S. EPA, Office of Emergency and Remedial Response, QAMS-005/80, December 1980.

10. "Users Guide to the EPA Contract Laboratory Program," U.S. EPA, Sample Management Office, August 1982.

11. "Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual," U.S. EPA Region IV, Environmental Services Division, February 1, 1991, (revised periodically).

12. "USEPA Contract Laboratory Program Statement of Work for Organics Analysis," U.S. EPA, Office of Emergency and Remedial Response, February 1988.

13. "USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis," U.S. EPA, Office of Emergency and Remedial Response, July 1988.

14. "Quality in the Constructed Project: A Guideline for Owners, Designers, and Constructors, Volume 1, Preliminary Edition for Trial Use and Comment," American Society of Civil Engineers, May 1988.

15. "Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements," U.S. EPA, Office of Emergency and Remedial Response, July 9, 1987, OSWER Directive No. 9234.0-05.

16. "CERCLA Compliance with Other Laws Manual," Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, August 1988 (Draft), OSWER Directive No. 9234.1-01 and -02.

17. "Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites," U.S. EPA, Office of Emergency and Remedial Response, (Draft), OSWER Directive No. 9283.1-2.

18. "Guide for Conducting Treatability Studies Under CERCLA," U.S. EPA, Office of Emergency and Remedial Response, Pre-publication Version.

19. "Health and Safety Requirements of Employees Employed in Field Activities," U.S. EPA, Office of Emergency and Remedial Response, July 12, 1981, EPA Order No. 1440.2.

20. "Standard Operating Safety Guides," U.S. EPA, Office of Emergency and Remedial Response, November 1984.

21. "Standards for General Industry," 29 CFR Part 1910, Occupational Health and Safety Administration.

22. "Standards for the Construction Industry," 29 CFR 1926, Occupational Health and Safety Administration.

23. "NIOSH Manual of Analytical Methods," 2d Edition. Volumes I - VII, or the 3rd Edition, Volumes I and II, National Institute of Occupational Safety and Health.

24. "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," National Institute of Occupational Safety and Health/Occupational Health and Safety Administration/United States Coast Guard/ Environmental Protection Agency, October 1985.

25. "TLVs - Threshold Limit Values and Biological Exposure Indices for 1987 - 88," American Conference of Governmental Industrial Hygienists.

26. "American National Standards Practices for Respiratory Protection," American National Standards Institute Z88.2-1980, March 11, 1981.

27. R.G. Cockrell, "Selection of a Method for Disposing of Grout Made with Trench Leachate at the Maxey Flats Disposal Site", prepared for the Maxey Flats Steering Committee and submitted to EPA Region IV, Reference No. TC-828, June 30, 1992.

28. R.G. Cockrell, "Conceptual Design of the Initial Closure Cap for the Maxey Flats Disposal Site", prepared for the Maxey Flats Steering Committee and submitted to EPA Region IV, Reference No. TC-855, October 1992.

29. R.G. Cockrell, "Guidelines for Trench Dewatering at the Maxey Flats Disposal Site", prepared for the Maxey Flats Steering Committee and submitted to EPA Region IV, Reference No. TC-871, September 1993.

SUMMARY OF THE MAJOR DELIVERABLES FOR THE REMEDIAL DESIGN AND REMEDIAL ACTION AT THE MAXEY FLATS DISPOSAL SUPERFUND SITE

DELIVERABLE	EPA RESPONSE
TASK 1 PROJECT PLANNING	
Initial Remedial Phase Monitoring and Maintenance Plan	Review and Approve
Recommendations for additional data needs and refinement of RD/RA tasks	Review and Approve
TASK II IRP REMEDIAL DESIGN	
Initial Remedial Phase (IRP) RD Work Plan	Review and Approve
- IRP Sampling and Analysis Plan	Review and Approve
- IRP Health and Safety Plan	Review and Approve
- IRP Quality Assurance Project Plan	Review and Approve
IRP Preliminary Remedial Design Report	Review and Comment
IRP Prefinal and Final Remedial Design Reports	Review and Approve
TASK III IRP REMEDIAL ACTION	
IRP RA Work Plan	Review and Approve
- IRP Construction Health and Safety Plan/Contingency Plan	Review and Approve
- IRP Construction Quality Assurance Plan	Review and Approve
- IRP Construction Management Plan	Review and Approve
IRP Prefinal Construction Inspection Report	Review and Approve
IRP Final Construction	

Inspection Report	Review and Approve
IRP Remedial Action Report	Review and Approve
TASK IV INTERIM MAINTENANCE PERIOD, FINAL CLOSURE PERIOD, AND ASSOCIATED REMEDIAL ACTIVITIES	
Interim Maintenance Period (IMP) Work Plan (7)	Review and Approve
- IMP Sampling and Analysis Plan	Review and Approve
- IMP Quality Assurance Plan	Review and Approve
- IMP Health and Safety Plan	Review and Comment
Final Closure Period (FCP) Work Plan	Review and Approve
- FCP Sampling and Analysis Plan	Review and Approve
- FCP Health and Safety Plan	Review and Comment
- FCP Quality Assurance Project Plan	Review and Approve
FCP Preliminary Remedial Design Report	Review and Approve
FCP Prefinal and Final Remedial Design Reports	Review and Approve
FCP RA Work Plan	Review and Approve
- FCP Construction Health and Safety Plan/Contingency Plan	Review and Comment
- FCP Construction Management Plan	Review and Approve
- FCP Construction Quality Assurance Plan	Review and Approve
FCP Prefinal Construction Inspection Report	Review and Approve
FCP Final Construction Inspection Report	Review and Approve
BoRP Remedial Action Report	Review and Approve
Institutional Control Work Plan	Review and Approve

Institutional Control Operations and Maintenance Manual	Review and Approve
Post-Institutional Control Work Plan	Review and Approve
Post-Institutional Control Operations and Maintenance Manual	Review and Approve

TASK V PERFORMANCE MONITORING

Performance Standards Verification Plan	Review and Approve

NOTE: Unless specifically authorized by EPA, seven copies of each of the specified deliverables shall be submitted to EPA by Settling Defendants, one copy shall be unbound, the remainder shall be bound. Work Plan companion deliverables (i.e., HASP, QAPP, SAP, etc.) may be submitted either as appendices to the Work Plan or under separate cover .