APPENDIX A

STATEMENT OF WORK FOR A REMEDIAL INVESTIGATION AND FEASIBILITY STUDY FOR OU1 AND OU2 FOR THE SOUTH DAYTON DUMP AND LANDFILL SITE MORAINE, OHIO

I. PURPOSE

This Statement of Work (SOW) sets forth the requirements for conducting a Remedial Investigation and Feasibility Study (RI/FS) for Operable Unit (OU) 1 and OU 2 at the South Dayton Dump and Landfill Superfund Alternative Site in Moraine, Ohio (Site). The Site includes the property located at 1975 Dryden Road and any areas where hazardous substances, pollutants or contaminants from the property or from former operations at the property have or may have come to be located. The RI Report shall fully evaluate the nature and extent of hazardous substances, pollutants or contaminants at and/or from the Site. The RI Report shall also assess the risk that these hazardous substances, pollutants or contaminants present for human health and the environment. The RI Report shall provide sufficient data to develop and evaluate effective remedial alternatives. The FS Report shall evaluate alternatives for addressing the impact to human health and the environment from hazardous substances, pollutants or contaminants at the Site.

The Respondents shall prepare and complete the RI and FS Reports in compliance with the Administrative Settlement Agreement and Order on Consent (ASAOC), SOW, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 C.F.R. Part 300) as amended and all requirements and guidance for RI/FS studies and reports, including but not limited to U. S. Environmental Protection Agency Superfund *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA/540/G-89/004, October 1988) (RI/FS Guidance), and any other guidance that the EPA uses in conducting or submitting deliverables for a RI/FS. Exhibit B sets forth a partial list of guidance used by EPA for a RI/FS.

The Respondents shall furnish all personnel, materials, and services necessary for, or incidental to, performing the RI/FS at the Site, except as otherwise specified herein.

This SOW reflects a change in approach from that described in the 2006 ASAOC for RI/FS and SOW, and the Dispute Resolution Agreement dated December 15, 2010 for the evaluation of the nature and extent of hazardous substances or contaminants at the Site and the assessment of the risk which these hazardous substances or contaminants present for human health and the environment.

The SOW in the 2006 ASAOC directed that the RI/FS use a Presumptive Remedy approach, consistent with relevant EPA guidance, for addressing the potential risk from direct contact with the landfill contents in the central portion of the Site and a traditional RI/FS and human health and ecological risk assessment for all Site areas not addressed by the Presumptive Remedy. During the course of the RI/FS work under the 2006 ASAOC, EPA established separate operable units that were not contemplated by the 2006 ASAOC and its SOW, identifying as "OU1" a

newly-defined on-Site area to be addressed by the Presumptive Remedy with respect to direct contact risk, and as "OU2", on-Site areas not addressed by the Presumptive Remedy for direct contact risk, all groundwater, and any off-Site media requiring investigation.

The Site will be managed in two operable units (OUs), and the Respondents will perform a RI/FS for each OU consistent with EPA laws, regulations, guidance, and the requirements of the ASAOC and this SOW. The two RI/FS are intended to be performed concurrently, not sequentially. OU1, as defined in the ASAOC and this SOW, includes all areas of the Site potentially used for waste disposal (see Figure 1 of this SOW) including all media including but not limited to waste, soil, groundwater, leachate, landfill gas and soil vapor within and beneath the extent of the waste. This area is outlined by the green line in Figure 1. The Respondents will conduct a RI/FS for OU1 to investigate waste, potential hot spots, groundwater contamination, and landfill gas/soil vapor in OU1 to the extent necessary to develop and evaluate remedial alternatives. OU2 will be all areas at the Site where Site-related contaminants have come to be located outside of the area defined as OU1 in this ASAOC. OU2 includes all media outside of OU1 as defined in this ASAOC in which Site-related contaminants are present, which may include: surface and subsurface soil, groundwater, landfill gas/soil vapor, surface water, sediment and air.

II. DOCUMENT REVIEW

1. The Respondents shall submit all documents or deliverables required as part of this SOW to the EPA, with a copy to the Ohio Environmental Protection Agency (OEPA), for review and approval by EPA. Documents must be submitted electronically, and the Agencies may request up to two paper copies each. Upon approval of a document, at least one paper copy of the final document will be provided to EPA and one to OEPA.

2. All deliverables submitted by the Respondents will be submitted to EPA in accordance with the schedule in Appendix A. Deliverables not described in Appendix A will be due within 15 days of EPA's request of the document unless the RPM extends that timeframe.

3. EPA, after reasonable opportunity for review and comment by OEPA, may: (a) approve, in whole or in part, the submission; (b) approve the submission upon specified conditions; (c) modify the submission to cure the deficiencies; (d) disapprove, in whole or in part, the submission, directing that Respondents modify the submission; or (e) any combination of the above. However, EPA will not modify a submission without first providing Respondents at least one notice of deficiency and opportunity to cure within 21 days, except where to do so would cause serious disruption to the Work or where previous submission(s) have been disapproved due to material defects. See Section X of the ASAOC for procedures concerning EPA Approval of Plans and Other Submissions.

4. Upon receipt of comments from EPA on a deliverable, the Respondents will submit a revised deliverable to OEPA for review and to EPA for review and approval in accordance with the schedule in Appendix A. The revised deliverable must fully and satisfactorily address each of EPA's comments on the draft deliverable. It must include a response to comments that identifies all revisions to the document and explains how the revised deliverable addresses each of EPA's comments. The Respondents will not make

any change to a draft deliverable that is not a direct result of addressing agency comments unless the change is identified in the response to comments. These requirements also apply to any subsequent revisions.

III. SCOPE

Respondents shall complete the following tasks as part of this RI/FS:

Task 1: Project Scoping and RI/FS Planning Documents

Task 2: Community Relations

Task 3: Site Characterization

Task 4: Remedial Investigation Report

Task 5: Treatability Studies

Task 6: Development and Screening of Alternatives (Technical Memorandum)

Task 7: Detailed Analysis of Alternatives (Feasibility Study Report)

Task 8: Progress Reports

The numbers following the section headings below refer to the relevant sections of the RI/FS Guidance.

TASK 1 PROJECT SCOPING AND RI/FS PLANNING DOCUMENTS (2)

1.1 Site Background (2.2)

The Respondents will evaluate existing planning documents and revise them to be consistent with this SOW. All tasks below are relevant to OU1 and OU2 unless otherwise stated.

1.1.1 Collect and Analyze Existing Data (2.2.2)

The Respondents will analyze the existing Site background information and review the site conceptual model to determine if modifications are needed.

1.1.2 Refine and Document Preliminary Remedial Action Objectives and Alternatives (2.2.3)

The respondent will review and, if necessary, refine the remedial action objectives (RAOs) that have been identified by EPA for each actually or potentially contaminated medium, listed below. The revised RAOs will be documented in a technical memorandum subject to EPA approval. The respondent will then identify a preliminary range of broadly defined potential remedial action alternatives and associated technologies. The range of potential alternatives should encompass where appropriate, alternatives in which treatment significantly reduces the toxicity, mobility, or

volume of the waste; alternatives that involve containment with little or no treatment; and a no-action alternative.

The preliminary RAOs for the OU1 remedial action, based on currently available information (these RAOs may be revised based on the findings of the RI), are:

1) Prevent unacceptable risks to human health and the environment from exposure to landfill contents;

2) Prevent unacceptable risks to human health and the environment from exposure to contaminated soil;

3) Prevent unacceptable risks to human health and the environment from exposure to contaminated groundwater;

4) Prevent unacceptable risks to human health and the environment from exposure to landfill gas and soil vapor;

5) Treat or eliminate high levels of hazardous substances, pollutants, or contaminants that cannot be reliably contained (hot spots) in accordance with Superfund requirements;

6) Minimize infiltration that results in contaminant leaching to groundwater above regulatory or risk-based requirements;

7) Control surface water runoff and erosion;

8) Prevent or mitigate unacceptable migration of contaminated groundwater above regulatory or risk-based requirements beyond the OU1 boundary;

9) Prevent or mitigate unacceptable migration of landfill gas and soil vapor above regulatory or risk-based requirements beyond the OU1 boundary.

The preliminary RAOs for the OU2 remedial action, based on currently available information (these RAOs may be revised based on the findings of the RI), are:

1) Prevent unacceptable risks to human health and the environment from exposure to contaminated soil;

2) Prevent unacceptable risks to human health and the environment from exposure to contaminated groundwater;

3) Prevent unacceptable risks to human health and the environment from exposure to landfill gas and soil vapor;

4) Prevent unacceptable risks to human health and the environment from exposure to contaminated surface water and sediments;

5) Prevent the discharge of contaminated groundwater into surface water bodies above regulatory or risk based concentrations;

6) Restore groundwater quality to beneficial use wherever practicable within a reasonable time frame.

1.1.3 Evaluate the Need for Treatability Studies (2.2.4)

If the Respondents or EPA identify remedial actions that involve treatment, the Respondents will conduct treatability studies unless the Respondents satisfactorily demonstrate to EPA that such studies are not needed. When treatability studies are needed, the Respondents will plan initial treatability testing activities (such as research and study design) to occur concurrently with Site characterization activities (see Task 3) to the extent practicable.

1.1.4 Begin Preliminary Identification of Potential ARARs (2.2.5)

The Respondents will review the potential state and federal applicable or relevant and appropriate requirements (ARARs) (chemical-specific, location- specific and action-specific) identified thus far and determine whether the list is adequate given the preliminary RAOs and remedial alternatives and ARARs associated with particular actions. ARAR identification will continue as Site conditions, contaminants, and remedial action alternatives are better defined.

1.1.5 Identify Data Needs (2.2.6) and Design a Data Collection Program (2.2.7)

Initially, the Respondents will identify data needs by revising the data quality objectives (DQOs) for the remaining work in OU1 and for OU2, and design a data collection program appropriate to the data needs. EPA may require and the Respondents may propose additional technical memoranda or work plan revisions to address additional data collection activities. In any event, the Respondents are responsible for fulfilling the additional data and analysis needs identified by EPA consistent with the general scope and objectives of this RI/FS.

Initially, and for each phase of fieldwork, the Respondents will develop strategies for sampling and analysis that specify the sampling design, sampling method, sample numbers, types and locations. This information will be presented in a technical memorandum or RI/FS Work Plan revision that documents the data need.

1.2 RI/FS Planning Documents (Work Plan/Field Sampling Plan/QAPP) (2.3)

1.2.1 General Requirements

Within 45 calendar days after the effective date of the ASAOC, the Respondents will submit draft RI/FS Planning Documents (including the ***RI/FS Work Plan, Field Sampling Plan, Quality Assurance Project Plan, and Health and Safety Plan***) to EPA, with a copy to OEPA, for review and approval by EPA.

The objective of the RI/FS Planning Documents is to develop an RI/FS strategy and general management plan for both OU1 and OU2 that accomplish the following:

- Remedial investigations that fully determine the nature and extent of the release or threatened release of hazardous substances, pollutants, or contaminants at and from the Site. In performing these investigations, the Respondents shall gather sufficient data, samples, and other information to fully characterize the nature and extent of the contamination at the Site, to support the human health and ecological risk assessments, and to provide sufficient data for the identification and evaluation of remedial alternatives for this Site.

- Feasibility studies that identify and evaluate alternatives for remedial action to protect human health and the environment by preventing, eliminating, controlling or mitigating the release or threatened release of hazardous substances, pollutants, or contaminants at and from the Site.

The Respondents shall prepare one set of RI/FS Planning Documents that covers both OU1 and OU2, but which plans for separate RI/FS activities for OU1 and OU2, leading to separate RI/FS Reports and other deliverables. When scoping the specific aspects of the project, the Respondents shall meet with EPA to discuss all project planning decisions and special concerns associated with the Site.

The RI/FS Planning Documents shall include a detailed description of the tasks the Respondents shall perform, the information needed for each task, a detailed description of the information the Respondents shall produce during and at the conclusion of each task, and a description of the work products that the Respondents shall submit to EPA and OEPA. This includes the deliverables set forth in this SOW; a schedule for each of the required activities consistent with the RI/FS Guidance and other relevant guidance; and a project management plan including a data management plan (e.g., requirements for project management systems and software, minimum data requirements, requirements for submittal of electronic data, data format and backup data management), monthly reports to EPA and OEPA, and meetings and presentations to EPA and OEPA at the conclusion of each major phase of the RI/FS. The Respondents shall refer to Appendix B of the RI/FS Guidance for a description of the required contents of the RI/FS Planning Documents.

The RI/FS Planning Documents shall include the preliminary RAOs for the remedial action at the Site; preliminary potential state and federal ARARs (chemical-specific, location-specific and action-specific); a description of the Site management strategy developed by the Respondents and EPA during scoping; a preliminary identification of remedial alternatives; and data needs for fully characterizing the nature and extent of the contamination at the site, evaluating risks and developing and evaluating remedial alternatives. The RI/FS Planning Documents shall reflect coordination with treatability study requirements, if any. The RI/FS Planning Documents shall also include a process for and manner of refining and/or identifying additional Federal and State ARARs, and for preparing the human health and ecological risk assessments and the feasibility study.

The Respondents shall prepare the RI/FS Planning Documents as described in *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, October, 1988. The documents shall include those identified in Sections 1.2.2 through 1.2.5.

1.2.2 OU1 and OU2 RI/FS Work Plan (2.3.1 and Appendix B)

The Respondents will submit a revised ***RI/FS Work Plan*** for OU1 and OU2 that includes a comprehensive description of the work to be performed and corresponding schedules for completion. The respondent will refer to Appendix B of the RI/FS Guidance for a comprehensive description of the contents of the required work plan.

Because of the unknown nature of the site and iterative nature of the RI/FS, additional data requirements and analyses may be identified throughout the process. The Respondents will submit a technical memorandum documenting the need for additional data, and identifying the DQOs whenever such requirements are identified. In any event, the Respondents are responsible for fulfilling additional data and analysis needs identified by EPA consistent with the general scope and objectives of this RI/FS.

1.2.2.1 Site Background

The Site Background section shall include a brief summary of the Site location, description, physiography, hydrology, geology, demographics, ecological, cultural and natural resource features, Site history, description of previous investigations and responses conducted at the Site by local, state, federal, or private parties, and Site data evaluations and project planning completed during the scoping process.

The Site Background section shall discuss the locations of existing groundwater monitoring wells, if any, and previous surface water, sediment, soil, groundwater, and air sampling locations. The Site Background section shall include a summary description of available data and identify areas where hazardous substances, pollutants or contaminants were detected and the detected levels. The Site Background section shall include tables displaying the minimum and maximum levels of detected hazardous substances, pollutants or contaminants in Site areas and media.

The RI/FS Work Plan will be accompanied by a relational database of all Site analytic data collected under CERCLA authority to date.

1.2.2.2 Data Gap Description/Data Acquisition

As part of the RI/FS Work Plan, the Respondents shall analyze the currently available data. The Respondents shall identify those areas of the Site and nearby areas that require data and evaluation in order to define the nature and extent of hazardous substances, pollutants or contaminants for the purpose of evaluating the level of risk presented by the site and the appropriate type(s) of remedial response. This Section of the RI/FS Work Plan shall include a description of the number, types, and locations of samples to be collected. The RI/FS Work Plan shall include an environmental program to accomplish the following:

- Conduct Site Reconnaissance. The Respondent(s) shall conduct (or have conducted):
  - Site surveys including property, boundary, utility rights-of-way, and topographic information
  - Field Screening

- Conduct Geological Investigations (Soils and Sediments). The Respondent(s) shall conduct geological investigations to determine the extent of hazardous substances, pollutants or contaminants in surface soils, subsurface soils and sediments at the Site. As part of this geological investigation Respondents shall:

  - Collect Surface Soil Samples
  - Collect Subsurface Soil Samples
  - Perform Soil Boring and Permeability Sampling
  - Collect Sediment Samples
  - Survey Soil Gases
  - Test Pit
  - Identify real-world horizontal, vertical, and elevation coordinates for all samples and site features in accordance with EPA Region 5 electronic data requirements

- Air Investigations. If EPA determines it to be necessary, the Respondent(s) shall conduct air investigations to determine the extent of atmospheric hazardous substances, pollutants or contaminants at and from the Site, which shall include:

  - Collect Air Samples
  - Establish Air Monitoring Station

- Hydrogeological Investigations (Ground Water). The Respondent(s) shall conduct hydrogeological investigations of ground water to determine the horizontal and vertical distribution of hazardous substances, pollutants or contaminants in the groundwater and the extent, fate and transport of any groundwater plumes containing hazardous substances, pollutants or contaminants. The hydrogeological investigation shall include:

  - Install Well Systems
  - Collect Samples from Upgradient, Downgradient, and Private wells
  - Collect Samples During Drilling (e.g., HydroPunch or Equivalent)
  - Perform Hydraulic Tests (such as Pump Tests, Slug Tests and Grain Size Analyses)

- Measure Ground-Water Elevations and determine horizontal and vertical sample locations in accordance with EPA Region 5 electronic data requirements.

  - Modeling
  - Determine the direction of regional and local groundwater flow
  - Identify the local uses of groundwater including the number, location, depth and use of nearby private and municipal wells

- Conduct Hydrogeological Investigations (Surface Water). The Respondent(s) shall conduct hydrogeological investigations to determine the nature and extent of contamination of surface water from the Site. The hydrogeological investigation shall include:

- Collect Samples
- Measure Surface-Water Elevation

- Conduct Ecological Investigation. If EPA determines it to be necessary, the Respondent(s) shall conduct ecological investigations to assess the impact to aquatic and terrestrial ecosystems from the disposal, release and migration of hazardous substances, pollutants or contaminants at the Site including:

  - Wetland and Habitat Delineation
  - Wildlife Observations
  - Community Characterization
  - Endangered Species Identification
  - Biota Sampling and Population Studies

- Collect Contaminated Building Samples. If EPA determines it to be necessary, the Respondent(s) shall collect contaminated building samples.

- Dispose of Investigation-Derived Waste. The Respondents shall characterize and dispose of investigation-derived wastes in accordance with local, state, and federal regulations as specified in the FSP (see the Fact Sheet, Guide to Management of Investigation-Derived Wastes, 9345.3-03FS (January 1992)).

- Evaluate and Document the Need for Treatability Studies. If the Respondents or EPA identify remedial actions that involve treatment, the Respondents shall include treatability studies as outlined in Task 5 of this SOW unless the Respondents satisfactorily demonstrate to EPA that such studies are not needed. When treatability studies are needed, the Respondents shall plan initial treatability testing activities (such as research and study design) to occur concurrently with Site characterization activities, to the extent practicable.

1.2.3 Field Sampling Plan

Respondents shall prepare the ***Field Sampling Plan*** (FSP) to ensure that sample collection and analytical activities for both OU1 and OU2 are conducted in accordance with technically acceptable protocols and that the data meet the Site-specific DQOs as established in the Quality Assurance Project Plan (QAPP), and OU1 and OU2 RI/FS Work Plan. All sampling and analyses performed shall conform to EPA direction, approval, and guidance regarding sampling, quality assurance/quality control (QA/QC), data validation, and chain of custody procedures.

Upon request by EPA, the Respondents shall allow EPA or its authorized representatives to take split and/or duplicate samples of any samples collected by the Respondents or their contractors or agents. The Respondents shall notify EPA not less than 15 business days in advance of any sample collection activity. EPA shall have the right to take any additional samples that it deems necessary.

1.2.4 Quality Assurance Project Plan

The Respondents shall review the Site-specific ***Quality Assurance Project Plan*** (QAPP) covering sample analysis and data handling for the samples and data collected during the RI/FS for both OU1 and OU2. If needed, the Respondents will revise the QAPP in accordance with the *Region 5 Instructions on the Preparation of a Superfund Division Quality Assurance Project Plan Based on EPA QA/R-5*; *EPA Requirements for Quality Assurance Project Plans* (QA/R-5, EPA/240/B-01/003, March 2001*)*; and *EPA Guidance for Quality Assurance Project Plans (QA/G-5,* EPA/600/R-02/009, December 2002).

The Respondents shall demonstrate, in advance to EPA's satisfaction, that each laboratory it may use is qualified to conduct the proposed work. This includes use of methods and analytical protocols for the chemicals of concern in the media sampled within detection and quantification limits consistent with both QA/QC procedures and DQO approved in the QAPP for the Site by EPA. The laboratory must have and follow an approved QA program. If a laboratory not in the Contract Laboratory Program is selected, methods consistent with CLP methods that would be used at this Site for the purposes proposed and QA/QC procedures approved by EPA shall be used. The Respondents shall only use laboratories that have a documented Quality Assurance Program which complies with ANSI/ASQC E-4 1994, *Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs*, (American National Standard, January 5, 1995) and *EPA Requirements for Quality Management Plans* (QA/R-2) (EPA/240/B-01-002, March 2001) or equivalent documentation as determined by EPA.

Upon request by EPA, the Respondents shall have such a laboratory analyze samples submitted by EPA for quality assurance monitoring. The Respondents shall provide EPA with the QA/QC procedures followed by all sampling teams and laboratories performing data collection and/or analysis. The Respondents shall also ensure the provision of analytical tracking information consistent with OSWER Directive No. 9240.0-2B, *Extending the Tracking of Analytical Services to PRP-Lead Superfund Sites*.

1.2.5 Health and Safety Plan (2.3.3 and Appendix B)

The Respondents will prepare a ***Health and Safety Plan*** (HSP) that conforms to their health and safety program and complies with the Occupational Safety and Health Administration (OSHA) regulations and protocols outlined in 29 C.F.R. Part 1910. The HSP shall be prepared in accordance with EPA's Standard Operating Safety Guide (PUB 9285.1-03, PB 92-963414, June 1992). The HSP will include the 11 elements described in the RI/FS Guidance such as a health and safety risk analysis, a description of monitoring and personal protective equipment, medical monitoring, and Site control. EPA does not approve the Respondent's HSP, but rather EPA reviews it to ensure that all the necessary elements are included, and that the plan provides for the protection of human health and the environment, and after that review provides comments as may be necessary and appropriate. The safety plan must, at a minimum, follow the EPA's guidance document *Standard Operating Safety Guides* (Publication 9285.1-03, PB92-963414, June 1992).

TASK 2 Community Relations Support

EPA has the responsibility of developing and implementing community involvement activities for the Site. The critical community involvement planning steps performed by EPA and OEPA include conducting community interviews and developing a Community Involvement Plan. Although implementing the Community Involvement Plan is the responsibility of EPA, the Respondents, if directed by EPA, shall assist by providing information regarding the Site's history; participating in public meetings; assisting in preparing fact sheets for distribution to the general public; or conducting other activities approved by EPA. All PRP-conducted community involvement activities shall be planned and developed in coordination with EPA.

TASK 3 Site Characterization (3)

3.1 Investigate and Define Site Physical and Environmental Characteristics (3.2.1.2)

The Respondents shall implement the RI/FS Planning Documents and collect data on the physical and environmental characteristics of the site and its surrounding areas including but not limited to the physiography, geology, and hydrology. This information will be ascertained through a combination of physical measurements, observations, and sampling efforts and will be utilized to define potential transport pathways and human ecological receptor populations. In defining the site's physical characteristics the Respondents will also obtain sufficient engineering data (such as pumping characteristics) for the projection of contaminant fate and transport, and development and screening of remedial action alternatives, including information to assess treatment technologies.

3.2 Define Sources of Contamination (3.2.3)

The respondent shall conduct sufficient sampling to define the boundaries of the contaminant sources to the level established in the QA/QC plan and DQOs. Defining the source of contamination will include analyzing the potential for contaminant release (e.g., long term leaching from soil), contaminant mobility and persistence, and characteristics important for evaluating remedial actions, including information to assess treatment technologies. The Respondents will locate and characterize all hot spots, defined as highly toxic and highly mobile material that presents a potential principal threat to human health or the environment and would likely threaten the integrity of the containment system if it were left in place. A hot spot should be large enough that its remediation or removal would significantly reduce the risk posed by the overall site, small enough that it is reasonable to consider removal or treatment, and located in a discrete, accessible part of the landfill.

3.3 Describe the Nature and Extent/Fate and Transport of Contamination (3.2.4)

The Respondents shall gather information to describe the nature and extent of contamination as a final step during the field investigation. To describe the nature and extent of contamination, the Respondents will utilize the information on site physical and environmental characteristics and sources of contamination to give a preliminary estimate of the contaminants that may have migrated. The Respondents will then implement an iterative monitoring program and any study program identified in the work plan or sampling plan such that by using analytical techniques

sufficient to detect and quantify the concentration of contaminants, the migration of contaminants through the various media at site can be determined. In addition, the Respondents shall gather data for calculations of contaminant fate and transport. This process is continued until the area and depth of contamination are known to the level of contamination established in the QAPP and DQOs.

3.3.1 Evaluate site characteristics (3.4.1)

The Respondents will analyze and evaluate the data to describe: (1) site physical and environmental characteristics, (2) contaminant source characteristics, (3) nature and extent of contamination and (4) contaminant fate and transport. Results of the site physical characteristics, source characteristics, and extent of contamination analyses are utilized in the analysis of contaminant fate and transport. The Respondents shall evaluate the actual and potential magnitude of releases from the sources, and horizontal and vertical spread of contamination as well as mobility and persistence of contaminants. Where modeling is appropriate, such models shall be identified to EPA and the state in a technical memorandum prior to their use. All data and programming, including any proprietary programs, shall be made available to EPA and the state together with a sensitivity analysis. The RI data shall be presented electronically according to EPA Region 5 format requirements. Analysis of data collected for site characterization will meet the DQOs developed in the QAPP and stated in the FSP (or revised during the RI).

3.3.2 Iterative Site Characterization Deliverables

If multiple, iterative phases of fieldwork are conducted, the Respondents will prepare an ***Interim Field Investigation Technical Memorandum*** to the Agencies for review and EPA Approval after each discrete phase. The Interim Field Investigation Technical Memorandum will review the investigative activities that were performed in the fieldwork phase, describe and display the site data collected, update the site conceptual model, identify data gaps, and propose the next phase of data collection activities (if needed).

3.3.3 Site Characterization Technical Memorandum (3.7.2)

After the final phase of field sampling and analysis for each OU, the Respondents will prepare and submit a ***Site Characterization Technical Memorandum***. This summary will review the investigative activities that have taken place, and describe and display site data documenting the location and characteristics of surface and subsurface features and contamination at the site including the affected medium, location, types, physical state, concentration of contaminants and quantity. In addition, the location, dimensions, physical condition and varying concentrations of each contaminant throughout each source and the extent of contaminant migration through each of the affected media will be documented. Respondents will address each of EPA's comments on the Site Characterization TM in the draft RI Report (Task 4).

3.3.4 Current and Future Land Uses and Reuse Assessment

The Respondents shall prepare a ***Current and Future Land Uses and Reuse Memorandum*** that evaluates the current and reasonably anticipated future land uses at the Site. The Memorandum shall identify: 1) past uses at the site including title and lien information; 2) current uses of the

site and neighboring areas; 3) the owner's plans for the site following cleanup and any prospective purchasers; 4) applicable zoning laws and ordinance; 5) current zoning; 6) applicable local area land use plans, master plans and how they affect the site; 7) existing local restrictions on property; 8) property boundaries; 9) groundwater use determinations, wellhead protection areas, recharge areas and other areas identified in the state's Comprehensive Ground Water Protection Program; 10) Flood plains, wetland, or endangered or threatened species; and 11) utility rights of way.

If EPA, in its sole discretion, determines that a Reuse Assessment is necessary, Respondents will perform the ***Reuse Assessment*** in accordance with EPA guidance, including, but not limited to: *Reuse Assessments: A Tool To Implement The Superfund Land Use Directive* (OSWER 9355.7-06P, June 4, 2001) upon request of EPA. The Reuse Assessment should provide sufficient information to develop realistic assumptions of the reasonably anticipated future uses for the Site.

3.3.5 Screening Level Ecological Risk Assessment

Respondents shall conduct a Screening Level Ecological Risk Assessment (SLERA) and submit a ***SLERA Report*** to EPA, with a copy to OEPA, for review and approval by EPA. Respondents shall conduct the screening level assessment and prepare the SLERA in accordance with EPA guidance including, at a minimum: *Ecological Risk Assessment Guidance for Superfund, Process for Designing and Conducting Ecological Risk Assessments* (EPA-540-R-97-006, June 1997, OSWER Directive 9285.7-25). The SLERA shall assess the need, and if required, the level of effort necessary, to conduct a detailed (or baseline) ecological risk assessment.

3.3.6 Baseline Risk Assessment

The Baseline Risk Assessment (BLRA) refers collectively to the Baseline Human Health Risk Assessment and Baseline Ecological Risk Assessment, described below.

3.3.6.1 Baseline Human Health Risk Assessment

As an attachment to the RI Report for each OU, the Respondents shall submit a ***Baseline Human Health Risk Assessment Report*** (BHHRA) to EPA, with a copy to OEPA, for review and approval by EPA. The Respondents shall conduct the baseline risk assessment to determine whether site contaminants pose a current or potential risk to human health and the environment in the absence of any remedial action. The major components of the Baseline Risk Assessment include contaminant identification, exposure assessment, toxicity assessment, and human health and ecological risk characterization.

Respondents shall conduct a baseline human health risk assessment that focuses on actual and potential risks to persons coming into contact with on-site hazardous substances, pollutants or contaminants as well as risks to the nearby residential, recreational and industrial worker populations from exposure to hazardous substances, pollutants or contaminants in groundwater, soils, sediments, surface water, air, and ingestion of contaminated organisms in nearby, impacted ecosystems. The human health risk assessment shall define central tendency and reasonable maximum estimates of exposure for current land use conditions and reasonable future land use

conditions. The human health risk assessment shall use data from the Site and nearby areas to identify the contaminants of concern (COC), provide an estimate of how and to what extent human receptors might be exposed to these COCs, and provide an assessment of the health effects associated with these COCs. The human health risk assessment shall project the potential risk of health problems occurring if no cleanup action is taken at the Site and/or nearby areas, and establish target action levels for COCs (carcinogenic and non-carcinogenic).

Respondents shall conduct the human health risk assessment in accordance with EPA guidance including, at a minimum: *Risk Assessment Guidance for Superfund (RAGS), Volume I - Human Health Evaluation Manual (Part A), Interim Final* (EPA-540-1-89-002, OSWER Directive 9285.7-01A, December 1, 1989); and Risk Assessment Guidance for Superfund (RAGS), Volume I - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments), Interim, (EPA 540-R-97-033, OSWER 9285.7-01D, January, 1998) or subsequently issued guidance.

Respondents shall also conduct the human health risk assessment in accordance with the following additional guidance found in the following OSWER directives:

1) "Clarification to the 1994 Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities," OSWER Directive 9200.4-27; August, 1998;

2) "Implementation of the Risk Assessment Guidance for Superfund (RAGS) Volume I - Human Health Evaluation Manual, (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments) (Interim)," OSWER Directive 9285.7-01D-1; December 17, 1997;

3) "Soil Screening Guidance: Technical Background Document," OSWER Directive 9355.4-17A; May 1, 1996 and "Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, OSWER Directive 9355.4; March 24, 2001;

4) "Soil Screening Guidance: User's Guide," Publication 9355.4-23; April, 1996;

5) "Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities," OSWER Directive 9355.4-12; July 14, 1994;

6) "Guidance Manual for the Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children," Publication 9285.7-15-1; February, 1994, and associated, clarifying Short Sheets on IEUBK Model inputs, including but not limited to OSWER 9285.7-32 through 34, as listed on the Superfund lead internet site at http://www.epa.gov/superfund/health/contaminants/lead/index.htm;

7) "Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children," Version 0.99D, NTIS PB94-501517, 1994 or "Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children," Windows© version, 2001;

8) "Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual: (Part B, Development of Risk-based Preliminary Remediation Goals)," Interim, OSWER Directive 9285.7-01B; December, 1991;

9) "Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors," OSWER Directive 9285.6-03; March 25, 1991; and

10) "Exposure Factors Handbook," Volumes I, II, and III; August 1997 (EPA/600/P-95/002Fa,b,c).

Respondents shall also comply with the guidance on assessing human health risk associated with adult exposures to lead in soil as found in the following document: "Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil," December, 1996. Respondents shall also comply with the "Superfund Lead-Contaminated Residential Sites Handbook," December 2002 by the EPA Lead Sites Workgroup.

Additional applicable or relevant guidance may be used only if approved by EPA. Respondents shall prepare the Human Health Risk Assessment Report according to the guidelines outlined below:

- Hazard Identification (sources). The Respondents shall review available information on the hazardous substances present at the site and identify the major contaminants of concern.

- Dose-Response Assessment. The Respondents shall select contaminants of concern based on their intrinsic toxicological properties.

- Conceptual Exposure/Pathway Analysis. The Respondents shall identify and analyze critical exposure pathways (e.g., drinking water). The proximity of contaminants to exposure pathways and their potential to migrate into critical exposure pathways shall be assessed.

- Characterization of Site and Potential Receptors. The Respondents shall identify and characterize human populations in the exposure pathways.

- Exposure Assessment. The exposure assessment will identify the magnitude of actual or potential human exposures, the frequency and duration of these exposures, and the routes by which receptors are exposed. The exposure assessment shall include an evaluation of the likelihood of such exposures occurring and shall provide the basis for the development of acceptable exposure levels. In developing the exposure assessment, the Respondents shall develop reasonable maximum estimates of exposure for both current land use conditions and potential land use conditions at the site.

- Risk Characterization. During risk characterization, Respondents shall compare chemical-specific toxicity information, combined with quantitative and qualitative information from the exposure assessment, to measured levels of contaminant exposure levels and the levels predicted through environmental fate and transport modeling. These comparisons shall determine whether concentrations of contaminants at or near the site are affecting or could potentially affect human health.

- Identification of Limitations/Uncertainties. The Respondents shall identify critical assumptions (e.g., background concentrations and conditions) and uncertainties in the report.

- Site Conceptual Model. Based on contaminant identification, exposure assessment, toxicity assessment, and risk characterization, the Respondents shall develop a conceptual model of the site.

3.3.6.2 Baseline Ecological Risk Assessment

As an attachment to the RI Report for each OU, the Respondents shall, if required on the basis of the SLERA, submit a ***Baseline Ecological Risk Assessment Report*** (BERA) to EPA, with a copy to OEPA, for review and approval by EPA. In the BERA, if required, the Respondents shall evaluate and assess the risk to the environment posed by site contaminants. Respondents shall conduct and prepare the BERA in accordance with EPA guidance including, at a minimum: *Ecological Risk Assessment Guidance for Superfund, Process for Designing and Conducting Ecological Risk Assessments* (EPA-540-R-97-006, June 1997, OSWER Directive 9285.7-25). The BERA shall evaluate both current and potential future risks to ecosystems (e.g., eventual surface water and groundwater transport to the Great Miami River and other ecosystems) and shall follow the guidelines outlined below:

- Hazard Identification (sources). The Respondents shall review available information on the hazardous substances present at the site and identify the major contaminants of concern.

- Dose-Response Assessment. The Respondents must select contaminants of concern based on their intrinsic toxicological properties.

- Conceptual Exposure/Pathway Analysis. Critical exposure pathways (e.g., surface water) shall be identified and analyzed. The proximity of contaminants to exposure pathways and their potential to migrate into critical exposure pathways shall be assessed.

- Characterization of Site and Potential Receptors. The Respondents shall identify and characterize environmental exposure pathways.

- Selection of Chemicals, Indicator Species, and End Points. In preparing the assessment, the Respondents will select representative chemicals, indicator species (species that are especially sensitive to environmental contaminants), and end points on which to concentrate.

- Exposure Assessment. In the exposure assessment, Respondents must identify the magnitude of actual or environmental exposures, the frequency and duration of these exposures, and the routes by which receptors are exposed. The exposure assessment shall include an evaluation of the likelihood of such exposures occurring and shall provide the basis for the development of acceptable exposure levels. In developing the exposure assessment, the Respondents shall develop reasonable maximum

estimates of exposure for both current land use conditions and potential land use conditions at the site.

- Toxicity Assessment/Ecological Effects Assessment. The toxicity and ecological effects assessment will address the types of adverse environmental effects associated with chemical exposures, the relationships between magnitude of exposures and adverse effects, and the related uncertainties for contaminant toxicity (e.g., weight of evidence for a chemical's carcinogenicity).

- Risk Characterization. During risk characterization, Respondents shall compare chemical-specific toxicity information, combined with quantitative and qualitative information from the exposure assessment, to measured levels of contaminant exposure levels and the levels predicted through environmental fate and transport modeling. These comparisons shall determine whether concentrations of contaminants at or near the site are affecting or could potentially affect the environment.

- Identification of Limitations/Uncertainties. The Respondents shall identify critical assumptions (e.g., background concentrations and conditions) and uncertainties in the report.

- Site Conceptual Model. Based on contaminant identification, exposure assessment, toxicity assessment, and risk characterization, the Respondents shall develop a conceptual model of the site.

TASK 4 Remedial Investigation (RI) Report (3.7.3)

For each OU, in accordance with the schedule in Exhibit A, the Respondents shall submit to EPA for review and approval, with a copy to OEPA, an ***RI Report*** addressing all of the Site and nearby areas. The RI Report shall be consistent with the ASAOC and this SOW. The RI Report shall accurately establish the site characteristics such as media contaminated, extent of contamination, and the physical boundaries of the contamination. Pursuant to this objective, the Respondents shall endeavor to obtain only the essential amount of detailed data necessary to determine the key contaminant(s) movement and extent of contamination. The key contaminant(s) must be selected based on persistence and mobility in the environment and the degree of hazard. The key contaminant(s) identified in the RI shall be evaluated for receptor exposure and an estimate of the key contaminant(s) level reaching human or environmental receptors must be made. The Respondents shall use existing standards and guidelines such as drinking-water standards, water-quality criteria, and other criteria accepted by the EPA as appropriate for the situation to evaluate effects on human receptors who may be exposed to the key contaminant(s) above appropriate standards or guidelines.

The Respondents shall submit an RI Report to EPA for review and approval pursuant to Section II, which includes the following:

- Executive Summary

- Site Background. The Respondent(s) shall assemble and review available facts about the regional conditions and conditions specific to the site under investigation.

- Investigation

  - Site Reconnaissance
  - Field Investigation & Technical Approach
  - Chemical Analysis & Analytical Methods
  - Field Methodologies
  - Ecological (if necessary)
  - Surface Water
  - Sediment
  - Soil Boring
  - Soil Sampling
  - Monitoring Well Installation
  - Groundwater Sampling
  - Hydrogeological Assessment
  - Air Sampling (if necessary)
  - Waste Investigation
  - Geophysical Investigation

- Site Characteristics

  - Geology
  - Hydrogeology
  - Meteorology
  - Demographics and Land Use
  - Ecological Assessment

- Nature and Extent of Contamination

  - Contaminant Sources
  - Contaminant Distribution and Trends

- Fate and Transport

  - Contaminant Characteristics
  - Transport Processes
  - Contaminant Migration Trends

- Human Risk Assessment

  - Hazard Identification (sources)
  - Dose-Response Assessment
  - Prepare Conceptual Exposure/Pathway Analysis
  - Characterization of Site and Potential Receptors
  - Exposure Assessment
  - Site Conceptual Model

- Ecological Risk Assessment

  - Hazard Identification (sources)
  - Dose-Response Assessment
  - Prepare Conceptual Exposure/Pathway Analysis
  - Characterization of Site and Potential Receptors
  - Selection of Chemicals, Indicator Species, and End Points
  - Exposure Assessment
  - Toxicity Assessment/Ecological Effects Assessment
  - Risk Characterization
  - Identification of Limitations/Uncertainties
  - Site Conceptual Model

- Summary and Conclusions

TASK 5 Treatability Studies (5)

If EPA or the Respondents determine that treatability testing is necessary, the Respondents shall conduct treatability studies as described in this Task 5 of this SOW. In addition, if applicable, the Respondents shall use the testing results and operating conditions in the detailed design of the selected remedial technology.

5.1 Determine Candidate Technologies and of the Need for Testing

The Respondents shall submit to EPA for review and approval, with a copy to OEPA, a ***Candidate Technologies and Testing Needs Technical Memorandum*** that identifies candidate technologies for a treatability studies program commensurate with the Alternatives Screening Technical Memorandum. The list of candidate technologies shall cover the range of technologies required for alternatives analysis. The Respondents shall determine and refine the specific data requirements for the testing program during Site characterization and the development and screening of remedial alternatives.

5.1.1 Conduct Literature Survey and Determine the Need for Treatability Testing

Within the Candidate Technologies and Testing Needs Technical Memorandum, the Respondents shall conduct a literature survey to gather information on the performance, relative costs, applicability, removal efficiencies, operation and maintenance (O&M) requirements, and implementability of candidate technologies. Respondents shall conduct treatability studies except where Respondents can demonstrate to EPA's satisfaction that they are not needed.

5.2 Treatability Testing and Deliverables (5.5, 5.6 and 5.8)

If treatability testing is needed, the Respondents will also prepare and submit a Treatability Study Work Plan, a Sampling and Analysis Plan, a HSP and a Treatability Evaluation Report.

5.2.1 Treatability Testing Work Plan and Sampling and Analysis Plan (5.5)

If EPA determines that treatability testing is necessary, EPA will decide on the type of treatability testing to use (e.g., bench versus pilot). Within 60 days of a request from EPA, the Respondents shall submit a ***Treatability Testing Work Plan*** and a ***SAP***, or amendments to the original RI/FS Work Plan(s), FSP and QAPP, to EPA with a copy to OEPA for review and approval by EPA, that describes the Site background, the remedial technology(ies) to be tested, test objectives, experimental procedures, treatability conditions to be tested, measurements of performance, analytical methods, data management and analysis, health and safety, and residual waste management. The Respondents shall document the DQOs for treatability testing as well. If pilot scale treatability testing is to be performed, the Treatability Study Work Plan shall describe pilot plant installation and start-up, pilot plant operation and maintenance procedures, operating conditions to be tested, a sampling plan to determine pilot plant performance, and a detailed HSP. If testing is to be performed off-Site, the plans shall address all permitting requirements. The requirements of SAPs are outlined in Tasks 1.2.3 and 1.2.4 of this SOW.

5.2.2 Treatability Study Health and Safety Plan (5.5)

If EPA determines that treatability testing is necessary and if the original HSP is not adequate for defining the activities to be performed during the treatability tests, the Respondents shall submit a separate or amended ***Health and Safety Plan***. Task 1.2.2 of this SOW provides additional information on the requirements of the HSP. EPA and OEPA review, but do not approve the Treatability Study HSP.

5.2.3 Treatability Study Evaluation Report (5.6)

If EPA determines that treatability testing is necessary, following the completion of the treatability testing, the Respondents will analyze and interpret the testing results in a ***Treatability Study Evaluation Report*** to OEPA for review and to EPA for review and approval. This report will be submitted as a separate deliverable. The Treatability Study Evaluation Report will evaluate each technology's effectiveness, implementability and cost, and actual results as compared with predicted results. The report will also evaluate full scale application of the technology, including a sensitivity analysis identifying the key parameters affecting full-scale operation.

TASK 6 Development and Screening of Remedial Alternatives (4)

The Respondents shall develop and screen an appropriate range of remedial alternatives that will be evaluated by the Respondents. This range of alternatives shall include, as appropriate, options in which treatment is used to reduce the toxicity, mobility, or volume of wastes, but which vary in the types of treatment, the amount treated, and the manner in which long-term residuals or untreated wastes are managed; options involving containment with little or no treatment; options involving both treatment and containment; and a no-action alternative.

If appropriate, potential Remedial Alternatives for OU1 will be screened and developed in accordance with *Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites* (EPA/540/P-91/001, February 1991).

The Respondents will perform the following activities as a function of the development and screening of remedial alternatives.

6.1 Alternatives Development and Screening Deliverables

The Respondents shall prepare and submit two technical memoranda for this task: a Remedial Action Objectives Technical Memorandum, and an Alternatives Screening Technical Memorandum.

6.1.1 Remedial Action Objectives Technical Memorandum (4.2.1)

Based on the BLRA, the Respondents will review and if necessary modify the site-specific RAOs, specifically the PRGs that were established by EPA, in consultation with OEPA, prior to or during negotiations between EPA and the Respondents. The Respondents will document the revised RAOs in a ***Remedial Action Objectives Technical Memorandum*** (RAO TM) to OEPA for review and to EPA for review and approval. These modified RAOs will specify the contaminants and media of interest, exposure pathways and receptors, and an acceptable contaminant level or range of levels (at particular locations for each exposure route). The Respondents will incorporate EPA's comments on the RAO TM into the Alternatives Screening Technical Memorandum and Feasibility Study Report.

6.1.2 Alternatives Screening Technical Memorandum (4.5)

The Respondents shall submit an ***Alternatives Screening Technical Memorandum*** to EPA with a copy to OEPA for review and comment by EPA. The Alternatives Screening Technical Memorandum shall summarize the development and screening of an appropriate range of remedial alternatives, and shall include an alternatives array summary. The Alternatives Screening Technical Memorandum shall document the methods, the rationale and the results of the alternatives screening process. If required by EPA, the Respondents shall modify the alternatives array considered in the FS Report to assure that the array identifies a complete and appropriate range of viable alternatives to be considered in the detailed analysis. The Respondents shall incorporate any modifications, as directed by EPA, in the FS Report (Task 7.2).

6.1.2.1 Develop General Response Actions (4.2.2)

In the Alternatives Screening Technical Memorandum, the Respondents shall develop general response actions for each medium of interest including containment, treatment, excavation, pumping, or other actions, organized by medium (soil, waste, groundwater, air, etc.), to satisfy the EPA-approved RAOs.

6.1.2.2 Identify Areas or Volumes of Media (4.2.3)

In the Alternatives Screening Technical Memorandum, the Respondents shall identify areas or volumes of media to which the general response actions may apply, taking into account requirements for protectiveness as identified in the RAOs. The Respondents shall also take into account the chemical and physical characterization of the Site.

6.1.2.3 Identify, Screen, and Document Remedial Technologies (4.2.4 and 4.2.5)

In the Alternatives Screening Technical Memorandum, the Respondents shall identify and evaluate technologies applicable to each general response action to eliminate those that cannot be implemented at the Site. The Respondents shall refine applicable general response actions to specify remedial technology types. The Respondents shall identify technology process options for each of the technology types concurrently with the identification of such technology types or following the screening of considered technology types. The Respondents shall evaluate process options on the basis of effectiveness, implementability, and cost factors to select and retain one or, if necessary, more representative processes for each technology type. The Respondents shall summarize and include the technology types and process options in the Alternatives Screening Technical Memorandum. Whenever practicable, the alternatives shall also consider the CERCLA preference for treatment over conventional containment or land disposal approaches.

In the Alternatives Screening Technical Memorandum, Respondents shall provide a preliminary list of alternatives to address the relevant contaminated media (soil, sediments, surface water, groundwater, air, etc.) at the Site that shall consist of, but is not limited to, treatment technologies, removal and off-site treatment/disposal, removal and on-site disposal, and in-place containment for soils, sediments, and wastes. See 40 C.F.R. § 300.430(e)(1)-(7). The Respondents shall specify the reasons for eliminating any alternatives.

6.1.2.4 Assemble and Document Alternatives (4.2.6)

The Respondents shall assemble the selected representative technologies into alternatives for each affected medium or operable unit. Together, all of the alternatives shall represent a range of treatment and containment combinations that shall address the operable unit as a whole. The Respondents shall prepare a summary of the assembled alternatives and their related ARARs for the Alternatives Screening Technical Memorandum. The Respondents shall specify the reasons for eliminating alternatives during the preliminary screening process.

The Respondents shall refine the remedial alternatives to identify the volumes of contaminated media addressed by the proposed processes and size critical unit operations as necessary. The Respondents shall collect sufficient information for an adequate comparison of alternatives. The Respondents shall also modify the RAOs for each chemical in each medium as necessary to incorporate any new human health and ecological risk assessment information presented in the Respondents' risk assessment or evaluation reports. Additionally, the Respondents shall update ARARs as the remedial alternatives are refined.

6.1.2.5 Conduct and Document Screening Evaluation of Each Alternative (4.3)

The Respondents may perform a final screening process based on short and long term aspects of effectiveness, implementability, and relative cost. Generally, this screening process is only necessary when there are many feasible alternatives available for a detailed analysis. If necessary, the Respondents shall conduct the screening of alternatives to assure that only the alternatives with the most favorable composite evaluation of all factors are retained for further analysis. As appropriate, the screening shall preserve the range of treatment and containment alternatives that was initially developed. The range of remaining alternatives shall include

options that use treatment technologies and permanent solutions to the maximum extent practicable. The Respondents shall prepare an Alternatives Screening Technical Memorandum that summarizes the results and reasoning employed in screening; arrays the alternatives that remain after screening; and identifies the action-specific ARARs for the alternatives that remain after screening.

TASK 7 Detailed Analysis of Alternatives - FS Report (6)

For each OU, the Respondents shall conduct and present a detailed analysis of remedial alternatives to provide EPA with the information needed to select a Site remedy.

7.1 Detailed Analysis of Alternatives (6.2)

The Respondents shall conduct a detailed analysis of the remedial alternatives for each OU of the Site. The detailed analysis shall include an analysis of each remedial option against each of the nine evaluation criteria set forth in 40 C.F.R. § 300.430(e)(9)(iii) and a comparative analysis of all options using the same nine criteria as a basis for comparison.

7.1.1 Apply Nine Criteria in the Individual Analysis of Alternatives (6.2.1-6.2.4)

The Respondents shall apply the nine evaluation criteria to the assembled remedial alternatives to ensure that the selected remedial alternative will protect human health and the environment and meet RAOs; will comply with, or include a waiver of, ARARs; will be cost-effective; will utilize permanent solutions and alternative treatment technologies, or resource recovery technologies, to the maximum extent practicable; and will address the statutory preference for treatment as a principal element. The evaluation criteria include: (1) overall protection of human health and the environment and how the alternative meets each of the RAOs; (2) compliance with ARARs; (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility, or volume; (5) short-term effectiveness; (6) implementability; (7) cost; (8) state (or support agency) acceptance; and (9) community acceptance. (Note: criteria 8 and 9 are considered after the RI/FS report has been released to the general public.) For each alternative the Respondents shall provide: (1) a description of the alternative that outlines the waste management strategy involved and identifies the key ARARs associated with each alternative, and (2) a discussion of the individual criterion assessment. If the Respondents do not have direct input on criteria (8) state (or support agency) acceptance and (9) community acceptance, EPA will address these criteria.

7.1.2 Alternatives Analysis for Institutional Controls

For any alternative that relies on Institutional Controls, Respondents shall include in the FS an evaluation of the following: 1) Overall Protection of Human Health and the Environment including what specific institutional control components will ensure that the alternative will remain protective and how these specific controls will meet RAOs; 2) Compliance with ARARs; 3) Long Term Effectiveness including the adequacy and reliability of institutional controls and how long the institutional control must remain in place; 4) Short Term Effectiveness including the amount of time it will take to impose the Institutional Control; 5) Implementability including research and documentation that the proper entities (e.g., potentially responsible parties, state, local government entities, local landowners conservation organizations) are willing to enter into

any necessary agreement or restrictive covenant with the proper entities and/or that laws governing the restriction exist or allow implementation of the institutional control; 6) Cost including the cost to implement, maintain, monitor and enforce the institutional control; 7) State and Community acceptance of the Institutional Control.

7.2 Feasibility Study Report (6.5)

Within 60 days after receipt of EPA's comments on the Alternatives Screening Technical Memorandum, the Respondents shall prepare and submit a draft ***FS Report*** to EPA for its review pursuant to Section II. The FS report shall summarize the development and screening of the remedial alternatives and present the detailed analysis of remedial alternatives. In addition, the FS Report shall also include the information EPA will need to prepare relevant sections of the Record of Decision (ROD) for the Site [see Chapters 6 and 9 of EPA's *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (EPA 540-R-98-031, July 1999) for the information that is needed].

Following comment by EPA on the draft FS Report, the Respondents will prepare a final FS Report which fully and satisfactorily addresses each of EPA's comments on the draft FS Report. The Respondents will submit the final FS Report to OEPA for review and to EPA for review and comment or approval in accordance with the schedule in Exhibit A. Any subsequent revisions to the FS Report that are required will be in accordance with the schedule in Exhibit A.

TASK 8 Progress Reports

The Respondents shall submit monthly (or at a reduced frequency if approved by EPA) written progress reports to EPA and OEPA concerning actions undertaken pursuant to the ASAOC and this SOW, beginning 30 calendar days after the effective date of the ASAOC, until the termination of the ASAOC, unless otherwise directed in writing by the RPM. These reports shall include, but not be limited to, a description of all significant developments during the preceding period, including the specific work that was performed and any problems that were encountered; electronic copies (formatted according to EPA specifications) and summary of the analytical data that was received during the reporting period (as necessary); and the developments anticipated during the next reporting period, including a schedule of work to be performed, anticipated problems, and actual or planned resolutions of past or anticipated problems. The Respondents shall provide the RPM with a pdf copy and an electronic copy (according to EPA Region 5 format specification) of laboratory data either within the monthly progress reports or no later than 60 days after samples are shipped for analysis.

Figure 1: Site location and OU1 Boundary

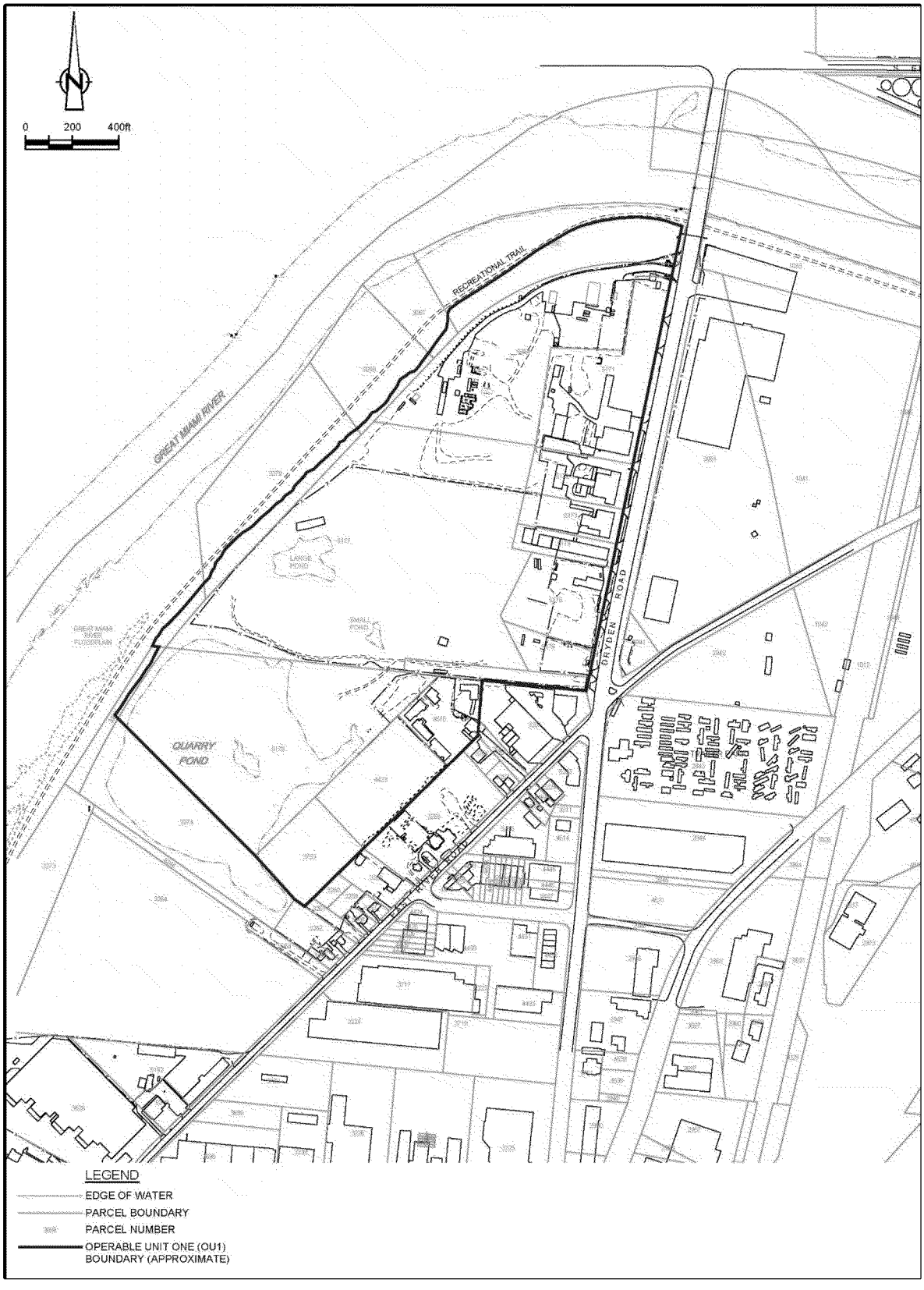

EXHIBIT A
SCHEDULE FOR MAJOR DELIVERABLES

Deliverables are relevant for both OUs unless specified otherwise in this table. All timeframes are in calendar days.

DELIVERABLE	DUE DATE
Task 1.2.2 – OU1 and OU2 RI/FS Work Plan	Revised RI/FS Work Plan due 45 days after the effective date of the ASAOC. Final Work Plan due 30 days after receipt of EPA's comments on the draft RI/FS Work Plan. Any subsequent revisions, if required, are due within 21 days of receipt of EPA's comments.
Task 1.2.3 - Field Sampling Plan	Revised FSP (or statement that the existing FSP is sufficient for planned RI/FS activities) due 45 days after the effective date of the ASAOC. Final FSP due 30 days after receipt of EPA's comments on the draft Field Sampling Plan. Any subsequent revisions, if required, are due within 21 days of receipt of EPA's comments.
Task 1.2.4 - Quality Assurance Project Plan and Quality Management Plan(s)	Revised QAPP (or statement that the existing QAPP is sufficient for planned RI/FS activities) due 45 days the effective date of the ASAOC. Final QAPP due 30 days after receipt of EPA's comments on the draft QAPP. Any subsequent revisions, if required, are due within 21 days of receipt of EPA's comments.
Task 1.2.5- Health and Safety Plan	Draft H&S Plan (or statement that the existing H&S Plan is sufficient for planned RI/FS activities) due 45 days after effective date of the ASAOC. Final H&S Plan due 30 days after receipt of EPA's comments on the draft H&S plan. Any subsequent revisions, if required, are due within 21 days of receipt of EPA's comments.
Task 3.3.2 - Interim Field Investigation Technical Memorandum	Draft Memorandum due 60 days after the end of fieldwork. Final Memorandum due 30 days after receipt of EPA's comments. Any subsequent revisions, if required, are due within 21 days of receipt of EPA's comments.
Task 3.3.3– Site Characterization Technical Memorandum	Draft Memorandum due 60 days after the end of the final phase of fieldwork.
Task 3.3.4 - Current and Future Land Uses and Reuse Memorandum	Draft Memorandum due 60 days after the end of the final phase of fieldwork. Any subsequent revisions, if required, are due within 21 days of receipt of EPA's comments.
Task 3.3.4 – Reuse Assessment (if needed)	If requested by EPA, the draft Reuse Assessment is due 30 days after a request by EPA.

Tasks 3.3.5 – Screening Level Ecological Risk Assessment Report	Draft SLERA Report is due 60 days after the end of the final phase of fieldwork. Any subsequent revisions, if required, are due within 30 days of receipt of EPA's comments. Any subsequent revisions, if required, are due within 21 days of receipt of EPA's comments.
Tasks 3.3.6 – Baseline Risk Assessment Report	Draft BLRA Report is due with the draft RI Report. Final BLRA Report is due with the final RI Report. Any subsequent revisions, if required, are due within 45 days of receipt of EPA's comments.
Task 4 - RI Report	Draft RI Report due 60 days after receipt of EPA's comments on the Site Characterization Technical Memorandum (Task 3.3.3). Final RI Report due 45 days after receipt of EPA's comments on the draft RI Report. Any subsequent revisions, if required, are due within 30 days of receipt of EPA's comments.
Task 5.1 – Candidate Technologies and Testing Needs Technical Memorandum	No later than the Site Characterization TM (Task 3.3.3).
Task 5.2.1 - Draft and Final Treatability Testing Work Plan and SAP or Amendments to the Original RI/FS Work Plan, FSP and/or QAPP.	Draft TTWP due within 45 days of receipt of comments on the Candidate Technologies and Testing Needs Technical Memorandum (Task 5.1), or 45 days of request from EPA. Final TTWP due within 30 days of receipt of comments on the draft TTWP.
Task 5.2.2 - Draft and Final Treatability Testing Health and Safety Plan or Amendment to the Original Health and Safety Plan	With the Treatability Testing Work Plan (Task 5.2.1)
Task 5.2.3 - Draft and Final Treatability Study Evaluation Report	Draft Report due with the Site Characterization TM (Task 3.3.3), the draft RI Report (Task 4), or in accordance with the schedule in the approved Treatability Testing Work Plan (Task 5.2.1).
Task 6.1.1 - Remedial Action Objectives Technical Memorandum	RAO TM due 45 days after receipt of EPA's comments on the draft RI Report (Task 4).
Task 6.1.2 – Alternatives Screening Technical Memorandum	ASTM due 45 days after receipt of EPA's approval of the RAO TM (Task 6.1.1).
Task 7.2 - FS Report	Draft FS Report due 60 days after receipt of EPA's comments on the Alternatives Screening Technical Memorandum (Task 6.1.2). Final FS Report due 45 days after receipt of EPA's comments on the draft FS Report. Any subsequent revisions, if required, are due within 30 days of receipt of EPA's comments.

TASK 8 - Monthly Progress Reports	On the 15th day of each month or the first business day after the 15th of the month commencing 30 days after the effective date of the ASAOC.
Miscellaneous Documents	In accordance with the submittal date provided by RPM

EXHIBIT B
PARTIAL LIST OF GUIDANCE

The following list, although not comprehensive, comprises many of the regulations and guidance documents that apply to the RI/FS process. The majority of these guidance documents, and additional applicable guidance documents, may be downloaded from the following websites:

http://www.epa.gov/superfund/index.htm (General Superfund)

http://www.epa.gov/superfund/policy/index.htm (Office of Solid Waste and Emergency Response)

http://cluin.org (Site Characterization, Monitoring and Remediation)

http://www.epa.gov/quality/qa_docs.html (Quality Assurance)

http://www.epa.gov/risk/guidance.htm (Risk Assessment)

http://www.epa.gov/superfund/health/contaminants/lead/index.htm (Lead)

http://nepis.epa.gov (General Publications Clearinghouse)

1. The (revised) National Contingency Plan;

2. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, EPA, Office of Emergency and Remedial Response, OSWER Directive No. 9355.3-01, EPA/540/G-89/004, October 1988.

3. *Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites*, EPA, Office of Emergency and Remedial Response, EPA/540/P-91/001, February 1991.

4. *Field Analytical and Site Characterization Technologies Summary of Applications*, EPA, EPA-542-F-97-024, November 1997.

5. *CLU-IN Hazardous Waste Clean-Up Information World Wide Web Site*, EPA, EPA-542- F-99-002, February 1999.

6. *Field Sampling and Analysis Technology Matrix and Reference Guide*, EPA, EPA-542- F-98-013, July 1998.

7. *Subsurface Characterization and Monitoring Techniques: A Desk Reference Guide, Volumes 1 and 2*, EPA, EPA/625/R-93/003, May 1993.

8. *Use of Airborne, Surface, and Borehole Geophysical Techniques at Contaminated Sites: A Reference Guide*, EPA, EPA/625/R-92/007(a,b), September 1993.

9. *Innovations in Site Characterization: Geophysical Investigation at Hazardous Waste Sites*, EPA, EPA-542-R-00-003, August 2000.

10. *Innovative Remediation and Site Characterization Technology Resources*, EPA, OSWER, EPA-542-F-01-026b, January 2001.

11. *Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells*, EPA, EPA/600/4-89/034, 1991.

12. *Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers*, EPA, EPA-542-S-02-001, May 2002.

13. *Ground Water Issue: Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures*, EPA, EPA/540/S-95/504, April 1996.

14. *Superfund Ground Water Issue: Ground Water Sampling for Metals Analysis*, EPA, EPA/540/4-89/001, March 1989.

15. *Resources for Strategic Site Investigation and Monitoring*, EPA, OSWER, EPA-542-F-010030b, September 2001.

16. *Region 5 Framework for Monitored Natural Attenuation Decisions for Groundwater*, EPA Region 5, September 2000.

17. *Ground Water Issue: Suggested Operating Procedures for Aquifer Pumping Tests*, EPA, OSWER, EPA/540/S-93/503, February 1993.

18. *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water*, EPA, EPA/600/R-98/128, September 1998.

19. *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action and Underground Storage Tank Sites*, EPA, OSWER Directive 9200.4-17P, April 21, 1999.

20. *Ground Water Issue: Fundamentals of Ground-Water Modeling*, EPA, OSWER, EPA/540/S-92/005, April 1992.

21. *Assessment Framework for Ground-Water Model Applications*, EPA, OSWER Directive #9029.00, EPA-500-B-94-003, July 1994.

22. *Ground-Water Modeling Compendium - Second Edition: Model Fact Sheets, Descriptions, Applications and Cost Guidelines*, EPA, EPA-500-B-94-004, July 1994.

23. *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*, EPA, Office of Solid Waste and Emergency Response, OSWER Directive No. 9200.1-23P, EPA 540-R-98-031, July 1999.

24. *Region 5 Instructions on the Preparation of a Superfund Division Quality Assurance Project Plan Based on EPA QA/R-5*, Revision 0, EPA Region 5, June 2000.

25. *Guidance for the Data Quality Objectives Process (QA-G-4)*, EPA, EPA/600/R-96/055, August 2000.

26. *Guidance for the Data Quality Objectives Process for Hazardous Waste Sites* (QA/G-4HW), EPA, EPA/600/R-00/007, January 2000.

27. *Guidance for the Preparation of Standard Operating Procedures (QA-G-6)*, EPA, EPA/240/B-01/004, March 2001.

28. *EPA Requirements for Quality Management Plans (QA/R-2)*, EPA, EPA/240/B-01/002, March 2001.

29. *EPA Requirements for QA Project Plans (QA/R-5)*, EPA, EPA/240/B-01/003, March 2001.

30. *Guidance for Quality Assurance Project Plans (QA/G-5)*, EPA, EPA/600/R-98/018, February 1998.

31. *Users Guide to the EPA Contract Laboratory Program*, EPA, Sample Management Office, OSWER Directive No. 9240.0-01D, January 1991.

32. *Technical Guidance Document: Quality Assurance and Quality Control for Waste Containment Facilities*, EPA, EPA/600/R-93/182, 1993.

33. *Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part A)*, EPA, EPA/540/1-89/002, December 1989.

34. *Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals)*, EPA, EPA/540/R-92/003, OSWER Publication 9285.7-01B, December 1991.

35. *Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part C, Risk Evaluation of Remedial Alternatives)*, EPA, Office of Emergency and Remedial Response, Publication 9285.7-01C, October, 1991.

36. *Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments)*, EPA, Office of Emergency and Remedial Response, Publication 9285.7-47,

37. *Risk Assessment Guidance for Superfund: Volume III - Part A, Process for Conducting Probabilistic Risk Assessment*, EPA, OSWER Publication 9285.7-45, EPA-540-R-02-002, December 2001.

38. *Policy for Use of Probabilistic in Risk Assessment at the U.S. Environmental Protection Agency*, EPA, Office of Research and Development, 1997.

39. *Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors*, EPA, OSWER Directive 9285.6-03, March 25, 1991.

40. *Exposure Factors Handbook*, Volumes I, II, and III, EPA, EPA/600/P-95/002Fa,b,c, August 1997.

41. *Supplemental Guidance to RAGS: Calculating the Concentration Term*, EPA, OSWER Publication 9285.7-08I, May 1992.

42. *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities*, EPA, OSWER Directive 9355.4-12, EPA/540/F-94/043, July 14, 1994.

43. *Clarification to the 1994 Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities*, EPA, OSWER Directive 9200.4-27, EPA/540/F-98/030, August 1998.

44. *Guidance Manual for the Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children*, EPA, OSWER Publication 9285.7-15-1, February 1994; and associated, clarifying Short Sheets on IEUBK Model inputs, including but not limited to OSWER 9285.7-32 through 34, as listed on the OSWER lead internet site at www.epa.gov/superfund/programs/lead/prods.htm,

45. *Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children*, Version 0.99D, NTIS PB94-501517, 1994 or Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children, Windows© version, 2001,

46. *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions*, EPA, OSWER Directive 9355.0-30, April 22, 1991.

47. *Performance of Risk Assessments in Remedial Investigation /Feasibility Studies (RI/FSs) Conducted by Potentially Responsible Parties (PRPs)*, OSWER Directive No. 9835.15, August 28, 1990.

48. *Supplemental Guidance on Performing Risk Assessments in Remedial Investigation Feasibility Studies (RI/FSs) Conducted by Potentially Responsible Parties (PRPs)*, OSWER Directive No. 9835.15(a), July 2, 1991.

49. *Role of Background in the CERCLA Cleanup Program*, EPA, OSWER 9285.6-07P, April 26, 2002.

50. *Soil Screening Guidance: User's Guide*, EPA, OSWER Publication 9355.4-23, July 1996.

51. *Soil Screening Guidance: Technical Background Document*, EPA, EPA/540/R95/128, May 1996.

52. *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (Peer Review Draft)*, EPA, OSWER Publication 9355.4-24, March 2001.

53. *Ecological Risk Assessment Guidance for Superfund: Process for Designing & Conducting Ecological Risk Assessments*, EPA, OSWER Directive 9285.7-25, EPA-540- R-97-006, February 1997.

54. *Guidelines for Ecological Risk Assessment*, EPA, EPA/630/R-95/002F, April 1998.

55. *The Role of Screening-Level Risk Assessments and Refining Contaminants of Concern in Baseline Ecological Risk Assessments*, EPA, OSWER Publication 9345.0-14, EPA/540/F-01/014, June 2001.

56. *Ecotox Thresholds*, EPA, OSWER Publication 9345.0-12FSI, EPA/540/F-95/038, January 1996.

57. *Issuance of Final Guidance: Ecological Risk Assessment and Risk Management Principles for Superfund Sites*, EPA, OSWER Directive 9285.7-28P, October 7, 1999.

58. *Guidance for Data Useability in Risk Assessment (Quick Reference Fact Sheet)*, OSWER 9285.7-05FS, September, 1990.

59. *Guidance for Data Useability in Risk Assessment (Part A)*, EPA, Office of Emergency and Remedial Response, Publication 9285.7-09A, April 1992.

60. *Guide for Conducting Treatability Studies Under CERCLA*, EPA, EPA/540/R-92/071a, October 1992.

61. *CERCLA Compliance with Other Laws Manual, Two Volumes*, EPA, Office of Emergency and Remedial Response, OSWER Directive No. 9234.1-01 and -02, EPA/540/G-89/009, August 1988.

62. *Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites*, EPA, Office of Emergency and Remedial Response, (Interim Final), OSWER Directive No. 9283.1-2, EPA/540/G-88/003, December 1988.

63. *Considerations in Ground-Water Remediation at Superfund Sites and RCRA Facilities - Update*, EPA, OSWER Directive 9283.1-06, May 27, 1992.

64. *Methods for Monitoring Pump-and-Treat Performance*, EPA, EPA/600/R-94/123, June 1994.

65. *Pump-and-Treat Ground-Water Remediation A Guide for Decision Makers and Practitioners*, EPA, EPA/625/R-95/005, July 1996.

66. *Ground-Water Treatment Technology Resource Guide*, EPA, OSWER, EPA-542-B-94/009, September 1994.

67. *Land Use in the CERCLA Remedy Selection Process*, EPA, OSWER Directive No. 9355.7-04, May 25, 1995.

68. *Reuse Assessments: A Tool To Implement The Superfund Land Use Directive*, EPA, OSWER 9355.7-06P, June 4, 2001.

69. *Reuse of CERCLA Landfill and Containment Sites*, EPA, OSWER 9375.3-05P, EPA-540- F-99-015, September 1999.

70. *Reusing Superfund Sites: Commercial Use Where Waste is Left on Site*, EPA, OSWER 9230.0-100, February 2002.

71. *Covers for Uncontrolled Hazardous Waste Sites*, EPA, EPA/540/2-85/002, 1985.

72. *Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments*, EPA, OSWER, EPA/530-SW-89-047, July 1989.

73. *Engineering Bulletin: Landfill Covers*, EPA, EPA/540/S-93/500, 1993.

74. *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites*, EPA OSWER Directive 9285.6-08, February 12, 2002.

75. *Institutional Controls: A Site Manager's Guide to Identifying, Evaluating and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups*, EPA, OSWER 9355.0-74FS-P, EPA/540-F-00-005, September 29, 2000.

76. *Health and Safety Requirements of Employees Employed in Field Activities*, EPA, Office of Emergency and Remedial Response, EPA Order No. 1440.2, July 12, 1981.

77. *OSHA Regulations in 29 CFR 1910.120*, Federal Register 45654, December 19, 1986.

78. *Standard Operating Safety Guides*, PB92-963414, June 1992.

79. *Community Relations in Superfund: A Handbook*, EPA, Office of Emergency and Remedial Response, OSWER Directive No. 9230.0#3B June 1988; and OSWER Directive No. 9230.0-3C, January 1992.

80. *Superfund Green Remediation Strategy*, EPA, August 2009.

81. *Principles for Greener Cleanups*, EPA, August 2009.