ATTACHMENT I

Interim Measures
Scope of Work

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Purpose

If deemed necessary by Respondent and/or U.S. EPA, the purpose of Interim Measures (IM) are to control or abate immediate threats to human health, and the environment, and/or prevent minimal release of potential hazardous wastes, or hazardous constituents at or from the Facility while long-term corrective measure alternatives are being evaluated. Respondent shall furnish all personnel, materials and services necessary for, or incidental to, performing the IMs.

Scope

Interim Measures are one possible step in the corrective action program. Interim Measures consist of the following components, which for clarity have been designated as sections.

Section I: Interim Measures Workplan

A. Interim Measures Objectives
B. Health and Safety Plan
C. Public Involvement Plan
D. Quality Assurance Project Plan
E. Data Management and Reporting Plan

Section II: Interim Measures Design Program

A. Design Plans and Specifications
B. Operations and Maintenance Plan
C. Project Schedule
D. Final Design Documents

Section III: Interim Measures Construction Quality Assurance Plan

A. Construction Quality Assurance Objectives
B. Inspection Activities
C. Documentation

Section IV: Reports

A. Progress
B. Interim Measures Workplan
C. Final Design Documents
D. Draft Interim Measures Report
E. Final Interim Measures Report

Section V: Proposed Schedule

Section I: Interim Measures Workplan

If interim measures are proposed by Respondent and/or determined to be necessary by U.S. EPA, Respondent shall prepare an Interim Measures Workplan. The Workplan shall include the development of several plans which shall be prepared concurrently.

A. Interim Measures Objectives

The Workplan shall specify the objectives of the interim measures, demonstrate how the interim measures will abate releases and threatened releases, and to the extent possible, be consistent and integrated with any long-term solution at the facility. The Interim Measures Workplan will include a discussion of the technical approach, engineering design, engineering plans, schedules, budget, and personnel. The Workplan will also include: a description of qualifications of personnel performing or directing the interim measures, including contractor personnel. This plan shall also document the overall management approach to the interim measures, and whether a Quality Assurance Project Plan, and Data Management and Reporting Plan are required for the IM.

B. Health and Safety Plan

Respondent shall submit a Health and Safety Plan to U.S. EPA for review, although it does not require approval by U.S. EPA.

1. Major elements of the Health and Safety Plan may include:
   - Facility description, including availability of resources such as roads, water supplies, electricity and telephone services;
   - Description of the known hazards and evaluation of the risks associated with the incident and with each activity conducted;
   - A list of key personnel and alternates responsible for site safety, response operations, and for protection of human health;
   - Description of the levels of protection to be worn by personnel;
   - Delineation of the work area;
   - Procedures to control site access;
   - Description of decontamination procedures for personnel and equipment;
   - Site emergency procedures;
   - Emergency medical care for injuries and toxicological problems;
   - Description of requirements for an environmental surveillance program;
   - Routine and special training required for response personnel; and
   - Procedures for protecting workers from weather-related problems;

2. The Facility Health and Safety Plan shall be consistent with:
   - NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);
   - U.S. EPA Order 1440.1 - Respiratory Protection;
   - U.S. EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities;
   - Facility Contingency Plan;
   - U.S. EPA Standard Operating Safety Guide (1984);
   - OSHA regulations particularly in 29 CFR 1910 and 1926;
   - State and local regulations; and
   - Other U.S. EPA guidance as provided.

C. Public Involvement Plan

All Public Involvement Plans prepared by Respondent shall be submitted to U.S. EPA for comment and approval prior to use. Respondent must never appear to represent or speak for the U.S. EPA before the public, other government officials, or the media.

1. Public Involvement activities that may be required of Respondent include the following:
   - Conducting an open house or informal meeting (i.e., availability session) in a public location where people can talk to Agency officials and Respondent on a one-to-one basis;
   - Preparing fact sheets summarizing current or proposed corrective action activities (all fact sheets should be reviewed by the U.S. EPA prior to public distribution);
   - Communicating effectively with people who have vested interest in the corrective action activities, (e.g., providing written or verbal information in the foreign language of a predominantly non-English-speaking community); and
   - Maintaining an easily accessible repository (such as a town hall or public library or the Facility itself, in some limited circumstances) of information on the facility-specific corrective action program, including the order, approved workplans, and/or other reports.

2. A schedule for community relations activities shall be included in the Public Involvement Plan.

D. Quality Assurance Project Plan

Respondent shall prepare a plan to document all monitoring procedures, sampling, field measurements and sample analysis performed during interim measures so as to ensure that all information, data, and resulting decisions are technically sound, statistically valid, and properly documented. The QAPP shall be prepared in accordance with Attachment V. A pre-QAPP meeting shall be held prior to preparation of the QAPP. Participants shall include, but are not limited to Respondent, their QAPP preparer, laboratory representatives, U.S. EPA Project Coordinator, and U.S. EPA Quality Assurance representatives. A performance audit may be conducted by U.S. EPA on the laboratory selected by Respondent.

E. Data Management and Reporting Plan

Respondent shall develop and initiate a Data Management and Reporting Plan to document and track interim measures data and results. This plan shall identify and set up data documentation materials and procedures, project file requirements, and project-related progress reporting procedures and documents. The plan shall also provide the format to be used to present the raw data and conclusions of the interim measures.

All groundwater data shall be submitted in a computer accessible format, i.e., diskette. The format used shall be compatible with the U.S. EPA, Region 5 groundwater database known as the Ground Water Information Tracking System (GRITS), Version 4.0.

Section II: Interim Measures Design Program

A. Design Plans and Specifications

Respondent shall develop clear and comprehensive design plans and specifications which include but are not limited to the following:

1. Discussion of the design strategy and the design basis, including:
   - Compliance with all applicable or relevant environmental and public health standards; and
   - Minimization of environmental and public impacts.

2. Discussion of the technical factors of importance including:
   - Use of currently accepted environmental control measures and technology;
   - The constructibility of the design; and
   - Use of currently acceptable construction practices and techniques.

3. Description of assumptions made and detailed justification of these assumptions.

4. Discussion of the possible sources of error and references to possible operation and maintenance problems.

5. Detailed drawings of the proposed design including:
   - Qualitative flow sheets;
   - Quantitative flow sheets;
   - Facility layout; and
   - Utility locations.

6. Tables listing materials, equipment and specifications.

7. Tables giving material balances.

8. Appendices including:
   - Sample calculations (one example presented and explained clearly for significant or unique design calculations);
   - Derivation of equations essential to understanding the report; and
   - Results of laboratory or field tests.

General correlations between drawings and technical specifications is a basic requirement of any set of working construction plans and specifications. Before submitting the project specifications, Respondent shall coordinate and cross-check the specifications and drawings and complete the proofing of the edited specifications and required cross-checking of all drawings and specifications.

B. Operation and Maintenance Plan

Respondent shall prepare an Operation and Maintenance Plan to cover both implementation and long-term maintenance of the interim measure. The plan shall be composed of the following elements as appropriate to the specific interim measure:

1. Equipment start-up and operator training:

- Respondent shall prepare, and include in the technical specifications governing treatment systems, contractor requirements for providing appropriate service visits by experienced personnel to supervise the installation, adjustment, start-up and operation of the treatment systems and training covering appropriate operational procedures once the start-up has been successfully accomplished.

2. Description of normal operation and maintenance (O&M), including:
   - Description of tasks for operation;
   - Description of tasks for maintenance;
   - Description of prescribed treatment or operation conditions;
   - Schedule showing frequency of each O&M task; and
   - Common and/or anticipated remedies.

3. Description of routine monitoring and laboratory testing, including:
   - Description of monitoring tasks;
   - Description of required laboratory tests and their interpretation;
   - Required QA/QC; and
   - Schedule of monitoring frequency and date, if appropriate, when monitoring may cease.

4. Description of equipment, including:
   - Equipment identification;
   - Installation of monitoring components;
   - Maintenance of site equipment; and
   - Replacement schedule for equipment and installed components.

5. Records and reporting mechanisms required, including:
   - Daily operating logs;
   - Laboratory records;
   - Mechanism for reporting emergencies;
   - Personnel and maintenance records; and
   - Monthly/annual reports to Federal/State agencies.

The Operation and Maintenance Plan shall be submitted with the Final Design Documents or as approved in the Interim Measures Workplan.

C. Project Schedule

Respondent shall develop a detailed Project Schedule for construction and implementation of the interim measure(s) which identifies timing for initiation and completion of all critical path tasks. Respondent shall specifically identify dates for completion of the project and major interim milestones which are enforceable terms of this Order. A Project Schedule shall be submitted simultaneously with the Final Design Documents.

D. Final Design Documents

The Final Design Documents shall consist of the Final Design Plans and Specification (100%) complete, the final Draft Operation and Maintenance Plan, and Project Schedule. Respondent shall submit the final documents 100% complete with reproducible drawings and specifications. The quality of the design documents should be such that Respondent would be able to include them in a bid package and invite contractors to submit bids for the construction project.

Section III: Interim Measure Construction Quality Assurance Plan

A. Construction Quality Assurance Objectives

In the CQA plan, Respondent shall identify and document the objectives and framework for the development of a construction quality assurance program including, but not limited to the following: responsibility and authority; personnel qualifications; inspection activities; sampling requirements; and documentation. The responsibility and authority of all organizations (i.e., technical consultants, construction firms, etc.) and key personnel involved in the construction of the interim measure should be described fully in the CQA plan. Respondent must identify a CQA officer and the necessary supporting inspection staff.

B. Inspection Activities

The observations and tests that will be used to monitor the construction and/or installation of the components of the interim measure(s) shall be summarized in the CQA plan. The plan shall include the scope and frequency of each type of inspection. Inspections shall verify compliance with all environmental requirements and include, but not be limited to, air quality and emissions monitoring records, waste disposal records (e.g., RCRA transportation manifests), etc. The inspection should also ensure compliance with all health and safety procedures. In addition to oversight inspections, Respondent shall conduct the following activities:

1. Preconstruction inspection and meeting
    a. Respondent shall conduct a preconstruction inspection and meeting to:
        - Review methods for documenting and reporting inspection data;
        - Review methods for distributing and storing documents and reports;
        - Review work area security and protocol;
        - Discuss any appropriate modifications of the construction quality assurance plan to ensure that site-specific considerations are addressed; and
        - Conduct a site walk-around to verify that the design criteria, plans, and specifications are understood and to review material and equipment storage locations.
    b. The preconstruction inspection and meeting shall be documented by a designated person and minutes should be transmitted to all parties.

2. Prefinal inspection
    a. Upon preliminary project completion, Respondent shall notify U.S. EPA for the purposes of conducting a prefinal inspection. The prefinal inspection will consist of a walk-through inspection of the entire project site. The inspection is to determine whether the project is complete and consistent with the contract documents and the U.S. EPA approved interim measure. Any outstanding construction items discovered during the inspection will be identified and noted. Additionally, treatment equipment will be operationally tested by Respondent will certify that the equipment has performed to meet the purpose and intent of the specifications. Retesting will be completed where deficiencies are revealed. The prefinal inspection report should outline the outstanding construction items, actions required to resolve items, completion date for these items, and date for final inspection.

3. Final Inspection
   a. Upon completion of any outstanding construction items, Respondent shall notify U.S. EPA for the purpose of conducting a final inspection. The final inspection will consist of a walk-through inspection of the project site. The prefinal inspection will be used as a checklist with the final inspection focusing on the outstanding items that have been resolved.

4. Sampling and Testing Requirements
   a. The sampling and testing activities, sample size, sample and test locations, frequency of testing, acceptance and rejection criteria, and plans for correcting problems should be presented in the CQA.

C. Documentation

Reporting requirements for CQA activities shall be described in detail the CQA plan. This shall include such items as daily summary reports, inspection data sheets, problem identification and interim measures reports, design acceptance reports and final documentation. Provisions for the final storage of all records shall be presented in the CQA plan.

Section IV: Reports

A. Progress

Respondent shall at a minimum provide the U.S. EPA with signed, monthly progress reports containing:

1. A description and estimate of the percentage of the interim measures completed;
2. Summaries of *all* findings;
3. Summaries of *all* changes made in the interim measures during the reporting period;
4. Summaries of *all* contacts with representatives of the local community, public interest groups, or State government during the reporting period;
5. Summaries of *all* problems of potential problems encountered during the reporting period;
6. Actions being taken to rectify problems;
7. Changes in personnel during the reporting period;
8. Projected work for the next reporting period; and
9. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

B. Interim Measures Workplan

Respondent shall submit an Interim Measures Workplan as described in Sections I, II and III.

C. Final Design Documents

Respondent shall submit the Final Design Documents as described in Section II.

D. Draft Interim Measures Report

At the "completion" of the construction of the project (except for long-term operations, maintenance and monitoring), Respondent shall submit an Interim Measures and Implementation Report to U.S. EPA. The Report shall document that the project is consistent with the design

specifications, and that the interim measures are performing adequately. The Report shall include, but not be limited to, the following elements:

1. Synopsis of the interim measures and certification of the design and construction;
2. Explanation of any modifications to the plan and why these were necessary for the project;
3. Listing of criteria, established before the interim measures were initiated, for judging the functioning of the interim measures and also explaining any modification to these criteria;
4. Results of facility monitoring, indicating that interim measures will meet or exceed the performance criteria; and
5. Explanation of the operation and maintenance (including monitoring) to be undertaken at the facility.

This report shall include the inspection summary reports, inspection data sheets, problem identification and corrective measure reports, block evaluation reports, photographic reporting data sheets, design engineers' acceptance reports, deviations from design and material specifications (with justifying documentation) and as-built drawings.

E. Final Interim Measures Report

Respondent shall finalize the Interim Measures Work Plan and the Interim Measures Implementation Report incorporating comments received on draft submissions.

Section V: Proposed Schedule

Respondent will provide U.S. EPA with IM submittals according to the following schedule:

Facility Submission	**Due Date**
Interim Measures Workplan • Interim Measures Objectives • Health and Safety Plan • Public Involvement Plan • Quality Assurance Project Plan • Data Management and Reporting Plan • Construction QA Plan	Within 30 days of U.S. EPA request/determination or upon written request
Final Design Documents • Design Plans and Specs • O&M Plan • Project Schedule	As outlined in the approved IM workplan
Draft Interim Measures Report	In accordance with the project schedule approved in the IM Workplan
Final Interim Measures Report	45 days after receipt of U.S. EPA comments on Draft IM Report
Progress Reports	Monthly

ATTACHMENT II

RCRA Facility Investigation
Scope of Work

ATTACHMENT II
RCRA Facility Investigation
Scope of Work

Purpose

The purpose of the RCRA Facility Investigation (RFI) is to determine the nature and extent of releases of hazardous waste or constituents from regulated units, solid waste management units, areas of concern, and other source areas at and from the Facility and to gather all necessary data to support a Corrective Measures Study. Respondent shall furnish all personnel, materials, and services necessary for, or incidental to, performing the RFI.

Scope

The RCRA Facility Investigation is one step in the corrective action program. The RFI consists of the following components, which for clarity have been designated as sections.

Section I: Description of Current Conditions

A. Facility Background
B. Preliminary Assessment of Nature and Extent of Contamination
C. Implementation of Interim/Stabilization Measures

Section II: RFI Workplan

A. Purpose/Objectives
B. Project Management Plan
C. Quality Assurance Project Plan
D. Data Management and Reporting Plan
E. Health and Safety Plan
F. Public Involvement Plan
G. Schedule for Facility Investigation

Section III: Facility Investigation

A. Purpose/Objectives
B. Environmental Setting
C. Source Characterization
D. Contamination Characterization
E. Potential Receptor Identification

Section IV: Investigation Results and Analysis

A. Data Analysis
B. Media Cleanup Standards
C. Analysis of Risk

Section V: Progress Reports

Section VI: Proposed Schedule

Section I: Description of Current Conditions

Respondent shall submit to U.S. EPA for review and comment, a report (as set forth below) providing the background information on the Facility, contamination, and interim measures. Respondent shall indicate in the applicable section if some of this information is not available. This report shall contain information that is consistent with the data gathered during the RCRA Facility Assessment. The current condition report shall be submitted prior to the submission of the RFI to allow the U.S. EPA to review it.

A. Facility Background

Respondent's report shall summarize the regional location, pertinent boundary features, general facility physiographic, hydrogeology, and historical use of the facility for the treatment, storage, or disposal of solid and hazardous waste. Respondent's report shall include:

1. *Maps*. All maps shall be of sufficient detail and accuracy to locate and report all current and future work performed at the site. Aerial photographs may be used with solid waste management units, areas of concern, and other source areas superimposed on them. Maps shall depict the following:
    - General geographic location;
    - Property lines, with the owners of all adjacent property clearly indicated;
    - Topography and surface drainage depicting all waterways, wetlands, flood plains, water features, drainage patterns, and surface-water containment areas;
    - All tanks, buildings, utilities, paved areas, easements, rights-of-way, and other features;
    - All solid or hazardous waste treatment, storage, or disposal areas active after November 19, 1980;
    - All known past solid or hazardous waste treatment, storage or disposal areas regardless of whether they were active on or after November 19, 1980;
    - All known past and present product and waste underground tanks or piping;
    - Surrounding land uses (residential, commercial, industrial, agricultural, recreational);
    - The location of all municipal, public, private and industrial wells, along with all monitoring wells, at the Facility and within a 1-mile radius of the Facility. These wells shall be clearly labeled and ground and top of casing elevations and construction details included, if available (these elevations and details may be included as an attachment); and
    - Wind rose and meteorology.

2. A history and description of ownership and operation, solid and hazardous waste generation, treatment, storage and disposal activities at the facility.

3. Approximate dates or periods of past product and waste spills, identification of the materials spilled, the amount spilled, the location where spilled, and a description of the response actions conducted (local, State, or Federal response units or private parties), including any inspection reports or technical reports generated as a result of the response.

4. A summary of past permits applied for and/or received, any enforcement actions and their subsequent responses and a list of documents and studies prepared for the facility. This may include information from previous and/or present owner/operators, if available.
5. A general description of major habitat types (e.g., grasslands, forests, lakes, streams, wetlands) located in and adjacent to the facility. In delineating wetlands, the U.S. Fish

and Wildlife Service's National Wetland Inventory maps should be consulted. The U.S. Army Corps of Engineers should be consulted and wetlands should be delineated using the Federal Manual for Identifying and Delineating Jurisdictional Wetlands.

6. A general description of plants and animals at and adjacent to the facility, including the following: qualitative observations of resident plants and animals (birds, mammals, fish, stream benthos, etc.); and classification of vegetation community types. Threatened and endangered species possibly on or near the facility should be identified as early as possible.

B. Preliminary Assessment of Nature and Extent of Contamination

Respondent shall prepare and submit for U.S. EPA review, a preliminary report describing the existing information on the nature and extent of contamination.

1. Respondent's report shall summarize all possible source areas of contamination. This, at a minimum, shall include all RCRA-regulated units, solid waste management units, areas of concern, spill areas, and other suspected source areas of contamination. For each area, Respondent shall identify the following:

   - Location of unit/area (to be depicted on facility map provided in Section I.A.1);
   - Quantities of solid and hazardous wastes (both managed and spilled or released);
   - Type of hazardous waste or constituents (both causing or potentially causing contamination), to the extent known;
   - Identification of areas where additional information is necessary; and
   - The results of previous investigations.

2. Respondent shall prepare a preliminary assessment and description of the existing degree and extent of contamination. This shall include:

   - For each medium where the Order identifies a release (e.g., soil, groundwater, surface water, sediments, etc.), a description of the existing extent of contamination. This description must include all available monitoring data and qualitative information on the locations and levels of contamination at the facility (both on-site and off-site). Include biodata (e.g., fishkills, distressed vegetation, abnormal individuals of a species, carcasses, tissue studies, etc.). Include a general assessment of the data quality, a map showing the location of all existing sampling points and potential source areas and contour maps showing any existing ground water plumes at the facility. Highlight potential ongoing release areas that would warrant use of interim measures (see Section I.C. Implementation of Interim/Stabilization Measures); and
   - A list and brief description of all previous investigations that have occurred at the facility, who they were conducted for (i.e., agency) and agency contacts.
   - Respondent shall submit a report that identifies the potential impact(s) on human health and the environment, including potential exposure pathways, migration routes, and potential receptors for all relevant land use scenarios related to the sources of contamination identified as relevant in paragraph 1 above. A site-conceptual model should be created to illustrate these pathways, routes, and receptors. The report shall include, at a minimum:
   - All potential migration pathways, including information on geology, pedology, hydrogeology, physiography, hydrology, water quality, foodwebs, meteorology,

air quality, chemistry, fate and transport characteristics associated with affected media, and natural attenuation, as appropriate;
- Physical properties of known contaminants;
- An assessment of whether off-site migration of contaminants has occurred or is likely to occur;
- An assessment of media-specific potential human exposure pathways (e.g., ingestion, inhalation, dermal contact), including groundwater and surface water use;
- Identification of current and future land use;
- Identification of current or potential receptors at risk including demography and identification of possible sensitive subpopulations (e.g., schools, homes for the elderly, hospitals, and ecosystems).

C. Implementation of Interim/Stabilization Measures

Respondent's report shall document past, present, or proposed interim/stabilization measures at the facility. This shall include:

- Objectives of the interim/stabilization measures: how the measure is mitigating a potential threat to human health and the environment and/or is consistent with and integrated into any long-term solution at the facility;
- Design, construction, operation, and maintenance requirements;
- Schedules for design, construction and monitoring;
- Schedule for progress reports; and
- Data in support of the potential need for future interim measures or related to any assessment undertaken to determine the need for future interim/stabilization measures.

Section II: RFI Workplan

A. Purpose/Objectives

Respondent shall prepare an RFI Workplan. The purpose of the RFI Workplan is to present to U.S. EPA the specific plans to characterize the nature and extent of contamination. The RFI Workplan shall include the development of several plans, which will be prepared concurrently. During the RCRA Facility Investigation, it may be necessary to revise the RFI Workplan to increase or decrease the detail of information collected to accommodate facility-specific situations.

B. Project Management Plan

Respondent shall prepare a Project Management Plan (PMP) which will include a discussion of the technical approach, schedules, and personnel. The PMP will also include a description of qualifications of personnel performing or directing the RFI, including contractor personnel. This plan shall also document the overall management approach to the RFI.

C. Quality Assurance Project Plan

Respondent shall prepare a plan to document all monitoring procedures, sampling, field measurements and sample analysis performed during the investigations so as to ensure that all information, data, and resulting decisions are technically sound, statistically valid, and properly documented. The QAPP shall be prepared in accordance with Attachment V. A pre-QAPP meeting shall be held prior to preparation of the QAPP. Participants shall include, but are not limited to Respondent, their QAPP preparer, laboratory representatives, U.S. EPA Project Coordinator, and U.S. EPA Quality Assurance representatives.

A performance audit may be conducted by U.S. EPA on the laboratories selected by Respondent. This audit will be completed and laboratories approved for use on the project prior to the start of field work for the RFI.

D. Data Management and Reporting Plan

Respondent shall develop and initiate a Data Management and Reporting Plan to document and track investigation data and results. This plan shall identify and set up data documentation materials and procedures, project file requirements, and project-related progress reporting procedures and documents. The plan shall also provide the format to be used to present the raw data and conclusions of the interim measures.

All groundwater data shall be submitted in a computer accessible format, i.e., diskette. The format used shall be compatible with the U.S. EPA, Region 5 groundwater database known as the Ground Water Information Tracking System (GRITS), Version 4.0.

E. Health and Safety Plan

Respondent shall submit a Health and Safety Plan to U.S. EPA for review, although it does not require approval by U.S. EPA.

1. Major elements of the Health and Safety Plan may include:

    - Facility description, including availability of resources such as roads, water supplies, electricity and telephone services;
    - Description of the known hazards and evaluation of the risks associated with the incident and with each activity conducted;
    - A list of key personnel and alternates responsible for site safety, response operations, and for protection of human health;
    - Description of the levels of protection to be worn by personnel;
    - Delineation of the work area;
    - Procedures to control site access;
    - Description of decontamination procedures for personnel and equipment;
    - Site emergency procedures;
    - Emergency medical care for injuries and toxicological problems;
    - Description of requirements for an environmental surveillance program;
    - Routine and special training required for response personnel; and
    - Procedures for protecting workers from weather-related problems;

2. The Facility Health and Safety Plan shall be consistent with:

- NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);
- U.S. EPA Order 1440.1 - Respiratory Protection;
- U.S. EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities;
- Facility Contingency Plan;
- U.S. EPA Standard Operating Safety Guide (1984);
- OSHA regulations particularly in 29 CFR 1910 and 1926;
- State and local regulations; and
- Other U.S. EPA guidance as provided.

F. Public Involvement Plan

The Public Involvement Plan (PIP) prepared by Respondent shall be submitted to U.S. EPA for comment and approval prior to use. Respondent must never appear to represent or speak for the U.S. EPA before the public, other government officials, or the media.

Public involvement activities that may be required of Respondent include the following:

- Conducting an open house or informal meeting (i.e., availability session) in a public location where people can talk to Agency officials and Respondent on a one-to-one basis;
- Preparing fact sheets summarizing current or proposed corrective action activities (all fact sheets should be reviewed by the U.S. EPA prior to public distribution);
- Communicating effectively with people who have vested interest in the corrective action activities, (e.g., providing written or verbal information in the foreign language of a predominantly non-English-speaking community); and
- Maintaining an easily accessible repository (such as a town hall or public library or the Facility itself, in some limited circumstances) of information on the facility-specific corrective action program, including the order, approved workplans, and/or other reports.

A schedule for community relations activities shall be included in the PIP.

G. Schedule for Facility Investigation

1. Sampling
2. Analysis
3. Reports
4. Public Involvement Activities
5. Laboratory or Bench-Scale Studies

Section III: Facility Investigation

A. Purpose/Objectives

The Facility Investigation phase of the RFI is the first step of the implementation process. Prior to this implementation phase, all documentation and reports for the Description of Current Conditions and RFI Workplan are drafted and submitted to U.S. EPA for review. Respondent

must have approval prior to implementing the procedures outlined in the RFI Workplan. Throughout the RFI implementation phase, it is critical that Respondent comply with report submission requirements. Respondent shall submit both progress reports and a draft RFI Report to U.S. EPA for review. At the direction of U.S. EPA, Respondent shall develop in final format the RFI Report, which will incorporate any comments received on the draft report.

Respondent shall conduct those additional investigations (including sampling) as approved in the RFI Workplan to: characterize the facility (Environmental Setting); define the source (Source Characterization); define the degree and three dimensional extent of contamination (Contamination Characterization); and identify actual or potential receptors (Potential Receptors Identification).

The investigations shall result in data of adequate technical quality to support the development and evaluation of the corrective measure alternative(s) during the CMS and/or IMs.

B. Environmental Setting

Respondent shall collect information to supplement and verify existing information on the environmental setting at the facility (when information already submitted to U.S. EPA is not sufficient). The U.S. EPA may request additional information not included on the following lists. Respondent shall characterize the following areas:

1. Hydrogeology

Respondent shall conduct a program to evaluate hydrogeologic conditions at the facility. This program shall provide the following information:

- A description of the regional and facility-specific geologic and hydrogeologic characteristics affecting groundwater flow beneath the facility, including:
  - ⇒ Regional and facility-specific stratigraphy including: description of strata including strike and dip, and identification of stratigraphic contacts;
  - ⇒ Structural geology including: description of local and regional structural features (e.g., folding, faulting, tilting, jointing, etc.);
  - ⇒ Depositional history;
  - ⇒ Areas and amounts of recharge and discharge
  - ⇒ Influence of tidal actions on groundwater flow regimes near large rivers;
  - ⇒ Regional and facility-specific groundwater flow patterns; and
  - ⇒ Seasonal variations in the groundwater flow regime.

- An analysis of any topographic features that might influence the groundwater flow system. (Note: Stereographic analysis of aerial photographs may aid in this analysis.)

- A representative and accurate classification and description of the hydrogeologic units based on field data, tests, and cores that may be part of the migration pathways at the facility (i.e., the aquifers and any intervening saturated and unsaturated zones), including, but not limited to:

  - ⇒ Hydraulic conductivity, intrinsic permeability [particularly when non-aqueous phase liquids (NAPLs) are present], and porosity (total and effective);
  - ⇒ Lithology, grain size, sorting, degree of cementation;
  - ⇒ An interpretation of hydraulic interconnections between saturated zones; and

⇒ The attenuation capacity and mechanisms of the natural earth materials (e.g., ion exchange capacity, organic carbon content, mineral content, etc.).
⇒ Based on field studies and cores, structural geology and hydrogeologic cross sections showing the extent (depth, thickness, lateral extent) of hydrogeologic units that may be part of the migration pathways identifying:
⇒ Sand and gravel in unconsolidated deposits;
⇒ Zones of fracturing or channeling in consolidated and unconsolidated deposits;
⇒ Zones of higher permeability or low permeability that might direct and restrict the flow of contaminants;
⇒ The uppermost aquifer: geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs;
⇒ Water-bearing zones above the first confining layer that may serve as a pathway for contaminant migration, including perched zones of saturation; and
⇒ All other geologic formations, or parts thereof, yielding a significant amount of groundwater.

- Based on data obtained from groundwater monitoring wells and piezometers installed upgradient and downgradient of the potential contaminant source, a representative description of water level or fluid pressure monitoring including:

⇒ Water level contour and/or potentiometric maps;
⇒ Hydrologic cross sections showing vertical flow gradients;
⇒ The flow system, including the vertical and horizontal components of flow; and
⇒ Any temporal changes in hydraulic gradients, (due to tidal or seasonal influences, etc.)

- A description of man-made influences that may affect the hydrogeology of the site, identifying:

⇒ Active and inactive local water-supply and production wells with an approximate schedule of pumping; and
⇒ Man-made hydraulic structures (sewers, pipelines, french drains, ditches, unlined ponds, septic tanks, NPDES outfalls, retention areas, etc.).\

2. Soils

Respondent shall conduct a program to characterize the soil and rock units potentially affected by contaminant release(s). Such characterization shall include, but not be limited to, the following information:

- Where remediation by removal of soils is the only corrective measure option, provide map(s) and perpendicular cross sections showing:

⇒ The extent of contamination;
⇒ Depth of groundwater; and
⇒ The consistency and distribution of soils [using the Unified Soil Classification System (ASTM D 2487)];

- Where remediation by removal is the likely option, and it is necessary to determine the extent of migration (e.g., to assess the mobility of wastes from an unlined surface

impoundment or landfill), provide the following in addition to the requirements immediately above:

⇒ Depth to bedrock and the characteristics of the bedrock including discontinuities such as faults, fissures, joints, fractures, sinkholes, etc.;
⇒ A detailed soil survey conducted according to USDA Soil Conservation Service (SCS) procedures including:
⇒

- USDA Textural Soil Classification and soil profiles showing stratifications or zones which may affect or direct the subsurface flow;
- Hydraulic conductivity and the SCS hydrologic group classification of A, B, C or D;
- Relative permeability (only if the waste may have changed the soil's hydraulic conductivity, such as concentrated organics);
- Storage capacity (if excavated soil will be stored);
- Shrink-swell potential (where extreme dry weather could lead to the formation of cracks);
- Potential for contaminant transport via erosion, using the Universal Soil Loss Equation;
- Soil sorptive capacity;
- Cation exchange capacity;
- Soil organic content; and
- Soil pH.
- The following contaminant characteristics must be included:

    - Physical state;
    - Viscosity;
    - pH;
    - pKa;
    - Density;
    - Water solubility;
    - Henry's Law Constant;
    - K_{ow};
    - Biodegradability; and
    - Rates of hydrolysis, photolysis and oxidation.

- Where in-situ soil treatment will likely be the remediation, the above information and the following additional information must be provided:

⇒ Bulk density;
⇒ Porosity;
⇒ Grain size distribution;
⇒ Mineral content;
⇒ Soil moisture profile;
⇒ Unsaturated hydraulic conductivity;
⇒ Effect of stratification on unsaturated flow; and
⇒ Infiltration and evapotranspiration.

3. Surface Water and Sediment

Respondent shall conduct a program to characterize the surface water bodies likely to be affected by releases from the facility. Such characterization shall include the following activities and information:

- Description of the temporal and permanent surface water bodies including:
  - ⇒ For lakes: location, elevation, surface area, inflow, outflow, depth, temperature stratification, and volume;
  - ⇒ For impoundments: location, elevation, surface area, depth, volume, freeboard, and purpose of impoundment;
  - ⇒ For rivers, streams, ditches, drains, swamps and channels: location, elevation, flow, velocity, depth, width, seasonal fluctuations, and flooding tendencies (i.e., 100-year event);
  - ⇒ For wetlands obtain any available delineation;
  - ⇒ Containment measures in place (e.g., levees, concrete lining, etc.)
  - ⇒ Drainage patterns; and
  - ⇒ Evapotranspiration rates.

- Description of the chemistry of the natural surface water and sediments. This includes determining:
  - ⇒ pH;
  - ⇒ total dissolved solids;
  - ⇒ total suspended solids;
  - ⇒ biological oxygen demand;
  - ⇒ alkalinity;
  - ⇒ conductivity;
  - ⇒ dissolved oxygen profiles;
  - ⇒ nutrients (NH_3, $N0_3$ /$N0_2$, PO_4^{-3});
  - ⇒ chemical oxygen demand;
  - ⇒ total organic carbon; and
  - ⇒ concentrations of the site-specific contaminants of concern.

- Description of sediment characteristics including:
  - ⇒ Deposition area;
  - ⇒ Thickness profile; and
  - ⇒ Physical parameters (e.g., grain size, density, ion exchange capacity, etc.).

4. Air

Respondent shall provide information characterizing the climate in the vicinity of the facility. Such information shall include:

- A description of the following parameters:
  - ⇒ Annual and monthly rainfall averages;
  - ⇒ Monthly temperature averages and extremes;
  - ⇒ Wind speed and direction;
  - ⇒ Relative humidity/dew point;
  - ⇒ Atmospheric pressure;

⇒ Evaporation data;
⇒ Development of inversions; and
⇒ Climate extremes that have been known to occur in the vicinity of the facility, including frequency of occurrence.

- A description of topographic and man-made features that affect air flow and emission patterns, including:
  ⇒ Ridges, hills, or mountain areas;
  ⇒ Canyons or valleys;
  ⇒ Surface water bodies (e.g., rivers, lakes, etc.);
  ⇒ Wind breaks and forests; and
  ⇒ Buildings.

C. Source Characterization

Respondent shall collect analytical data to characterize the wastes and the areas where wastes have been placed, collected or removed including: type; quantity; physical form; disposition (containment or nature of disposal); and any facility characteristics that may affect or have affected a release (e.g., facility security, engineered barriers). This shall include quantification of the following specific characteristics, at each source area:

1. Unit/Disposal Area/Area of Concern Characteristics:

   - Location of unit/disposal area;
   - Type of unit/disposal area;
   - Design features;
   - Operating practices (past and present) including the history of releases;
   - Period of operation;
   - Age of unit/disposal area;
   - General physical conditions; and
   - Method used to close or remediate the unit/disposal area.

2. Waste Characteristics:
   - Type of waste placed in the unit;
     ⇒ Hazardous classification (e.g., flammable, reactive, corrosive, oxidizing or reducing agent);
     ⇒ Quantity; and
     ⇒ Chemical composition.

   - Physical and chemical characteristics;
     ⇒ Physical form (solid, liquid, gas);
     ⇒ Physical description (e.g., powder, oily sludge);
     ⇒ Temperature;
     ⇒ pH;
     ⇒ General chemical class (e.g., acid, base, solvent);
     ⇒ Molecular weight;
     ⇒ Density;
     ⇒ Boiling point;
     ⇒ Viscosity;
     ⇒ Solubility in water;
     ⇒ Cohesiveness of the waste;

⇒ Vapor pressure; and
⇒ Flash point.

- Migration and dispersal characteristics of the waste;
  - ⇒ Sorption;
  - ⇒ Biodegradability, bioconcentration, biotransformation;
  - ⇒ Photodegradation rates;
  - ⇒ Hydrolysis rates; and
  - ⇒ Expected chemical transformations.

Respondent shall document the procedures used in making the above determinations.

D. Contamination Characterization

Respondent shall collect analytical data on environmental media, including ground water, soils, surface water, sediment, and air likely to be affected by releases from the facility. This data shall be sufficient to define the extent, origin, direction, and rate of movement of contaminant plumes. Data shall include:

- time and location of sampling;
- media sampled;
- concentrations found;
- conditions during sampling; and
- the identity of the individuals performing the sampling and analysis.

Respondent shall address the following types of contamination at the facility:

1. Groundwater Contamination

Respondent shall conduct a groundwater investigation to characterize any plumes of contamination at the facility. This investigation shall, provide the following information:

- A description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the facility;
- The horizontal and vertical direction of contaminant movement;
- The velocity of contaminant movement;
- The horizontal and vertical concentration profiles of 40 C.F.R. Part 264 Appendix IX constituents in the plume(s);
- An evaluation of factors influencing the plume movement; and
- An extrapolation of future contaminant movement.

Respondent shall document the procedures used in making the above determinations (e.g., well design, well construction, geophysics, modeling, etc.).

2. Soil Contamination

Respondent shall conduct an investigation to characterize the contamination of the soil and rock units above the water table in the vicinity of the contaminant release. The investigation shall include the following information:

A description of the vertical and horizontal extent of contamination;

- A description of contaminant and soil chemical properties within the contaminant source area and plume. This includes contaminant solubility, speciation, adsorption, leachability, exchange capacity, biodegradability, hydrolysis, photolysis, oxidation and other factors that might affect contaminant migration and transformation;
- Site-specific contaminant concentrations;
- Velocity and direction of contaminant movement; and
- An extrapolation of future contaminant movement.

Respondent shall document the procedures used in making the above determinations.

3. Surface Water and Sediment Contamination

- Respondent shall conduct a surface water and sediment investigation to characterize contamination in surface water bodies resulting from contaminant releases at the facility. Respondent is also required to characterize contamination from storm water runoff. The investigation shall include the following information:
- A description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the facility, and the extent of contamination in underlying sediments;The horizontal and vertical direction of contaminant movement;
- The contaminant velocity;
- An evaluation of the physical, biological, and chemical factors influencing contaminant movement;
- An extrapolation of future contaminant movement; and
- A description of the chemical and physical properties of the contaminated surface waters and sediments. This includes determining the pH, total dissolved solids, specific contaminant concentrations, etc.

Respondent shall document the procedures used in making the above determinations.

4. Air Contamination

Respondent shall conduct an investigation to characterize the particulate and gaseous contaminants released into the atmosphere. This investigation shall provide the following information:

- A description of the horizontal and vertical direction and velocity of contaminant movement;
- The rate and amount of the release; and
- The chemical and physical composition of the contaminants(s) released, including horizontal and vertical concentration profiles.

Respondent shall document the procedures used in making the above determinations.

E. Potential Receptor Identification

Respondent shall collect data describing the human populations and environmental systems that currently or potentially are at risk of contaminant exposure from the facility. Chemical analysis of biological samples may be needed. Data on observable effects in ecosystems may also be required by U.S. EPA. The following characteristics shall be identified:

1. Local uses and possible future uses of groundwater:

- Type of use (e.g., drinking water source: municipal or residential, agricultural, domestic/non-potable, public and industrial) and
- Location of groundwater users including wells and discharge areas.

2. Local uses and possible future uses of surface waters characterized in the "Environmental Setting" or "Contamination Characterization" Sections above:

   - Domestic and municipal (e.g., potable and lawn/gardening watering);
   - Recreational (e.g., swimming, fishing);
   - Agricultural;
   - Industrial; and
   - Environmental (e.g., fish and wildlife propagation).

3. Authorized or unauthorized human use of or access to the facility and adjacent lands, including but not limited to:

   - Recreation;
   - Hunting;
   - Residential;
   - Commercial;
   - Zoning; and
   - Relationship between population locations and prevailing wind direction.

4. A demographic profile of the people who use or have access (authorized or unauthorized) to the facility and adjacent land, including, but not limited to: age; sex; sensitive subgroups; and environmental justice concerns.

5. A description of the ecological characteristics of the facility and adjacent areas, including habitat and species present and expected to be present. Data required for this may include the following:
   - Chemical sampling in potentially exposed habitats and reference sites.
   - Toxicity testing.
   - Tissue analyses.
   - Biological community assessment.
   - Habitat assessment of aquatic and terrestrial habitats on or potentially affected by the facility.
   - Revised assessment of ecological impacts on receptors. Impacts should include those occurring at individual level (e.g., mortality, growth and reproductive impairments) and those occurring at higher levels of biological organization (i.e., at population, community, and ecosystem levels).

6. A description of the biota in surface water bodies on, adjacent to, or affected by the facility.

7. A description of any State and Federal endangered or threatened species (both proposed and listed) near the Facility.

Section IV: Investigation Results and Analysis

Respondent shall prepare an analysis and summary of all facility investigations and their results. The investigation data should be sufficient in quality (e.g., quality assurance procedures have been followed) and quantity to describe the nature and extent of contamination, potential threat to human health and/or the environment, and to support the Corrective Measures Study and/or IMs.

A. Data Analysis

Respondent shall analyze all facility investigation data outlined in Section III and prepare a report on the type and extent of contamination at the facility which has not been eliminated from further investigation by the screening methods used, including sources and migration pathways. The report shall describe the extent of contamination (qualitative/quantitative) in relation to background levels indicative for the area as well as in relation to applicable screening levels.

B. Media Cleanup Standards

Respondent shall provide information as required to support U.S. EPA's selection/development for media cleanup standards (MCSs) of any releases that may have adverse effects on human health and the environment due to migration of waste constituents. MCSs are to contain such terms and provisions as necessary to protect human health and the environment, including, the provisions stated below.

1. Groundwater Cleanup Standards

   Respondent shall provide information to support U.S. EPA's selection/development of groundwater cleanup standards for all of the 40 C.F.R. Part 264 Appendix IX constituents found in the groundwater during the Facility Investigation (Section III). The groundwater cleanup standards shall consist of:

   - For any constituents for which an MCL has been promulgated under the Safe Drinking Water Act, the MCL value;
   - Background concentration of the constituent in the ground water; or
   - An alternate standard [e.g., an alternate concentration limit (ACL) for a regulated unit] to be approved by U.S. EPA.

2. Soil Cleanup Standards

   Respondent shall provide information to support U.S. EPA's selection/development of soil cleanup standards. U.S. EPA may require the following information:

   - The volume and physical and chemical characteristics of the wastes in the unit;
   - The effectiveness and reliability of containing, confining, and collecting systems and structures in preventing contaminant migration;
   - The hydrologic characteristics of the unit and the surrounding area, including the topography of the land around the unit;
   - The patterns of precipitation in the region;
   - The existing quality of surface soils, including other sources of contamination and their cumulative impacts on surface soils;

- The potential for contaminant migration and impact to the underlying groundwater;
- The patterns of land use in the region;
- The potential for health risks caused by human exposure to waste constituents; and
- The potential for damage to domestic animals, wildlife, food chains, crops, vegetation, and physical structures caused by exposure to waste constituents.

3. Surface Water and Sediment Cleanup Standards

Respondent shall provide information to support U.S. EPA's selection/development of surface water and sediment cleanup standards. U.S. EPA may require the following information:

- The volume and physical and chemical characteristics of the wastes in the unit;
- The effectiveness and reliability of containing, confining, and collecting systems and structures in preventing contaminant migration;
- The hydrologic characteristics of the unit and the surrounding area, including the topography of the land around the unit;
- The patterns of precipitation in the region;
- The quantity, quality, and direction of groundwater flow;
- The proximity of the unit to surface waters;
- The current and potential uses of nearby surface waters and any water quality standards established for those surface waters;
- The existing quality of surface waters, including other sources of contamination and their cumulative impacts on surface waters;
- The potential for damage to domestic animals, wildlife, food chains, crops, vegetation and physical structures caused by exposure to waste constituents;
- The patterns of land use in the region; and
- The potential for health risks caused by human exposure to waste constituents.

4. Air Cleanup Standards

Respondent shall provide information to support U.S. EPA's selection/development of air cleanup standards. U.S. EPA may require the following information:

- The volume and physical and chemical characteristics of the wastes in the unit, including its potential for the emission and dispersal of gases, aerosols and particulates;
- The effectiveness and reliability of systems and structures to reduce or prevent emissions of hazardous constituents to the air;
- The operating characteristics of the unit:
- The atmospheric, meteorological, and topographic characteristics of the unit and the surrounding area;
- The existing quality of the air, including other sources of contamination and their cumulative impact on the air;

- The potential for health risks caused by human exposure to waste constituents; and
- The potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents.

5. Other Relevant Cleanup Standards

Respondent shall identify all relevant and applicable standards for the protection of human health and the environment (e.g., National Ambient Air Quality Standards, Ohio Water Quality Standards, water quality criteria, health advisories, proposed MCL's, etc.).

C. Analysis of Risk

Respondent may determine as necessary an analysis of risk at the facility. This analysis would include ecological as well as human health risk and shall be consistent with applicable guidance provided in **References**. Risk may be evaluated at several milestones within the process, as developed in the U.S. EPA-approved RFI Workplan.

All activities in conducting corrective action pursuant to this Order will allow for risk screening steps to be conducted with the data available at the risk assessment phase as well as within the RFI and CMS as appropriate. Generally, a screening risk assessment would be conducted during the RFI with additional, more detailed analysis, including appropriate cumulative risk, occurring as more data becomes available. The highest level of risk analysis may occur later in the CMS stage.

Section V: Progress Reports

Respondent will, at a minimum, provide the U.S. EPA with signed monthly progress reports. These reports are required to contain the following information, but U.S. EPA requirements are not limited to this list:

1. A description and estimate of the percentage of the RFI completed;
2. Summaries of *all* findings in the reporting period, including results of any sampling and analysis;
3. Summaries of *all* changes made in the RFI during the reporting period;
4. Summaries of *all* contacts with representatives of the local community, public interest groups or State government during the reporting period;
5. Summaries of *all* contacts made regarding access to off-site property;
6. Summaries of *all* problems encountered during the reporting period;
7. Actions being taken to rectify problems;
8. Changes in relevant personnel during the reporting period;
9. Projected work for the next reporting period; and
10. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

Section VI: Proposed Schedule

Respondent will provide U.S. EPA with RFI submittals according to the following schedule:

Facility Submission	Due Date
Description of Current Conditions (Section I)	30 days after the effective date of the Order
RFI Workplan (Section II)	90 days after the effective date of the Order
Draft RFI Report (Sections III and IV)	As scheduled in the approved RFI Workplan
Final RFI Report	45 days after receipt of comments on the Draft RFI Report
Progress Reports on Sections I through IV	Monthly