ATTACHMENT A

Interim Measures
Scope of Work

ATTACHMENT A
Interim Measures
Scope of Work

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 or minimize the release or potential release of 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.

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 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

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.

The preconstruction inspection and meeting shall be documented by a designated person and minutes should be transmitted to all parties.

2. Prefinal inspection

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

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

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 B

RCRA Facility Investigation
Scope of Work

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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 physiography, 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 ar as 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.

3. 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;

Biodegradability; and

Rates of hydrolysis, photolysis and oxidation.

Where in-situ soil treatment will likely be the remediation, the above information and the fdllowing 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;
- [illegible] (NH_3, NO_3 /NO_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

ATTACHMENT C

Corrective Measures Study
Scope of Work

ATTACHMENT C
Corrective Measures Study
Scope of Work

Purpose

The purpose of the Corrective Measures Study (CMS} portion of the RCRA corrective action process is to identify and evaluate potential remedial alternatives for the releases that have been identified at and/or from the Facility.

Scope

A Corrective Measures Study Report is, unless otherwise specified by U.S. EPA, a required element of the CMS. The CMS consists of the following components:

Section I: Corrective Measures Study Report

A. Introduction/Purpose

B. Description of Current Conditions

C. Media Cleanup Standards

D. Identification, Screening and Development of Corrective Measure Alternatives

E. Evaluation of A Final Corrective Measure Alternative

F. Recommendation by Respondent for a Final Corrective Measure Alternative

G. Public Involvement Plan

Section II: Progress Reports

Section III: Proposed Schedule

Section I: Corrective Measures Study Report

The CMS Report shall include the following elements:

A. Introduction/Purpose

Respondent shall describe the purpose of the document and provide a summary description of the project.

B. Description of Current Conditions

Respondent shall include a brief summary/discussion of any new information that has been discovered since the RFI current conditions report was provided. This discussion should concentrate on those issues which could significantly affect the evaluation and selection of the corrective measures alternative(s).

C. Media Cleanup Standards

Respondent may propose media cleanup standards. The standards must be based on promulgated Federal and State standards, risk derived standards, all data and information gathered during the corrective action process (e.g., from interim measures, RCRA Facility Investigation, etc.), and/or other applicable guidance documents. If no other guidance exists for a given contaminant and media, Respondent shall propose and justify a media cleanup standard.

D. Identification, Screening, and Development of Corrective Measure Alternatives

1. Identification: List and briefly describe potentially applicable technologies for each affected media that may be used to achieve the corrective action objectives. Respondent should consider including a table that summarizes the available technologies. Depending on the site-specific situation, U.S. EPA may require Respondent to consider additional technologies.

   Respondent should consider innovative treatment technologies, especially in situations where there are a limited number of applicable corrective measure technologies. Innovative technologies are defined as those technologies utilized for remediation other than

incineration, solidification/stabilization, and pumping with conventional treatment for contaminated groundwater. Innovative treatment technologies may require extra effort to gather information, to analyze options, and to adapt the technology to the site-specific situation. Treatability studies and on-site pilot scale studies may be necessary for evaluating innovative treatment technologies.

2. Screening: When Respondent is required to, or chooses to, evaluate a number of corrective measures technologies, Respondent will evaluate the technology limitations to show why certain corrective measures technologies may prove unfeasible to implement given existing waste and site-specific conditions.

Likewise, if only one corrective measure alternative is being analyzed, Respondent must indicate any technological limitations given waste and site-specific conditions at the facility for which it is being considered. Respondent should consider including a table that summarizes these findings.

3. Corrective Measure Development: As required by U.S. EPA, Respondent shall assemble the technologies that pass the screening step into specific alternatives that have potential to meet the corrective action objectives for each media. Options for addressing less complex sites could be relatively straight-forward and may only require evaluation of a single or limited number of alternatives.

Each alternative may consist of an individual technology or a combination of technologies used in sequence (i.e., treatment train). Depending on the site-specific situation, different alternatives may be considered for separate areas of the facility. List and briefly describe each corrective measure alternative.

E. Evaluation of a Final Corrective Measure Alternative

For each remedy which warrants a more detailed evaluation, including those situations when only one remedy is being proposed, Respondent shall provide detailed documentation of how the potential remedy will comply with each of the standards listed below. These standards reflect the major technical components of remedies including cleanup of releases, source

control and management of wastes that are generated by remedial activities. The specific standards are provided below.

1. Protect human health and the environment.

2. Attain media cleanup standards set by the U.S. EPA.

3. Control the source of releases so as to reduce or eliminate, to the extent practicable, further releases that may pose a threat to human health and the environment.

4. Comply with any applicable standards for management of wastes.

5. Other Factors.

In evaluating the selected alternative or alternatives Respondent shall prepare and submit information that documents that the specific remedy will meet the standards listed above. The following guidance should be used in completing this evaluation. This guidance provides examples of the types of information that would be supportive; U.S. EPA may require additional information.

1. Protect Human Health and the Environment

Corrective action remedies must be protective of human health and the environment. Remedies may include those measures that are needed to be protective, but are not directly related to media cleanup, source control, or management of wastes. An example would be a requirement to provide alternative drinking water supplies in order to prevent exposures to releases from an aquifer used for drinking wat r purposes. Another example would be a requirement for the construction of barriers or for other controls to prevent harm arising from direct contact with waste management units. Therefore, Respondent shall include a discussion on what types of short term remedies are appropriate for the particular facility in order to meet this standard. This information should be provided in addition to a discussion of how the other corrective measure alternatives meet this standard.

2. Attain Media Cleanup Standards Set by U.S. EPA

Remedies will be required to attain media cleanup standards set by U.S. EPA which may be derived from existing State or Federal regulations (e.g. groundwater standards) or other standards. The media cleanup standards for a remedy will often play a large role in determining the extent of and technical approaches to the remedy. In some cases, certain technical aspects of the remedy, such as the practical capabilities of remedial technologies, may influence to some degree the media cleanup standards that are established.

As part of the necessary information for satisfying this requirement, Respondent shall address whether the potential remedy will achieve the preliminary remediation objective as identified by U.S. EPA as well as other, alternative remediation objectives that may be proposed by Respondent. Respondent shall also include an estimate of the time frame necessary for each alternative to meet these standards.

3. Control the Sources of Releases

A critical objective of any remedy must be to stop further environmental degradation by controlling or eliminating further releases that may pose a threat to human health and the environment. Unless source control measures are taken, efforts to clean up releases may be ineffective or, at best, will essentially involve a perpetual cleanup. Therefore, an effective source control program is essential to ensure the long-term effectiveness and protectiveness of the corrective action program.

The source control standard is not intended to mandate a specific remedy or class of remedies. Instead, Respondent is encouraged to examine a wide range of options. This standard should not be interpreted to preclude the equal consideration of using other protective remedies to control the source, such as partial waste removal, capping, slurry walls, in-situ treatment/stabilization and consolidation.

As part of the CMS Report, Respondent shall address the issue of whether source control measures are

necessary, and if so, the type of actions that would be appropriate. Any source control measure proposed should include a discussion on how well the method is anticipated to work given the particular situation at the facility and the known track record of the specific technology.

4. Comply With Any Applicable Standards for Management of Wastes.

Respondent shall include a discussion of how the specific waste management activities will be conducted in compliance with all applicable State or Federal regulations (e.g., closure requirements, land disposal restrictions).

5. Other Factors

There are five general factors that will be considered as appropriate by U.S. EPA in selecting/approving a remedy that meets the four standards listed above. These factors represent a combination of technical measures and management controls for addressing the environmental problems at the facility. The five general decision factors include:

a. Long-term reliability and effectiveness;

b. Reduction in the toxicity, mobility or volume of wastes;

c. Short-term effectiveness;

d. Implementability; and

e. Cost.

U.S. EPA may request Respondent to provide additional information to support the use of these factors in the evaluation of viable remedial alternatives. Examples of the types of information that may be requested are provided below:

a. Long-term Reliability and Effectiveness

Demonstrated and expected reliability is a way of assessing the risk and effect of failure. Respondent may consider whether the technology or a combination of technologies have been used effectively under analogous site conditions, whether failure of any one technology in the alternative would have an immediate impact on receptors, and whether the alternative would have the flexibility to deal with uncontrollable changes at the site (e.g., heavy rain storms, flooding, earthquakes, etc.).

Most corrective measure technologies, with the exception of destruction, deteriorate with time. Often, deterioration can be slowed through proper system operation and maintenance, but the technology eventually may require replacement. Each corrective measure alternative should be evaluated in terms of the projected useful life of the overall alternative and of its component technologies. Useful life is defined as the length of time the level of effectiveness can be maintained.

b. Reduction in the Toxicity, Mobility or Volume of Wastes

As a general goal, remedies will be preferred that employ techniques, such as treatment technologies, that are capable of eliminating or substantially reducing the inherent potential for the wastes in SWMUs (and/or contaminated media at the facility) to cause future environmental releases or other risks to human health and the environment. There may be some situations where achieving substantial reductions in toxicity, mobility or volume may not be practical or even desirable. Examples might include large, municipal-type landfills, or wastes such as unexploded munitions that would be extremely dangerous to handle, and for which the short-term risks of treatment outweigh potential long-term benefits.

Estimates of how much the corrective measures alternatives will reduce the waste toxicity, volume, and/or mobility may be helpful in applying this factor. This may be done through a comparison of initial site conditions to expected post-corrective measure conditions.

c. Short-term Effectiveness

Short-term effectiveness may be particularly relevant when remedial activities will be conducted in densely populated areas, or where waste characteristics are such that risks to workers or to the environment are high and special protective measures are needed. Possible factors to consider include fire, explosion, exposure to hazardous substances and potential threats associated with treatment, excavation, transportation, and re-disposal or containment of waste material.

d. Implementability

Implementability will often be a determining variable in shaping remedies. Some technologies will require State or local approvals prior to construction, which may increase the time necessary to implement the remedy. In some cases, State or local restrictions or concerns may necessitate eliminating or deferring certain technologies or remedial approaches from consideration in remedy selection. Information to consider when assessing implementability may include:

1. The administrative activities needed to implement the corrective measure alternative (e.g., permits, rights of way, off-site approvals, etc.) and the length of time these activities will take;

2. The constructibility, time for implementation, and time for beneficial results;

3. The availability of adequate off-site treatment, storage capacity, disposal services, needed technical services and materials; and

4. The availability of prospective technologies for each corrective measure alternative.

e. Cost

The relative cost of a remedy may be an appropriate consideration, especially in those situations where several different technical alternatives to remediation will offer equivalent protection of human health and the environment, but may vary widely in cost. However, in those situations where only one remedy is being proposed, the issue of cost would not need to be considered. Cost estimates could include costs for: engineering, site preparation, construction, materials, labor, sampling/analysis, waste management/disposal, permitting, health and safety measures, training, operation and maintenance, etc.

F. Recommendation by Respondent for a Final Corrective Measure Alternative

In the CMS Report, Respondent may recommend a preferred remedial alternative for consideration by U.S. EPA. Such a recommendation should include a description and supporting rationale for the proposed remedy, consistent with the remedial standards and the decision factors discussed above. Such a recommendation is not required and the U.S. EPA still retains the role of remedy selection.

G. Public Involvement Plan

After the CMS has been performed by Respondent and the U.S. EPA has selected a preferred alternative for proposal in the Statement of Basis, it is the agency's policy to request public comment on the Administrative Record and the proposed corrective measure(s). Changes to the proposed corrective measure(s) may be made after consideration of public comment. U.S. EPA may also require that Respondent perform additional corrective measures studies. If the public is interested, a public meeting

may be held. After consideration of the public's comments on the proposed corrective measure, the agency develops the Final Decision and Response to Comments to document the selected corrective measure, the agency's justification for such selection, and the response to the public's comment. Additional public involvement activities may be necessary, based on site-specific circumstances.

Section II: Progress Reports

Respondent will, at a minimum, provide 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 CMS completed;

2. Summaries of *all* findings in the reporting period, including results of any pilot studies;

3. Summaries of *all* changes made in the CMS during the reporting period;

4. Summaries of *all* contacts with representative 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 III: Proposed Schedule

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

Facility Submission	Due Date
Draft CMS Report (Section I)	Within 90 days of U.S. EPA approval of the RFI Report
Final CMS Report (Section I)	45 days after Public and U.S. EPA Comments on the Draft Final CMS
Progress Reports on Sections I	Monthly

ATTACHMENT D

Corrective Measures Implementation
Scope of Work

ATTACHMENT D
Corrective Measures Implementation
Scope of Work

PURPOSE

The purpose of the Corrective Measures Implementation (CMI) program is to design, construct, operate, maintain and monitor the performance of the Corrective Measures selected by U.S. EPA and other measures/additional work determined necessary by U.S. EPA pursuant to this Order such that the performance standards are achieved and maintained. Respondent shall furnish all personnel, materials and services necessary for the implementation of the Corrective Measures.

SCOPE

The CMI program shall consist of four tasks:

Section I: Corrective Measures Implementation Workplan

A. Program Management Plan
B. Public Involvement Plan
C. Health and Safety Plan
D. Quality Assurance Project Plan
E. Sampling and Analysis Plan
F. Surveys

Section II: Corrective Measures Design

A. Preliminary Design
B. Prefinal and Final Designs
C. Operation and Maintenance Plan
D. Cost Estimate
E. Project Schedule
F. Construction Quality Assurance Objectives

Section III: Corrective Measures Construction

A. Responsibility and Authority
B. Construction Quality Assurance Personnel Qualifications
C. Inspection Activities
D. Sampling Requirements

E. Documentation
Section IV: Other Reports and Submissions

A. Progress
B. Construction Completion Report
C. Attainment of Groundwater Performance Standards Report
D. Completion of Work Report
E. Institutional Controls
F. Submittal Summary

Section I: Corrective Measures Implementation (CMI) Workplan

Respondent shall prepare and submit a CMI Workplan which includes the development and implementation of several plans, which shall be prepared concurrently. Respondent shall submit a draft CMI Workplan within 60 days of U.S. EPA's decision on the corrective measure(s) and submit a final CMI Workplan that incorporates U.S. EPA comments on the draft CMI Workplan according to the schedule identified in the Submittal Summary, Section IV. The CMI Workplan includes the following:

A. Program Management Plan

Respondent shall prepare and submit a Program Management Plan (PMP) which includes a discussion of the technical approach, engineering designs and plans, schedules, and personnel needed for performing the design, construction, operation, maintenance and monitoring of Corrective Measures for U.S. EPA review and approval. The PMP shall document the responsibility and authority of all organizations and key personnel involved with the implementation. The PMP shall also include a description of qualifications of key personnel directing the Corrective Measure Design and Implementation, including contractor personnel.

B. Public Involvement Plan

The existing Public Involvement Plan (PIP) shall be revised to describe the community relations program to be implemented by Respondent during the design and construction subject to the approval of U.S. EPA. Specific activities which must be conducted include the revision of the PIP to reflect knowledge of community concerns and involvement during design and construction and the preparation of a fact sheet at the completion of the engineering design. At the request of U.S. EPA, Respondent shall participate in the preparation of information disseminated to the public and in providing information for public meetings that may be held or sponsored by the U.S. EPA.

C. Health and Safety Plan

Respondent shall submit a Health and Safety Plan (HSP) to U.S. EPA for review although it does not require approval by U.S. EPA. The HSP shall be designed to protect on-site personnel and area residents from physical, chemical and other hazards posed by the Corrective Measures, including pre-design studies.

1. Major elements of the HSP shall include:

Facility description including availability of resources such as roads, water supply, electricity, and telephone service;

Description of the known hazards and evaluation of the risks associated with each activity conducted;

A list of key personnel and alternates responsible for site safety, response operations, and protection of human health;

Delineation of work area;

Description of protective clothing or other protective items to be worn by personnel in work area;

Procedures to control site access;

Description of decontamination procedures for personnel and equipment;

Site emergency procedures;

Emergency medical care needed 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 HSP shall be consistent with:

NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);

EPA Order 1440.1 - Respiratory Protection;

EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities;

Facility Contingency Plan;

EPA Standard Operating Safety Guide (1984);

OSHA regulations particularly in 29 CFR 1910 and 1926;

State and local regulations; and

Other applicable EPA guidance as provided.

D. Quality Assurance Project Plan

Respondent shall prepare and submit a Quality Assurance Project Plan (QAPP) to document all monitoring procedures, sampling, field measurements, and sample analyses to be performed during the Corrective 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. At the request of U.S. EPA, Respondent shall participate in a pre-QAPP meeting with the U.S. EPA prior to preparation of any QAPP.

A performance audit may be conducted by U.S. EPA on the laboratories selected by Respondent.

E. Sampling and Analysis Plan

Respondent shall develop a Sampling and Analysis Plan (SAP) for the predesign field activities and any monitoring programs required by this Order. Respondent shall submit the SAP addressing predesign field activities with the draft CMI Work Plan and shall propose a schedule for the submittal of any additional sampling plans. The SAP shall include, at a minimum:

1. A description of the proposed field activities;

2. The proposed locations of soil borings, ground water monitoring wells and surface water monitoring points;

3. A description of how the SAP is expected to meet the requirements of the final remedy;

4. A description of the planned operation and maintenance (O&M) activities, including the anticipated frequency of each O&M task;

5. A flow chart and schedule of work to be performed during the CMI.

F. Surveys

Respondent shall submit surveys to delineate current Facility boundaries and to update water well use adjacent to the Facility.

Section II: Corrective Measures Design

Respondent shall prepare final construction plans and specifications to implement the Corrective Measures at the facility which have been selected by U.S. EPA. The final product of the Corrective Measures Design shall be a technical package (or packages) that contain and address all elements necessary to accomplish the Corrective Measures. This includes all design support activities, initial permitting and access requirements, operation and maintenance, and institutional controls, as well as technical elements.

A. Preliminary Design

Respondent shall submit for U.S. EPA review and approval a Preliminary Design when the design effort is approximately 50% complete. The Preliminary Design submittal shall include or discuss, at a minimum, the following:

1. Design strategy and basis, including compliance with all applicable or relevant environmental and public health standards and minimization of environmental and public impacts;

2. Technical factors of importance, including use of currently accepted environmental control measures and technology, design constructability, and use of currently acceptable construction practices techniques;

3. A summary of activities performed and data generated during Corrective Measures Design or Predesign, including results and interpretations of data and studies;

4. Design assumptions and parameters, including design restrictions and process performance criteria;

5. Real estate, easement and permit requirements;

6. Preliminary construction schedule, including contracting strategy;

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

8. Detailed drawings of the proposed designs, including qualitative and quantitative flow sheets;

9. Tables listing equipment and specifications;

10. Tables giving material and energy balances; and

11. Sample calculations and derivation of equations essential to understanding the report.

B. Prefinal and Final Designs

Respondent shall submit for U.S. EPA review and approval the Prefinal Design when the design effort is 95% complete and shall submit the Final Design when the design effort is 100% complete. The Prefinal Design shall fully address all U.S. EPA's comments on the Preliminary Design. After receipt of U.S. EPA comments on the Prefinal Design, Respondent shall execute the required revisions and submit the Final Design with reproducible drawings and specifications suitable for bid advertisement. The Final Design consists of the Final Design Plans and Specifications (100% complete), Final Construction Cost Estimate, Final Operation and Maintenance Plan, Construction Quality Assurance Objectives, Final Project Schedule and Final Health and Safety Plan specifications.

The U.S. EPA may require additional work, including but not limited to studies, to supplement the available technical data. Respondent shall furnish all equipment and personnel necessary to complete any additional work needed. Draft and final reports shall be prepared and present all data obtained during the additional studies, a summary of the results, and conclusions.

C. Operation and Maintenance Plan

Respondent shall prepare an Operation and Maintenance (O&M) Plan to cover both implementation and long term maintenance of the Corrective Measures. A draft O&M Plan shall be submitted for U.S. EPA review and comment concurrently with the Prefinal Design and the final O&M Plan shall be submitted for U.S. EPA review and approval with the Final Design. The plan shall include the following elements:

1. Description of normal O&M:

    a. Description of tasks for operation;

    b. Description of tasks for maintenance;

    c. Description of prescribed treatment or operation conditions; and

    d. Schedule showing frequency of each O&M task.

2. Description of potential operating problems:

a. Description and analysis of potential operation problems;

b. Sources of information regarding problems; and

c. Common and/or anticipated remedies.

3. Description of routine monitoring and laboratory testing:

a. Description of monitoring tasks;

b. Description of required laboratory tasks and their interpretation;

c. Required data collection, Quality Assurance Project Plan (QAPP);

d. Schedule of monitoring frequency; and

e. Description of triggering mechanisms for ground water/surface water monitoring results.

4. Description of alternate O&M:

a. Should system fail, alternate procedures to prevent release or threatened releases of hazardous substances, pollutants or contaminants which may endanger public health and the environment or exceed cleanup standards; and

b. Analysis of vulnerability and additional resource requirements should a failure occur.

5. Corrective steps:

a. Description of corrective steps to be implemented in the event that cleanup or performance standards are not met; and

b. Schedule for implementing these corrective steps.

6. Safety plan:

a. Description of precautions, of necessary equipment, etc., for site personnel; and

b. Safety tasks required in event of systems failure.

7. Description of equipment:

a. Equipment identification;

b. Installation of monitoring components;
c. Maintenance of site equipment; and

d. Replacement schedule for equipment and installed components.

8. Records and reporting mechanisms required:

a. Daily operating logs;

b. Laboratory records;

c. Records for operating costs;

d. Mechanism for reporting emergencies;

e. Personnel and maintenance records; and

f. Monthly/annual reports to State agencies.

D. Cost Estimate

Respondent shall refine the cost estimate developed in the CMS to reflect the more detailed/accurate design plans and specifications being developed. The cost estimate shall include both capital and O&M costs. An Initial Cost Estimate shall be submitted simultaneously with the Prefinal Design and the Final Cost Estimate with the Final Design.

E. Project Schedule

Respondent shall develop a project schedule for construction and implementation of the Corrective Measures which identifies timing for initiation and completion of all critical path tasks. The schedule to be submitted to U.S. EPA for review and approval shall provide for the completion of the Corrective Measures in a

reasonable period of time. Respondent shall specifically identify dates for completion of the project and major interim milestones. An initial project schedule shall be submitted simultaneously with the Prefinal Design and a final project schedule with the Final Design.

F. Construction Quality Assurance Objectives

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. Draft Construction Quality Assurance Objectives, Prefinal Design, and the Final Construction Quality Assurance Plan shall be submitted for U.S. EPA review and approval within 45 days after U.S. EPA's approval of the Final Design.

Section III: CORRECTIVE MEASURES CONSTRUCTION

Respondent shall finalize the Construction Quality Assurance Plan incorporating comments received on the draft Construction Quality Assurance Plan submitted with the Prefinal Design. Within 45 days of U.S. EPA's approval of the Final Design, Respondent shall implement a construction quality assurance (CQA) program and submit the Final CQA Plan to ensure, with a reasonable degree of certainty, that a completed Corrective Measure will meet or exceed all design criteria, plans and specifications. The CQA Plan is a facility specific document which must be approved by U.S. EPA prior to the start of the construction. At a minimum, the CQA Plan should include the elements which are summarized below. Within 120 days of U.S. EPA's approval of the CQA Plan, Respondent shall construct and implement the Corrective Measures in accordance with the approved design, schedule and CQA Plan. Respondent shall also implement the elements of the approved O&M Plan.

A. Responsibility and Authority

Respondent shall describe fully in the CQA Plan the responsibility and authority of all organizations (i.e., technical consultants, construction firms, etc.) and key personnel involved in the construction of the corrective

measures. Respondent shall also identify a CQA officer and the necessary supporting inspection staff.

B. Construction Quality Assurance Personnel Qualifications

Respondent shall set forth the qualifications of the CQA Officer and supporting inspection personnel shall be presented in the CQA plan to demonstrate that they possess the training and experience necessary to fulfill their identified responsibilities.

C. Inspection Activities

Respondent shall summarize in the CQA plan the observations and tests that will be used to monitor the construction and/or installation of the components of the Corrective Measures. The plan shall include the scope and frequency of each type of inspection. Inspections shall verify compliance with 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 shall also ensure compliance with all health and safety procedures. In addition to the oversight inspections, Respondent shall conduct construction inspections.

Within 30 days after Respondent makes a preliminary determination that construction is complete, Respondent shall notify U.S. EPA for the purposes of conducting an inspection. The inspection shall 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 Corrective Measures. Any outstanding construction items discovered during the inspection shall be identified and noted. Additionally, treatment equipment, if installed, shall be operationally tested by Respondent. Respondent shall certify that the equipment has performed to meet the purpose and intent of the specifications. Retesting will be completed where deficiencies are revealed. Respondent shall outline in the inspection report the outstanding construction items, actions required to resolve items, completion date for these items and date for final inspection.

Upon completion of any outstanding construction items, Respondent shall notify U.S. EPA for the purposes of conducting a final inspection. The final inspection shall consist of a

walk-through inspection of the project site. Confirmation shall be made that outstanding items have been resolved subject to EPA's approval.

D. Sampling Requirements

Respondent shall present in the CQA Plan the sampling activities, sample size, sample locations, frequency of testing, criteria for acceptance and rejection and plans for correcting problems as addressed in the project specifications.

E. Documentation

Respondent shall describe in detail in the CQA plan the reporting requirements for CQA activities. This shall include such items as daily summary reports, inspection data sheets, problem identification and corrective 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: Other Reports and Submissions

Respondent shall prepare plans, specifications and reports as set forth in Sections I through III to document the design, construction, operation, maintenance and monitoring of the Corrective Measure. Other documentation shall include, but not be limited to the following:

A. Progress

Respondent shall at a minimum provide the U.S. EPA with signed monthly progress reports during the design and construction phases and semi-annual progress reports for operation and maintenance activities containing:

1. A description and estimate of the percentage of the CMI completed;

2. Summaries of all findings;

3. Summaries of all changes made in the CMI 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 or 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. Construction Completion Report

Within 30 days of a successful final inspection, as determined by U.S. EPA, Respondent shall submit a Construction Completion Report. In the report, a registered professional engineer and Respondent's Project Coordinator shall state that the Corrective Measures have been constructed in accordance with the design and specifications, to the best of their knowledge, and the performance standards have been attained. The written report shall include as-built drawings signed and stamped by a registered professional engineer. The report shall be certified by a Responsible Official pursuant to Section XIV of the Order. The Final O&M Plan shall be submitted concurrently with the Construction Completion Report.

C. Attainment of Ground Water Performance Standards Report

Within 30 days after Respondent concludes that the ground water performance standards have been attained, Respondent shall submit a written report and certification to U.S. EPA for review and approval. In the report, a registered professional engineer and Respondent's Project Coordinator shall state that the ground water performance standards have been attained in full satisfaction of the requirements of this Order. The report shall be certified by a Responsible Official pursuant to Section XIV of the Order.

D. Completion of Work Report

This report shall be submitted by Respondent when construction is complete, performance standards have been attained and O&M is complete. Within 30 days after Respondent concludes that all

phases of the work (including O&M and monitoring) have been completed, Respondent shall schedule and conduct a precertification inspection to be attended by representatives of Respondent and U.S. EPA. After the precertification inspection and any prefinal or subsequent final inspections required by U.S. EPA, Respondent shall submit within 30 days of a successful final inspection, a written Completion of Work Report to U.S. EPA for approval. In the report, a registered professional engineer and Respondent's Project Coordinator shall state that the Corrective Measures have been completed in full satisfaction of the requirements of this Order. The written report shall include as-built drawings stamped by a registered professional engineer. The report shall be certified by a Responsible Official pursuant to Section XIV of the Order.

F. Submittal Summary

A summary of the information reporting requirements contained in the CMI Scope of Work is presented below.

SUBMITTAL	DUE DATE
Draft CMI Workplan -Project Management Plan -Public Involvement Plan -Health and Safety Plan -Pre-Design QAPP -Pre-Design SAP -Surveys	Within 60 days of U.S. EPA's decision on corrective measure(s)
Final CMI Workplan -Revisions to Draft	30 days after receipt of U.S. EPA's comments on Draft CMI Workplan
Preliminary Design (50%) -Design Criteria -Pre-Design Results -Design Assumptions/ Parameters -Preliminary Plans -Outline of Required Specifications -Preliminary Construction Schedule	In accordance with the project schedule approved in the CMI Workplan

SUBMITTAL	DUE DATE
Prefinal Design (95%) -Revisions to Preliminary Design -Final QAPP -Final SAP -Final HSP -Final Construction Schedule -Cost Estimates -Draft O&M Plan -CQA Objectives Final Design (100%) -Revisions to Prefinal Design	30 days after receipt of U.S. EPA's comments on Preliminary Design 30 days after receipt of U.S. EPA's comments on Prefinal Design
Construction Quality Assurance Plan (CQAP)	45 days after U.S. EPA's approval of Final Design
Construct and implement corrective measure(s)	120 days after U.S. EPA's approval of CQAP
Final O&M Plan Construction Inspection Construction Completion Report	30 days after final Construction Inspection 30 days after Construction Completion 30 days after final Construction Inspection
O&M Progress Report	No later than one year after U.S. EPA's approval of Construction Completion Report, semi-annually thereafter
Attainment of GW Performance Standards Report	30 days after determination that GW performance standards have been attained
Completion of Work Inspection	30 days after completion of all work, including O&M

SUBMITTAL	DUE DATE
Completion of Work Report	30 days after Completion of Work Inspection

RCRA FIRST TOOL 2: Corrective Action Framework Template

Introduction

For regulators and facilities wishing to utilize an RFI FIRST approach this model CAF Template[1] may be used as a tool for drafting the facility-specific CAF. The CAF is a tool generally intended to summarize the goals and expectations for the RFI process. A key principle of an RFI lean approach is that the regulatory authority works with the facility through preliminary discussions early on in the RFI process to set up a CAF Meeting and then to develop the CAF.

As part of an RFI lean approach the regulatory authority or facility representatives usually develop the CAF. This party should be selected during the CAF meeting and coordinate closely with all participants during development. EPA expects that much of the work in developing a CAF will occur during and immediately after the CAF meeting.

Attention to permit and/or order obligations is warranted. Such obligations should be considered in developing all aspects of the CAF, not just where explicitly mentioned.

CAF Template

Corrective Action Framework

{Facility name]
{EPA ID}
[Address]

The Corrective Action Framework *(CAF)* is a tool intended to summarize the goals and expectations of the *[regulatory authority]* and the *{Responsible Party,facility, or Representative]* that will facilitate the RCRA Facility Investigation (RFI) at the *[facility name].* The CAF is not a legally binding document and does not alter any legal requirements under any permit or order applicable to the facility. Nor is the CAF a substitute for a permit or order. Only where the CAF is expressly incorporated into a new permit (or order, for interim status facilities) or incorporated through a modification to an existing permit (or order for interim status facilities) will the CAF become an enforceable condition of the permit (or order for interim status facilities). The CAF is also not expected to address every technical or administrative aspect or detail of the RFI. Rather, the CAF describes the discussions that took place during the CAF meeting or any subsequent meetings (e.g., elevation to management for resolution of differences to avoid delay). The CAF also documents material exchanged during the CAF meeting(s) which are necessary for the RFI

[1] This document is intended to provide guidance to EPA personnel on implementing the RCRA Subtitle C program. As indicated by the use of non-mandatory language such as "guidance," "recommend," "may," "should," and "can," it identifies policies and provides recommendations and does not impose any legally binding requirements. This document is not a rule or regulation, may not apply to a particular situation based upon the circumstances, does not change or substitute for any law, regulation, or any other legally binding requirement and is not legally enforceable. While EPA has made every effort to ensure the accuracy of the discussion in these documents, the obligations of the regulated community are determined by statutes, regulations or other legally binding requirements. In the event of a conflict between the discussion in this document and any statute or regulation, this document would not be controlling. In addition, under RCRA, states may apply to EPA for, and receive from EPA, authorization of a state program to operate in lieu of the federal RCRA hazardous waste program. These state programs may be broader in scope or more stringent than EPA's RCRA regulations, and requirements can vary from state to state. Members of the regulated community are encouraged to contact their state agencies for the requirements that apply to them.

to efficiently commence. Note that this CAF is a "living document" and is subject to change in light of new information or data.

[The sections below should be included as appropriate, to address the CAF goals for the specific facility.]

I. **CAF Meeting Participants**

[Provide a list of meeting attendees, including name, title, employer, and contact information]

II. Site Characterization

[Provide a brief overview of the types of facility characteristics discussed in the CAF meeting, primarily focusing on the historical and current operational characteristics of the facility.]

a. Overview of facility/surrounding properties
[Provide a description of the uses of the facility and surrounding properties, including land uses.]

b. Environmental characteristics
[Briefly discuss key environmental characteristics of the facility and surrounding properties that are relevant to the RF/ and evaluation of exposure pathways. This may include facility hydrogeology, groundwater characteristics/usability, presence of streams and rivers, etc. EPA recommends these discussions be drafted with appropriate technical experts present (e.g., hydrogeologists).]

c. Areas of Concern (AOCs)/ Solid Waste Management Units (SWMUs) descriptions
{Provide a list the AOCs, SWMUs, and wastes handled at those locations. It is crucial that the list be consistent with the facility's Permit, Order, and/or RCRA Facility Assessment (RFA). Describe any discussions between the regulatory authority and facility on the SWMUs/AOCs needing or not needing additional investigation. This discussion may address, as appropriate, contamination beyond the facility boundary.]

d. Previous releases
[Provide a description of any previously-documented and suspected releases.]

e. RCRA regulatory history
{If applicable, summarize the facility's RCRA regulatory history (e.g., compliance orders, closures, etc.) that could affect the investigation's scope.]

f. Other permitted activities
{If applicable, summarize the discussion of the facility's non-RCRA permits (e.g., stormwater, NPDES, air) which could affect the RF/, and interpretation and evaluation of facility data (e.g., does the facility have a permitted storm water discharge upstream of aSWMU?).]

g. Access or physical constraints
[Summarize physical and/or operational characteristics of the facility that limit and/or prevent access to contamination. Describe how these physical and/or operational

characteristics may affect sampling and current exposures. The discussion should clearly indicate the exact locations of any access limitations.]

h. Other potential areas of investigation based on facility history
[Describe any facility investigations which may not necessarily be tied to the defined SWMUs/AOCs and releases discussed above (e.g., new areas of contamination).]

i. Other
{If necessary, provide a summary of the facility's characteristics and history that are not covered under the above headings (e.g., CERCLA or State cleanup actions).]

III. Conceptual Site Model

The following sections describe the *[facility name]* Conceptual Site Model (CSM). The CSM is based on information currently available for the facility and surrounding areas. This information may be updated based on new data or information that is generated during the investigation.

[It is envisioned that the regulatory authority and facility would complete a tabularized or text CSM or both. An example of a tabularized CSM is provided in Enclosure 1. Human health and ecological risk assessors should be consulted during the development of the CSM.j

a. Sources and extent of known contamination
{Provide a list of sources of contamination (e.g., tanks, landfill, AOCs etc.), their location, and extent of known impacts for all environmental media within and beyond the facility boundary. Consider specifying the types of contaminants/constituents of potential concern (COPCs) for all sources and contaminated media.]

b. Contamination transport/migration pathways
{For all sources of contamination, identify key migration pathways, such as soil leaching, vapor intrusion, groundwater discharge into surface water, and inter-aquifer exchange.]

c. Tentative exposure pathways
{Describe current and future exposure pathways for all known and/or suspected contaminated media. Note that because the exposure pathways evaluation is being performed prior to the completion of the investigation, the exposure pathways would typically be considered tentative (and the CAF drafted accordingly) until the investigation is completed and the complete pathways can be confirmed. The tentative exposure pathways may need to be broken out according to individual or groups of SWMUs/AOCs or other defined exposure units. Consider having the exposure pathway evaluation and identification of units be performed by or in consultation with human health and ecological risk assessors.]

d. Exposure receptors
{Summarize the current and future human and ecological receptors within and beyond the facility boundary. This may include the receptor population(s) (residential, commercial, recreational, etc.) and receptor age(s) (child/adolescent/adult). Provide a description of current operations and current land uses for the facility and neighboring properties, as well as the reasonably-expected future land use for the facility and surrounding properties.]

i. Exposure point and exposure medium
{Document the point of potential human and ecological contact with the contaminated medium (e.g., soils, water, or air). The contaminated medium (exposure medium) may include the source itself or other media impacted by releases from the source.]

ii. Exposure routes
[Document the routes of exposure (e.g., ingestion, inhalation, or dermal contact) at each exposure point.]

e. Discussion of unknowns and uncertainty
{Discuss data gaps and how these gaps will be addressed (e.g., sampling).]

IV. RFI Workplan

[Discuss the key elements that the parties anticipate including in the RF/ workplan.]

a. Scope and objectives of the investigation
[Summarize the scope and key objectives of the RF/. This may also include a discussion of the performance objectives of the RCRA process (e.g., Corrective Action Objectives).]

b. Screening levels
{Specify the source of the risk-based screening levels that should be used for each environmental media (e.g., use of EPA's residential soil RSLs for screening soils and sediments beyond thefacility boundary).]

c. Adaptive approach
{During the CAF process, the administrative authority and facility may identify flexible and adaptable sampling approaches (e.g., iterative sampling) that could improve the efficiency and timeliness of the investigation by reducing the number of field mobilizations and/or exchanges between the parties during phases of the investigation. This section should summarize these approaches.]

d. Quality Assurance Project Plan (QAPP)
[Describe the key elements and special conditions of the QAPP}

e. Data quality objectives
[Summarize the data quality objectives for the investigation.]

i. Standard Operating Procedures
[Summarize discussion pertaining to Standard Operating Procedures used to conduct sample and data analysis.]

f. Modeling
[Summarize how modeling will be used to evaluate thefacility, such as appropriate use and expectations for initial and ongoing calibration and validation.]

g. Sampling approach/design

[Provide a summary of sampling methods and approaches to be implemented during the investigation, which may include, but is not limited to, soil sampling depth intervals, well locations, and sampling schemes (e.g., random).]

h. Sample analysis

{Provide a summary of the COPCs to be analyzed in each environmental medium and/or SWMU/AOC, as well as required detection limits (e.g., below 10-6 cancer screening levels), etc.]

i. Use of historical data

[Provide a brief summary of how historical data will be used to scope the investigation (e.g., whether data is adequate and reliable enough that a particular location need not be resampled). Also, consider discussing the use of historical data in risk assessments.]

j. Background

{Provide a brief summary on how background will be derived, evaluated, and used in risk assessments. This will likely include the locations and amount of background sampling to be performed.]

k. Health and Safety Plan

{Provide a brief discussion on any special circumstances pertaining to the facility's Health and Safety Plan of which both parties should be aware, including those that could affect the investigation, such as overhead power Jines, railroads, and high-hazard processes within an operating facility.]

l. Community involvement and environmental justice

{Summarize any discussion pertaining to community involvement and environmental justice issues/concerns that could influence the project.]

m. Workplan implementation schedule

[Provide a schedule of the RF/ activities, including a schedule of sampling activities, notifications, and interim deliverables (if necessary). It is crucial for the scheduling to be consistent with the facility's Permit or Order requirements.]

V. Interim Measures

{This section should briefly summarize any proposed or planned interim measures (/Ms) at the facility and any discussion on /Ms between the regulatory authority and owner/operator. This could include a description of the IM, its scope and objectives, and schedule for its implementation.]

a. Immediate IMs

[Identify and summarize the implementation of immediate /Ms. Consider including a discussion on the use of immediate /Ms that may be part of the overall facility remedy.]

b. Future potential IMs

[Summarize any discussion on SWMUs/AOCs where /Ms may be considered in the future, but immediate action is not necessary (e.g., a discussion on the use of /Ms to facilitate cleanup in advance of a final remedy).}

VI. Goals and Expectations

Prior to and during the CAF meeting, the *[regulatory authority]* and facility identified the following goals and expectations. Each goal and expectation is summarized below.

[Goals and expectations can be thought of as key project management or risk management issues requiring resolution specific to the RF/ and ultimately Corrective Action at the facility. The examples below may or may not be relevant for a specific facility. It may be useful to identify as goals and expectations in this section, key elements of other discussions in the CAF, such as elements of the site characterization, CMS, and/or RF/ workplan discussions identified in Sections II, Ill, and IV above, respectively.]

- Land use/reasonably-expected future land use related to characterization and remediation
- Existing background conditions and consideration in RFI process
- Use of historical data
- Use of presumptive remedies
- Expected groundwater use/process for addressing groundwater contamination including state, federal, and local requirements
- Coordination with other programs
- Potential facility process/land use/owner changes
- Toxicity/criteria changes
- Expected risk range issues (Target Cancer Risk and Non-Cancer Hazard Index)
- Expected process for addressing remediation
    - Unknown sources (if source cannot be found)
    - Source removal vs. source control (containment)
    - Use of risk based or pathway elimination approach
    - Potential for determination of technical impracticability
    - Use of institutional and engineering controls

VII. Other Potential Issues

a. Format for data/information exchange/submissions
[Describe the format of electronic data and reports to be submitted to the administrative authority. This may also include the methods and ground rules for routine correspondence and updates, such as communications between the administrative and facility's technical experts. It is crucial to be consistent with the facility's Permit or Order requirements.]

b. Interim submissions approaches
[A CAF need not address every technical or administrative detail of the RF/, such as modeling parameters or exposure factors. However, should the regulatory authority and facility identify approaches or submissions on technical or administrative issues that can improve project efficiency, the parties may wish to document these for future reference.

For example, the parties may identify a preferred procedure for information exchange, that is consistent with permit or order requirements.]

c. Schedule of deliverables **(e.g.,** RFI workplan)
[This section should summarize the schedules of any action items generated as a result of CAF meeting. Additionally, this section should describe when and how often the CAF will be revisited for updates and/or revisions.]

d. Elements of RFI
[List the elements, and associated materials, necessary for a complete RF/.]

e. Risk Assessment
[Summarize the scope of the Risk Assessment, such as whether it is a baseline risk assessment or streamlined risk evaluation. This may also include any discussion on interim submissions, such as a Risk Assessment workplan.]

Enclosure I

{Depending on the size and complexity of the facility, a table may need to be completed for individual or groups of SWMUs/AOCs or other defined exposure unit.]

Table A.1 Initial Conceptual Site Model*

Contaminant Source/ Contaminated Media[2]	Transport/ Migration Pathway (e.g., leaching to groundwater, volatilization, plant uptake, fugitive dust emissions, runoff)	Scenario Timeframe (current or future)	Exposure Medium (contaminated media)	Exposure Point (the point of contact with exposure medium)	Within or Beyond the Facility Boundary	Receptor Population (e.g., resident, commercial, industrial)	Receptor Age (child/adult)	Exposure Route (ingestion, inhalation, dermal contact)

•Guidance on how to complete this table is canbe found in the EPA Risk Assessment Guidance for Superfund (RAGS) including, but not limited to RAGS Parts A and D.

2 The contaminant source/contaminated media can include the sources of releases (e.g., tanks, spills, landfills, lagoons, etc.), as well as the media directly impacted by those releases.