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I. INTRODUCTION

WHEREAS, the State of Ohio by its Attorney General, at the written request of the Director of the Ohio Environmental Protection Agency, has filed its Complaint in the above-captioned case against Shieldalloy Metallurgical Corporation and Cyprus Foote Mineral Company ("Defendants") pursuant to Ohio Revised Code ("R.C.") Chapters 3734 and 6111, the regulations promulgated thereunder and other laws;

WHEREAS, the State of Ohio's Complaint seeks, among other things, remedies to investigate and abate alleged pollution and contamination at the Site, owned by Shieldalloy Metallurgical Corporation on S.R. 209, Guernsey County, Ohio;

WHEREAS, Shieldalloy Metallurgical Corporation, which is the current owner of the "Site," and Cyprus Foote Mineral Company, which is the successor to the former owner of the Site, have agreed to enter into this Consent Order for Preliminary Injunction ("COPI") with the State of Ohio;

WHEREAS, this COPI provides for the Defendants to complete a Remedial Investigation ("RI") and Feasibility Study ("FS") (collectively "RI/FS") for the Site;

WHEREAS, the objectives of the RI/FS are: (1) to complete a remedial investigation of the Site to determine the nature and extent of alleged contamination at the Site; and (2) to develop and evaluate an appropriate response to the alleged contamination employing sound scientific, engineering and construction practices;

WHEREAS, Defendants do not admit the allegations set forth in the Complaint and deny any violation of any federal or state statute, regulation or common law;

WHEREAS, on September 2, 1993, Shieldalloy Metallurgical Corp. ("Shieldalloy") filed a voluntary petition for relief under chapter 11, title 11, United States Code (the "Bankruptcy Code") with the United States Bankruptcy Court, Southern District of New York, In re: Shieldalloy Metallurgical Corp., Civ. No. 93 B 44469 (JLG);

WHEREAS, Shieldalloy believes that expeditious resolution of the State of Ohio's claims against Shieldalloy in this case and in the bankruptcy case will facilitate reorganization in its bankruptcy case;

WHEREAS, the State of Ohio and Defendants contemplate that following the completion of the RI/FS required by this COPI, and selection of a remedy by the Ohio EPA, they will enter into negotiations aimed at reaching an agreement concerning the implementation of the remedial action, resolution of the State of Ohio's claims in Shieldalloy's bankruptcy case, and other matters;

WHEREAS, the Defendants have a goal of completing the RI/FS under this COPI by September 30, 1995, and obtaining the selection of a remedy under this COPI pursuant to applicable requirements of law by December 31, 1995;

WHEREAS, the State of Ohio acknowledges Defendants' schedule goal and the Ohio Environmental Protection Agency ("OEPA") agrees to use its best efforts to review and comment on Defendants' RI/FS documents as promptly as possible;

WHEREAS, the Parties have agreed to submit to the Court joint status reports on progress made in achieving Defendants' goal;

WHEREAS, Ohio EPA has consulted with and anticipates continued consultation with the Nuclear Regulatory Commission, which is developing an Environmental Impact Statement for the Site;

WHEREAS, Ohio EPA has consulted with the United States Environmental Protection Agency concerning this Site and anticipates continued consultation with that Agency concerning the work contemplated under this COPI;

NOW, THEREFORE, without adjudication or admission of any issue of fact or law, and upon consent of the Parties hereto, it is hereby ORDERED, ADJUDGED AND DECREED as follows:

II. JURISDICTION

1. The Parties agree that the Court has jurisdiction over them and the subject matter of the Complaint and that venue is proper in this Court for the purposes and duration of this COPI.

III. PARTIES BOUND

2. The provisions of this COPI shall apply to and be binding upon the Defendants, their successors in interest and assigns, and others to the extent provided by Civil Rule 65(D); provided, however, the Defendants' officers, employees, agents or employees of any contractor or consultant engaged by

Defendants to carry out the Work to be performed pursuant to this COPI shall only be responsible to take action under this COPI in their corporate capacity, and shall not be personally responsible for the obligations assumed under this COPI.

3. No change in corporate ownership or status of Defendants, including but not limited to any transfer of assets of real or personal property, shall in any way alter Defendants' obligations under this COPI. Defendants shall provide a copy of this COPI to any subsequent owner(s) or successor(s) prior to the transfer of the company's ownership rights.

4. Defendants shall provide a copy of this COPI to each general contractor, subcontractor, laboratory, consultant, agent, employee, and person hired by or who will provide work or services on behalf of Defendants related to this COPI.

IV. DEFINITIONS

5. As used in this COPI, the following terms, words, and abbreviations shall have the meanings provided below:

- A. "COPI" shall mean Consent Order for Preliminary Injunction.
- B. "CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9601, et seq., as amended.
- C. "Contractor" shall mean a qualified contractor retained by the Defendants pursuant to this COPI, and any subcontractor, representative, agent, employee, or designee thereof.
- D. "Days" shall mean calendar days, including weekends and holidays.

- E. "Decision Document" shall mean the document issued by Ohio EPA setting forth the remedial action requirements for the Site.
- F. "Defendants" shall mean the Shieldalloy Metallurgical Corporation and Cyprus Foote Mineral Company, individually and collectively.
- G. "Director" shall mean the Director of the Ohio Environmental Protection Agency and the Director's duly authorized representatives.
- H. "Document" shall mean any record, report, photograph, videotape, correspondence, computer disk or tape, recorded or retrievable information of any kind, including raw data, narrative reports, and any and all documentary evidence, relating to the treatment, storage, or disposal, and concerning the investigation and remediation of, hazardous wastes, solid wastes, industrial wastes, other wastes, hazardous substances, hazardous waste constituents and radioactive wastes at the Site. "Document" shall be construed broadly to promote the effective sharing between Defendant(s) and Ohio EPA of information and views concerning the work to be performed pursuant to this COPI.
- I. "Feasibility Study" ("FS") shall mean the development, evaluation, and analysis of remedial alternatives in accordance with state and federal environmental laws and with this COPI.
- J. "NCP" shall mean the National Oil and Hazardous Substances Pollution Contingency Plan, referred to in CERCLA as the National Contingency Plan, and codified at 40 C.F.R. Part 300, as amended.
- K. "OEPA" or "Ohio EPA" shall mean the Ohio Environmental Protection Agency or its Director and his/her designated representatives as the context or other law or regulation may require.
- L. "Oversight Costs" shall mean all direct and indirect costs of oversight incurred by Ohio in verifying the work to be performed by Defendants pursuant to this COPI, or otherwise implementing or enforcing this COPI, including but not limited to the costs of payroll, fringe, contractors, travel, oversight, samples, laboratory analysis, data management, safety and

general equipment, supplies, general maintenance, reviewing or developing work plans, reports, or other items pursuant to this COPI.

- M. "Paragraph" shall mean a portion of the COPI identified by an arabic numeral or an upper case letter.
- N. "Parties" shall mean the State of Ohio and the Defendants.
- O. "Preferred Plan" shall mean the document prepared by Ohio EPA that presents to the public Ohio EPA's preferred alternative for the clean up/pollution abatement of the Site. The Preferred Plan includes a brief summary of the alternatives evaluated in the detailed analysis of the Feasibility Study, and identification of key factors that lead to the identification of the preferred alternative.
- P. "Remedial Investigation/Feasibility Study" ("RI/FS") shall mean the Remedial Investigation and Feasibility Study together.
- Q. "Remedial Investigation ("RI") shall mean the investigation conducted in accordance with state environmental laws and this COPI by Defendants to determine the nature and extent of contamination at the Site, and includes the gathering of all necessary data to support the Feasibility Study.
- R. "Response Costs" shall mean all costs incurred by Ohio pursuant to this COPI, verifying the Work, doing the Work or otherwise implementing or enforcing this COPI, including, but not limited to, payroll costs, contractor costs, travel costs, direct costs, indirect costs, legal and enforcement related costs, oversight costs, laboratory costs, the costs of reviewing or developing plans, reports, and other items.
- S. "Section" shall mean a portion of this COPI identified by a roman numeral.
- T. "Site" shall mean the property currently owned by Shieldalloy Metallurgical Corporation on S.R. 209, Guernsey County, Ohio as well as any area adjacent to the Site, where the treatment, storage, and/or disposal of hazardous wastes, hazardous waste constituents, hazardous substances, solid wastes, industrial wastes, radioactive waste and/or other wastes have occurred, and/or the discharge of hazardous waste, hazardous waste

constituents, hazardous substances, solid waste, industrial waste, radioactive waste and/or other wastes into waters of the State have occurred, as well as any area inside or outside of the property where such hazardous waste, hazardous waste constituents, hazardous substances, solid waste, industrial wastes, radioactive waste and/or other wastes have migrated.

- U. "Statement of Work" ("SOW") shall mean the statement of work for the implementation of the RI/FS as set forth in Appendix A to this COPI. The Statement of Work is not specific to this Site, and shall be used as an outline in developing workplans specific to this Site.
- V. "Waste Material" shall mean (1) any "hazardous waste" as that term is defined under R.C. Section 3734.01(J); (2) any "solid waste" as that term is defined under R.C. Section 3734.01(E); (3) any "industrial waste" as that term is defined under R.C. Section 6111.01(C); (4) any "other wastes" as that term is defined under R.C. Section 6111.01(D); (5) any "hazardous substances" as that term is defined under Section 101(14) of CERCLA, 42 U.S.C. §9601(14); (6) any "hazardous waste constituent" as that term is defined under Rule 3745-50-10(A)(43) of the Ohio Administrative Code ("OAC"); and, (7) any radioactive waste, including but not limited to waste containing "source material," "special nuclear material" or "by product material" as those terms are defined under the Atomic Energy Act, 42 U.S.C. 2014, et seq.
- W. "Work" shall mean all activities Defendants are required to perform under this COPI.
- X. "Workplans" shall mean those documents which are to be submitted to Ohio EPA by Defendants pursuant to this COPI detailing the requirements for characterizing the Site and for support of the RI/FS, and Site access restrictions. Each required workplan shall include a detailed description of the proposed investigations and/or implementation activities; a time schedule for conducting those activities; and personnel and equipment needs. For each workplan that includes sampling as an element, the Workplan shall include a sampling plan together with a rationale for the sampling activities, locations, quantity and frequency of sampling, constituents for analysis, and quality control/quality assurance procedures.

6. Except as otherwise defined above, the terms used in this COPI shall have the same meaning as used in Ohio Revised Code Chapters 3734 and 6111 and the regulations promulgated thereunder.

V. DESIGNATION OF SITE COORDINATORS

7. The Defendants shall designate a site coordinator and an alternate site coordinator to oversee and implement all work required by this COPI and to coordinate with the Ohio EPA site coordinator.

8. Within ten (10) days of the entry date of this COPI, Defendants shall notify Ohio EPA in writing of the name, address, and telephone number of their designated site coordinator and alternate site coordinator. If a designated site coordinator or alternate site coordinator is changed, the identity of the successor will be given to the other Party at least five (5) days before the changes occur, unless impracticable, but in no event later than the actual day the change is made.

9. To the maximum extent practicable, except as specifically provided in this COPI, communications between the Parties regarding the implementation of this COPI shall be made between the Defendants' site coordinators and the Ohio EPA site coordinator. Defendants' site coordinator, or alternate, shall be available, including for communication with Ohio EPA, for the duration of this COPI. Each Party's site coordinator shall be responsible for assuring that all communications from the other Party are appropriately disseminated and processed. Defendants' site coordinator or alternate shall be present on the Site or on call during all hours of

work at the Site. The absence of the Ohio EPA site coordinator shall not be cause for the stoppage of work unless otherwise provided by Ohio EPA in writing.

10. Without limitation of any authority conferred by law on Ohio EPA, the authority of the Ohio EPA site coordinator includes, but is not limited to:

- A. Taking samples and directing the type, quantity and location of samples to be taken by Defendants pursuant to an approved workplan;
- B. Observing, taking photographs, or otherwise recording information related to the implementation of this COPI, including the use of any mechanical or photographic device;
- C. Directing that work stop whenever the site coordinator for Ohio EPA determines that the activities at the Site may create or exacerbate a substantial threat to public health or safety, or threaten to cause or contribute to air or water pollution or soil contamination;
- D. Conducting investigations and tests related to the implementation of this COPI;
- E. Inspecting and copying records, operating logs, contracts and/or other documents related to the implementation of this COPI subject to Section XIII. ACCESS TO INFORMATION AND RECORDS RETENTION;
- F. Assessing Defendants' compliance with this COPI.
- G. Conducting inspections at any time of all areas of the Site (see Section VI. SITE ACCESS RESTRICTIONS herein).
- H. Directing actions taken at the Site pursuant to this COPI; and,
- I. Reviewing and approving or disapproving all workplans, reports, studies and other documents that Defendants are required to submit pursuant to this COPI.

VI. SITE ACCESS RESTRICTIONS

11. Within thirty (30) days of the entry date of this COPI, Defendants shall submit to Ohio EPA for review and approval pursuant to Section IX. REVIEW OF SUBMITTALS a plan for the control of public access to the Site. The Site Access Restrictions Workplan shall specify fencing, gates, and/or other means of restricting public access.

12. Defendants shall implement the Site Access Restrictions Workplan as approved by the Ohio EPA. Defendants shall submit all plans, reports, or other deliverables required under the approved Site Access Restrictions Workplan in accordance with the approved schedule, for review and approval pursuant to Section IX. REVIEW OF SUBMITTALS of this COPI.

VII. REMEDIAL INVESTIGATION/FEASIBILITY STUDY

13. Defendants shall implement a Remedial Investigation/Feasibility Study pursuant to the terms of this COPI. All Work performed pursuant to this COPI shall be under the direction and supervision of a contractor with expertise in hazardous waste site investigation. Defendants shall notify Ohio EPA in writing of the name of the supervising contractor and any subcontractor to be used in carrying out the terms of this COPI. The RI/FS Workplan shall be developed and will be reviewed for consistency with the National Contingency Plan 40 C.F.R. Part 300, as amended ("NCP"), and the most current version of applicable EPA guidance documents.

A. Within seven (7) days of the entry date of this COPI, Defendants shall meet with the Ohio EPA to discuss the requirements of the RI/FS Workplan, unless otherwise mutually agreed upon by the Parties.

B. Within thirty (30) days of the entry date of this COPI, Defendants shall submit to Ohio EPA for review and approval pursuant to Section IX. REVIEW OF SUBMITTALS a Workplan for the implementation of the Remedial Investigation and Feasibility Study for the Site ("Remedial Investigation and Feasibility Study Workplan or "RI/FS Workplan"). The RI/FS Workplan shall provide for the determination of the nature and extent of the contamination of the Site caused by the storage, treatment, disposal, discharge, or release of Waste Material, and for the development and evaluation of alternatives for abating and remediating contamination at the Site.

C. The RI/FS Workplan shall be developed in conformance with this COPI, the RI/FS SOW, the guidance documents listed in Appendices A and B, attached hereto and incorporated fully herein, the NCP and R.C. Chapters 3734 and 6111. If Ohio EPA determines that any additional or revised guidance documents affect the work to be performed in implementing the RI/FS, Ohio EPA will notify Defendants, and Defendants shall modify the RI/FS Workplan and other affected documents accordingly.

D. Upon approval of the RI/FS Workplan by Ohio EPA, Defendants shall promptly implement the Work detailed therein in accordance with the schedule contained in the approved RI/FS Workplan. Defendants shall submit all

plans, reports, or other deliverables required under the approved RI/FS Workplan, in accordance with the approved schedule, for review and approval pursuant to Section IX. REVIEW OF SUBMITTALS of this COPI.

VIII. ADDITIONAL WORK

14. Ohio EPA or Defendants may determine that in addition to the tasks defined in the approved RI/FS Workplan and other requirements of this COPI, additional work may be necessary to accomplish the objectives of this COPI.

15. In the event that Ohio EPA determines that additional Work is necessary, Ohio EPA will orally notify Defendants and submit a written request to them explaining the need for and detailing the nature of the additional Work. Within ten (10) days of receipt of written notice from Ohio EPA that additional Work is necessary, Defendants shall prepare and submit a Workplan for Ohio EPA's review and approval for the performance of the additional Work. ("Additional Work Workplan"). Defendants shall develop the Additional Work Workplan in conformance with the RI/FS SOW, and the list of guidance documents. Upon approval of the Workplan by Ohio EPA pursuant to Section IX. REVIEW OF SUBMITTALS, Defendants shall implement the Workplan for additional Work in accordance with the schedules contained therein.

16. In the event that Defendants determine that additional Work is necessary to achieve the purpose of this COPI, Defendants shall submit a written request for approval to Ohio EPA explaining the need for and detailing the nature of

the additional Work prior to performing the additional Work. Upon agreement by Ohio EPA of Defendants' request, Defendants shall develop an Additional Work Workplan in conformance with the RI/FS SOW and the list of guidance documents. Upon approval of the Workplan by Ohio EPA pursuant to Section IX. REVIEW OF SUBMITTALS, Defendants shall implement the Workplan for additional Work in accordance with the schedules contained therein.

17. In the event that additional Work is necessary for any task described in this COPI, the deadline for completing such task(s) shall be extended by the amount of time required to perform the additional Work required, including the period for time required to plan and/or obtain approval from the Ohio EPA for the performance of such Work.

IX. REVIEW OF SUBMITTALS

18. Ohio EPA agrees to review any Workplan, report, study, or other document that Defendants are required under this COPI to submit to Ohio EPA. Ohio EPA may review such Workplan report, study or other document in accordance with this COPI, applicable policies, guidelines and appropriate state and federal laws. Upon review, Ohio EPA may in writing:

- A. Approve the submission in whole or in part;
- B. Approve the submission upon specified conditions;
- C. Direct Defendants to modify the submission;
- D. Disapprove the submission in whole or in part, notifying Defendants of the deficiencies; or

E. Any combination of the above.

19. In the event of approval or approval upon condition by the Ohio EPA, Defendants shall proceed to take any action required by the submission as approved or conditionally approved by Ohio EPA. Defendants reserve the right to invoke the Dispute Resolution provisions of this COPI with respect to any original or revised submission which Ohio EPA disapproves, directs Defendants to modify, or approves upon condition, whether in whole or in part.

20. In the event that Ohio EPA initially disapproves a submission, in whole or in part, and notifies Defendants of the deficiencies, Defendants shall within fourteen (14) days, or such longer period of time as specified by the Ohio EPA in writing, correct the deficiencies and resubmit to Ohio EPA for approval a revised submission. By agreement of the site coordinators, the Defendants may only resubmit such portions pertaining to the notice of deficiency. The revised submission shall incorporate all of the changes, additions, and/or deletions specified by Ohio EPA in its notice of deficiency. Any Work done by Defendants prior to Ohio EPA's approval of a submission of a corresponding deliverable is subject to being revised.

21. In the event that Ohio EPA disapproves a revised submission, in whole or in part, Ohio EPA may again require Defendants to correct the deficiencies and incorporate all changes, additions, and/or deletions within fourteen (14) days, or such period of time as specified by Ohio EPA in writing. In the alternative, Ohio EPA retains the right to perform any or all of the remediation including but not

limited to conducting a complete or partial RI/FS.

22. All Workplans, reports, or other items required to be submitted to Ohio EPA under this COPI shall, upon approval by Ohio EPA, be deemed to be incorporated in and made an enforceable part of this COPI and, upon such approval, shall be deemed not inconsistent with the NCP in the opinion of the Ohio EPA. In the event that Ohio EPA approves a portion of a Workplan, report, or other item, the approved portion shall be deemed to be incorporated in and made an enforceable part of this COPI.

23. The Defendants' and Ohio EPA's site coordinators may jointly agree to minor field changes to be made by the Defendants to any document, workplan, report, or study approved by the Ohio EPA. Defendants shall notify Ohio EPA's site coordinator of the nature of and reasons for the desired modification. Within five (5) days of agreement by Ohio EPA's and the Defendants' site coordinators, the Defendants' site coordinator shall submit written notification describing the agreed minor field changes to Ohio EPA's site coordinator for review and approval. Ohio EPA agrees to document such an agreement by letter to the Defendants' site coordinator setting forth the nature and extent of the minor field changes to be made.

24. In the event of disapproval of any second submittal under Section IX, REVIEW OF SUBMITTALS, or any noncompliance with the terms of or deadlines under this COPI, Ohio EPA may conduct any of the Work required by this COPI, including a complete or partial Remedial Investigation and Feasibility Study.

X. SELECTION OF THE REMEDY

25. Ohio EPA agrees to select the remedy for the Site following the procedures of the Interim Final Policy titled "Preferred Plans and Decision Documents" attached hereto as Appendix C to this COPI and any applicable requirements of state and/or federal law and the NCP. As set forth in Appendix C, Ohio EPA will propose a remedy for the Site in the Preferred Plan. Ohio EPA agrees to provide a public comment period of thirty (30) days, at which time the Defendants may submit any comments they may have regarding the proposed remedy to Ohio EPA. Ohio EPA agrees to resubmit a Preferred Plan for an additional public comment period if significant changes are made to the proposed remedy after consideration of the comments received during the initial public comment period.

26. Upon completion of the public comment period described in this Section, Ohio EPA agrees to set forth a Decision Document that describes the remedial alternatives to be implemented at the Site.

27. During the first ten (10) days (unless extended by the Parties' mutual agreement) following issuance of the Decision Document, the Parties agree to meet and confer in good faith concerning the negotiation of a consent order that would include, but not necessarily be limited to, a permanent injunction implementing the Remedial Design and Remedial Action ("RD/RA") for the selected remedy.

28. The Dispute Resolution procedures set forth in Section XIX do not apply to the provisions of this Section. Nothing in this COPI shall be deemed to waive any right Defendants may have to challenge the Ohio EPA's selection of a

remedy, outside of the terms of the COPI.

XI. DOCUMENT SUBMITTAL

29. Unless otherwise provided in this COPI, all documents required to be submitted pursuant to this COPI shall be sent by certified mail return receipt requested, or equivalent, to the following addresses:

Ohio Environmental Protection Agency
1800 WaterMark Drive
P.O. Box 1049
Columbus, Ohio 43266-0149
ATTN: Manager, TPSS, DERR

and

Ohio Environmental Protection Agency
Southeast District Office
2195 Front Street
Logan , Ohio 43138
ATTN: Site Coordinator, Shieldalloy Metallurgical Corp.

30. All correspondence to be sent to Defendants will be directed to the following addresses:

C. Scott Eves
Shieldalloy Metallurgical Corporation
12 West Boulevard
P.O. Box 768
Newfield, NJ 08344

and

Patrick Lee
Cyprus Foote Mineral Company
9100 East Mineral Circle
Englewood, CO 80112

XII. DEFENDANTS' PROGRESS REPORTS

31. Unless otherwise directed by Ohio EPA, Defendants shall submit a written progress report to Ohio EPA by the tenth (10) day of every month. At a minimum, each progress report shall:

- A. Identify the Site and activity;
- B. Describe the status of the Work and actions taken towards achieving compliance with this COPI during the reporting period and activities which are scheduled for the next month;
- C. Describe difficulties encountered during the reporting period and actions taken to rectify any deficiencies;
- D. Describe activities planned for the next month;
- E. Identify changes in key personnel;
- F. List target and actual completion dates for each element of activity, including project completion; and,
- G. Provide an explanation for any deviation from any applicable schedules.

XIII. ACCESS TO INFORMATION AND RECORDS RETENTION

32. Defendants shall provide to Ohio EPA, upon written request, copies of all non-privileged documents and information within their possession or control, or that of their contractors or agents relating to events or conditions at the Site including, but not limited to, manifests, reports, correspondence, or other documents, photos, or audiovisual information related to the Work.

33. Unless Defendants show that a document or other information submitted to Ohio EPA pursuant to this COPI is confidential under the provisions of

OAC Rule 3745-50-30(A) or R.C. Section 6111.05(A), Ohio EPA may release the document or other information to the public without notice to Defendants.

34. If Defendants assert that certain documents or other information are privileged and/or confidential under state law, Defendants shall provide Ohio EPA with the following:

- A. The title of the document or information;
- B. The date of the document or information;
- C. The name and title of the author of the document or information;
- D. The name and title of each addressee and recipient;
- E. A general description of the contents of the document or information; and,
- F. The privilege or basis of confidentiality being asserted by Defendants and the basis for the assertion.

35. No claim of confidentiality or privilege shall be made with respect to any data, including but not limited to, all sampling, analytical, monitoring, or laboratory reports.

36. Defendants shall preserve for the duration of this COPI and for a minimum of ten (10) years after its termination, all documents and other information within its possession or control, or within the possession of its contractors or agents, which in any way relate to the Work, notwithstanding any document retention policies to the contrary. Defendants may preserve such documents by microfiche, or other electronic or photographic device. At the conclusion of this document retention period, Defendants shall notify Ohio EPA at

least sixty (60) days prior to the destruction of these documents or other information; and upon request, shall deliver such documents and other information to Ohio EPA, unless such documents are privileged.

XIV. SITE ACCESS

37. Ohio EPA, its employees and agents, shall have full access to the Site at all reasonable times without the need for a warrant, as may be necessary for the implementation of this COPI. Access under this COPI shall be for the limited purpose of carrying out the following activities and related activities of this COPI:

- A. Monitoring the Work;
- B. Conducting sampling;
- C. Inspecting and copying non-privileged records, operating logs, contracts, and/or other documents related to the implementation of this COPI; and,
- D. Verifying any data and/or other information submitted to Ohio EPA.

38. To the extent that the Site or any other property to which access is required for the implementation of this COPI is owned or controlled by persons other than Defendants, Defendants shall use their best efforts to secure from such persons access for Defendants and Ohio EPA as necessary to effectuate this COPI. Copies of all access agreements obtained by Defendants shall be submitted to Ohio EPA within ten (10) days of receipt by Defendants. If any access required to effectuate this COPI is not obtained within thirty (30) days of the entry date of this COPI, or within thirty (30) days of the date that Ohio EPA notifies Defendants in writing that

additional access beyond that previously secured is necessary, Defendants shall promptly notify Ohio EPA in writing of the steps Defendants have taken to obtain access. Ohio EPA may, as it deems appropriate, assist Defendants in obtaining access.

39. This Section shall not be construed to eliminate or restrict any State right to seek access to the Site which it may otherwise have under Federal or State law.

XV. DEED NOTICE

40. Within thirty (30) days of the entry date of this COPI, Shieldalloy Metallurgical Company shall record a notice on the deed to property which is part of the Site owned by Shieldalloy Metallurgical Company with the County Recorders Office for Guernsey County, Ohio. The notice shall describe this COPI and any monitoring or containment devices present on the Site.

XVI. REIMBURSEMENT OF COSTS

41. Defendants shall reimburse the State of Ohio for all response costs incurred by Ohio from January 18, 1995 and continuing through completion of the RI/FS, selection of remedy and other Work required or contemplated by this COPI. Ohio EPA will submit an itemized statement of Ohio's response costs to Defendants on an annual basis. Defendants shall pay Ohio EPA's response costs for the previous year, subject to the Dispute Resolution section, within thirty (30) days of receipt of such itemized statement. Failure to include response costs in an annual statement does not preclude submission of such costs in a subsequent annual statement.

Consistent with the Reservation of Rights section of this COPI, the State of Ohio explicitly reserves all rights concerning recovery of response costs incurred prior to January 18, 1995. With respect to this section on Reimbursement of Costs, the Dispute Resolution section of this COPI shall apply only to disputes over the accuracy of the State of Ohio's request for reimbursement.

42. Defendants shall remit payments to Ohio EPA pursuant to this Section as follows:

- A. Except as otherwise provided below, payment shall be made by certified check payable to "Treasurer, State of Ohio", and shall be forwarded to the Fiscal Officer, Ohio EPA, P.O. Box 1049, 1800 WaterMark Drive, Columbus, Ohio 43266-0149, ATTN: Edith Long (or successor).
- B. A copy of the transmittal shall be sent to the Fiscal Officer, DERR, Ohio EPA, P.O. Box 1049, 1800 WaterMark Drive, Columbus, Ohio 43266-0149, ATTN: Patricia Campbell (or successor).
- C. For costs incurred by the Ohio Attorney General's office, payment shall be made by certified check payable to "Treasurer, State of Ohio," and shall be delivered to Matthew A. Sanders, Administrative Assistant, or his successor, Environmental Enforcement Section, Ohio Attorney General's Office, 30 East Broad Street, 25th Floor, Columbus, Ohio 43215-3428.

XVII. INDEMNITY

43. Defendants agree to indemnify, save, and hold harmless the State of Ohio from any and all claims or causes of action arising from, or on account of, the State of Ohio's oversight of activities at this Site during the duration of this COPI, and/or acts or omissions of the Defendants, their officers, employees, receivers,

trustees, agents, or assigns, in carrying out any activities pursuant to this COPI. The State of Ohio shall not be considered a party to and shall not be held liable under any contract entered into by Defendants in carrying out the activities pursuant to this COPI. Consistent with federal, state and common law, nothing in this COPI shall render Defendants liable to indemnify the State of Ohio for any negligent or other tortious act or omission of the State of Ohio occurring outside of the State of Ohio's exercise of its discretionary functions. Discretionary Functions of the State of Ohio include, but are not limited to, the State of Ohio's review, approval or disapproval of Work performed pursuant to this COPI. Defendants and the State of Ohio will cooperate in the defense of any claim or action against the State of Ohio which may be the subject of this indemnity.

XVIII. RESOLUTION OF INCONSISTENCIES

44. Should Defendants identify any inconsistency between any of the laws, rules, regulations, or guidance documents or orders which they are required to follow pursuant to this COPI, Defendants shall notify Ohio EPA in writing of each such inconsistency and its effect on the work to be performed. Defendants shall recommend, with a supporting rationale justifying each recommendation, the requirement which they believe should be followed. Defendants shall implement the affected Workplan, report, or other deliverable based upon Ohio EPA's direction resolving any inconsistencies, except in the case of inconsistencies between federal and state requirements, in which case the Defendants may attempt to resolve the

dispute pursuant to the Dispute Resolution procedures set forth in Section XIX.

XIX. DISPUTE RESOLUTION

45. The site coordinators shall, whenever possible, operate by consensus. In the event that Defendants have a good faith dispute involving the implementation of this COPI, the site coordinators shall have seven (7) days from the date the dispute arises to negotiate in good faith in an attempt to resolve the dispute. This seven (7) day period may be extended by mutual agreement of the Parties.

46. In the event the site coordinators are unable to reach consensus on the dispute, each site coordinator shall reduce his/her position to writing within seven (7) days of the end of the good faith negotiation period described in the preceding paragraph. Those written positions shall be immediately exchanged by the site coordinators. Following the exchange of written positions, the site coordinators shall have an additional seven (7) days to resolve the dispute.

47. If Ohio EPA does not concur with the position of the Defendants, Ohio EPA site coordinator will notify Defendants in writing. Upon receipt of such written notice, Defendants shall have seven (7) days to forward a request for resolution of the dispute, along with a written statement of the dispute, to the Chief of the Division of Emergency Response and Remediation (DERR) at Ohio EPA. The statement of dispute shall be limited to a concise presentation of the Defendants' position on the dispute. The Chief of DERR, or his/her designee, will resolve the

dispute based upon and consistent with this COPI, applicable policies and guidance documents, and appropriate state and federal laws, and notify Defendants of the resolution within fourteen (14) days of the Defendants' request for dispute resolution.

48. Any Defendant may petition the Court within 14 days of receipt of the Chief of DERR's written notification of dispute resolution as described in the preceding paragraph. The Court shall affirm the Chief of DERR's resolution of the dispute unless the petitioning Defendant demonstrates that the resolution was unlawful or unreasonable.

49. The pendency of dispute resolution set forth in this Section shall not affect the time period for completion of the Work to be performed under this COPI, unless otherwise agreed by the Parties.

50. Within thirty (30) days of resolution of any dispute, Defendants shall incorporate the resolution and final determination into the appropriate Workplan, schedule or procedures and proceed to implement this COPI according to the amended Workplans, schedule or procedures as approved.

51. Unless otherwise expressly provided for in this COPI, the Dispute Resolution procedures of this Section shall be the exclusive mechanism for Defendants to resolve disputes arising under or with respect to this COPI.

52. In any dispute subject to dispute resolution, the Parties may, by written agreement, modify the procedures in the first three paragraphs of this Section.

XX. RESERVATION OF RIGHTS

53. The State of Ohio reserves the right to seek further relief from this or any other Court, including, but not limited to, further preliminary and/or permanent injunctive relief, civil penalties and cost recovery for work beyond this COPI. This reservation explicitly includes the State of Ohio's right to pursue an order implementing a remedy for contamination at the Site, including but not limited to a Remedial Design ("RD") and Remedial Action ("RA") order (collectively "RD/RA" Order), and to seek recovery of costs for such work. This reservation also explicitly includes the State of Ohio's right to seek relief for claims for damages to natural resources. This COPI in no way waives any defenses which Defendants may have as to such further relief.

54. The State of Ohio expressly reserves, and this COPI shall be without prejudice to, any civil or criminal claims, demands, rights, or causes of action, judicial or administrative, the State of Ohio may have or which may in the future accrue against Defendants or others, regardless of whether such claim, demand, right or cause of action was asserted in the Complaint. This COPI in no way waives any defenses which Defendants may have as to such claims, demands, rights or causes of action. All Workplans, report or other items required to be submitted to Ohio EPA under this COPI, and approved by Ohio EPA, are deemed not inconsistent with the NCP in the opinion of Ohio EPA.

55. Nothing herein shall limit the authority of the State of Ohio to undertake any action against any entity, including Defendants, to eliminate or

control conditions which may present a threat to the public health, safety, welfare or environment, and to seek cost reimbursement for any such action. This COPI in no way waives any defenses which Defendants may have as to such claims, demands, rights or causes of action.

56. Nothing herein shall be construed to relieve Defendants of their obligation to comply with applicable federal, state or local statutes, regulations or ordinances, including but not limited to permit requirements.

57. Entering into this COPI, the COPI itself, or the taking of any action in accordance with it do not constitute an admission by Defendants of any factual or legal matters or opinions set forth herein. Defendants do not admit liability under Ohio law or any other applicable law, rule or regulation for any purpose or admit any issues of fact or law, any wrongdoing, or any responsibility with regard to Waste Material, releases or threatened releases of hazardous substances at or from the Site, or with regard to any contamination at or from the Site. Defendants do not admit and reserve their rights to contest or legally challenge jurisdiction and venue with regard to activities not required or contemplated by this COPI. Nothing herein absolves Defendants from the duty to comply with this COPI.

58. Defendants reserve all rights that they may have against each other under all federal, state and local laws, except as may be set forth in a separate agreement or agreements.

XXI. APPENDICES

59. All appendices to this COPI are incorporated by reference into and are an enforceable part of this COPI. The following appendices are attached to this COPI at the time of signing by the Parties:

- A. "Appendix A" is the RI/FS Statement of Work;
- B. "Appendix B" is the List of U.S. EPA and Ohio EPA Guidance Documents; and,
- C. "Appendix C" is the Ohio EPA's policy "Preferred Plans and Decision Documents";

XXII. MODIFICATION

60. No modification shall be made to this COPI without the written agreement of the Parties and the Court.

XXIII. PARTIES' STATUS REPORTS

61. On the sixtieth day following the entry of this COPI, and on each succeeding period of sixty days until the work contemplated by this COPI is completed, the Parties shall submit to the Court a joint status report detailing the progress made in achieving the Defendants' goal of completing the RI/FS by September 30, 1995 and obtaining a selection of remedy by December 31, 1995 in compliance with applicable requirements. A copy of each status report may also be furnished to the Bankruptcy Court by Shieldalloy Metallurgical Corporation.

XXIV. STAY OF LITIGATION

62. Other than for the purpose of enforcing compliance with this COPI, the Parties agree that all further proceedings in this case, including but not limited to discovery, shall be stayed pending further order of this Court. The Parties reserve the right to move the Court to lift such stay. For purposes of Civil Rule 12, the State of Ohio's Complaint shall be deemed to be filed on the date the stay is lifted.

XXV. RETENTION OF JURISDICTION

63. This Court shall retain jurisdiction of this matter for the purpose of overseeing the Parties' compliance with this COPI.

XXVI. TERMINATION

64. This COPI shall terminate upon Order of this Court upon Joint Motion of the Parties that all activities required or contemplated under this COPI, including Additional Work, have been completed and all response costs owed under this COPI have been paid. Upon the Court's entry of an agreed termination of this COPI consistent with this Section, the State of Ohio covenants not to sue the Defendants for the approved Work performed pursuant to this COPI. Nothing herein shall preclude Ohio EPA from seeking further investigatory work in connection with implementation of a remedy or to address an imminent threat of harm to the public health or the environment. This section, and the sections of this COPI on Reservation of Rights, Indemnity, and Access to Information, shall survive this

Termination provision.

XXVII. COURT COSTS

65. Defendants shall pay the court costs of this action.

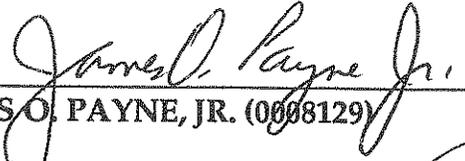
XXVIII. SIGNATORIES

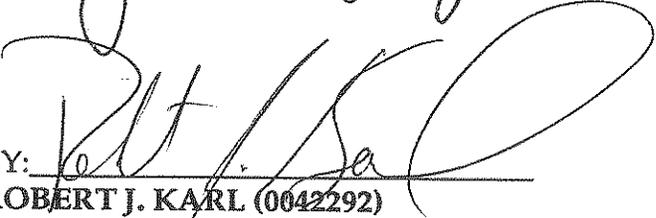
66. Each undersigned representative of each respective Defendant understands the terms and conditions of this COPI and certifies that he or she is fully authorized to enter into the terms and conditions of this COPI and to execute and legally bind the respective Defendants to this document.

EFFECTIVE UPON AND ENTERED THIS ___ DAY OF _____, 1995.

JUDGE, COURT OF COMMON PLEAS

BETTY D. MONTGOMERY
ATTORNEY GENERAL OF OHIO

BY: 
JAMES O. PAYNE, JR. (0008129)

BY: 
ROBERT J. KARL (0042292)

Assistant Attorneys General
Environmental Enforcement Section
30 East Broad Street - 25th Floor
Columbus, Ohio 43266-0410
Telephone: (614) 644-2766

Attorneys for Plaintiff
State of Ohio

SHIELDALLOY METALLURGICAL CORP.

BY:  _____

C. SCOTT EVES

Vice President/Environmental Services

SHIELDALLOY METALLURGICAL CORP.

12 West Boulevard

Newfield, NJ 08344

BY: David R. Berz / APS

DAVID BERZ

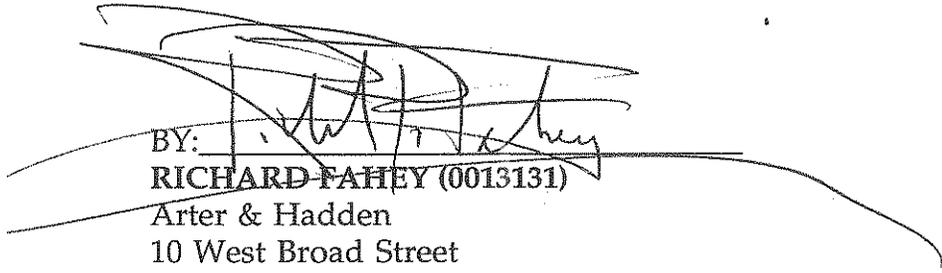
Weil, Gotshal & Manges

1615 L Street, N.W.

Washington, D.C. 20036-5610

(202) 682-7058

Attorney for Defendant Shieldalloy
Metallurgical Corporation



BY:

RICHARD FAHEY (0013131)

Arter & Hadden

10 West Broad Street

Columbus, Ohio 43215

(614) 221-3155

Attorney for Defendant Shieldalloy
Metallurgical Corporation

CYPRUS FOOTE MINERAL COMPANY

By:

S. Scott Shellhans

Name:

S. Scott Shellhans

Title:

PRESIDENT

Address:

348 Holiday Inn Drive
Kings Mountain, NC 28086

ATTORNEY FOR DEFENDANT

CYPRUS FOOTE MINERAL COMPANY

By:

Donald J. Patterson

Name:

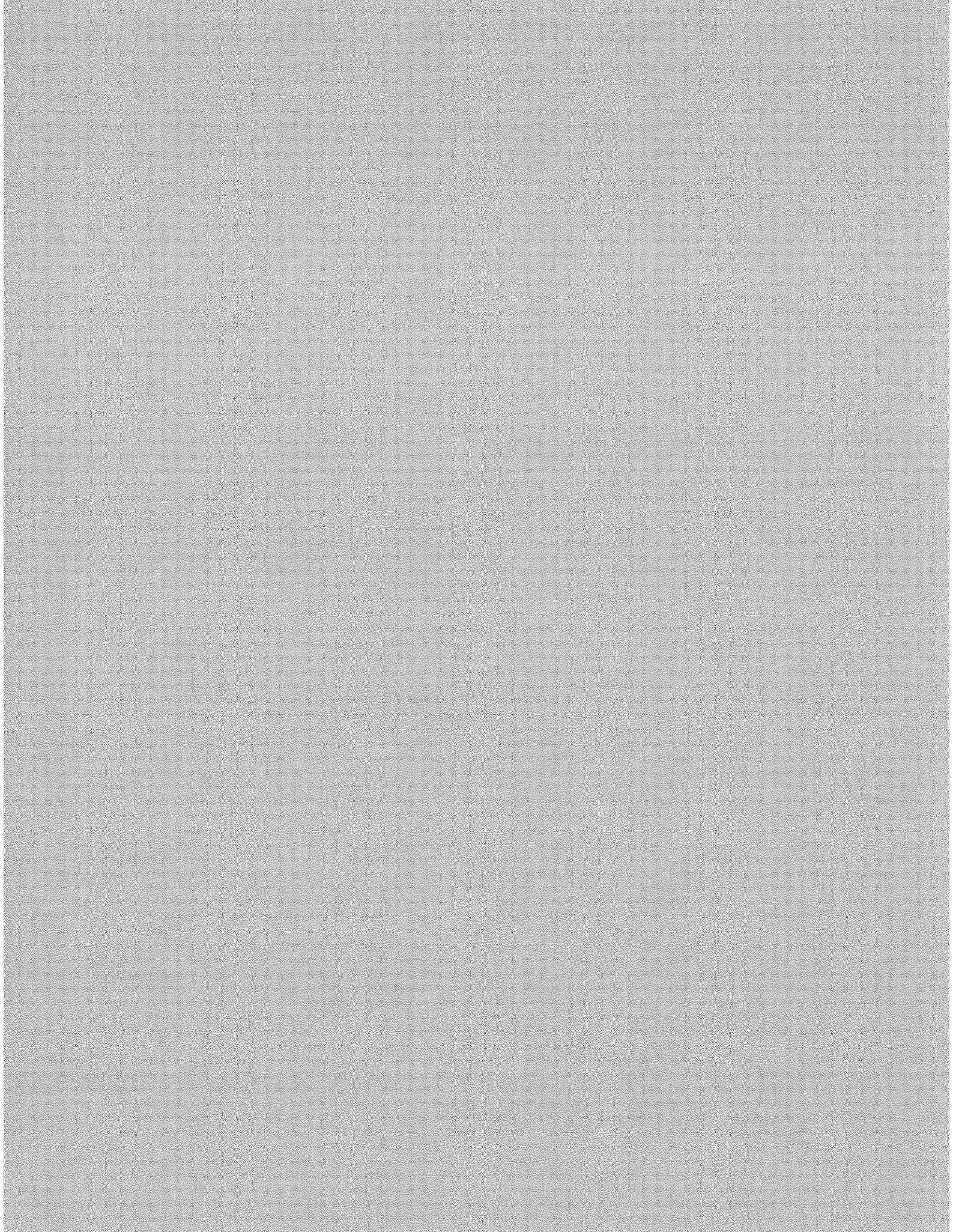
Donald J. Patterson, Jr.

Title:

Attorney

Address:

Beveridge & Diamond, P.C.
1350 I Street, N.W., Suite 700
Washington, D.C. 20005



APPENDIX A

Revised 05/26/92

GENERIC STATEMENT OF WORK REMEDIAL INVESTIGATION/FEASIBILITY STUDY STATE VERSION

PURPOSE:

The purpose of this remedial investigation/feasibility study (RI/FS) is to investigate the nature and extent of releases of hazardous waste or constituents, pollutants, wastes, industrial wastes or contaminants at the Site, assess the potential risk to human health and the environment, and develop and evaluate potential remedial alternatives. The RI and FS are interactive and may be conducted concurrently so that the data collected in the RI influences the development of remedial alternatives in the FS, which in turn affects the data needs and the scope of treatability studies.

The Respondent shall conduct this RI/FS and shall produce an RI and FS report that are in accordance with this statement of work, the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (RI/FS Guidance) (U.S. EPA, Office of Emergency and Remedial Response, October 1988), and any other guidances that Ohio EPA uses in conducting an RI/FS (a list of the primary guidances is attached), as well as any additional requirements in the administrative order. The RI/FS Guidance describes the report format and the required report content. The Respondent shall furnish all necessary personnel, materials, and services needed, or incidental to, performing the RI/FS, except as otherwise specified in the administrative order.

At the completion of the RI/FS and the terms of this Order, the Ohio EPA shall be responsible for the selection of a site remedy. The remedial action alternative selected by the Ohio EPA shall meet the cleanup standards specified in the How Clean Is Clean Policy. That is, the selected remedial action will be protective of human health and the environment, shall be in compliance with applicable or relevant and appropriate requirements of other laws, will be cost-effective, shall utilize permanent solutions and alternative treatment technologies or resource recovery technologies, to the maximum extent practicable, and shall address the statutory preference for treatment as a principal element. The final RI and FS reports, as approved by the Ohio

EPA, shall, with the administrative record, form the basis for the selection of the site's remedy and will provide the information necessary to support the development of a decision document.

The Ohio EPA shall provide oversight of the Respondent's activities throughout the RI/FS. The Respondent shall support the Ohio EPA's initiation and conduct of activities related to the implementation of oversight activities.

TASKS/DELIVERABLES:

The Remedial Investigation/Feasibility Study consists of eleven tasks:

TASK 1 -- Scoping of the RI/FS

- A. Site Background/Site History
- B. Current or Previous Interim/Emergency Actions

TASK 2 -- Work Plan Requirements

- A. RI/FS Work Plan
- B. Quality Assurance Project Plan
- C. Field Sampling Plan
- D. Health and Safety Plan

TASK 3 -- Interim Actions

TASK 4 -- Community Relations

TASK 5 -- Remedial Investigation

- A. Environmental Setting
- B. Source Characterization
- C. Contamination Characterization
- D. Ecological Assessment
- E. Potential Receptor Identification
- F. RI report

TASK 6 -- Human Health Baseline Risk Assessment

- A. Conceptual Site Model
- B. Human Risk Assessment Report

TASK 7 -- Environmental Baseline Risk Assessment

- A. Conceptual Site Model
- B. Environmental Risk Assessment Report

TASK 8 -- Development and Screening Alternatives

- A. Remedial Action Objectives
- B. Technologies Screening
- C. Alternatives Array

TASK 9 -- Treatability Study

- A. Treatability Study Work Plan
- B. Treatability Study Evaluation Report

TASK 10 -- Detailed Analysis of Alternatives

- A. Detailed Analysis of Alternatives Report
- B. Feasibility Study Report

TASK 11 -- Monthly Progress Reports

TASK 1 -- SCOPING OF THE RI/FS

The Respondent shall describe the background of the Site, its history and current condition and outline the purpose and need for remedial investigation of the Site. Data gathered during previous investigations, site inspections and other relevant activities shall be used. Previous investigations shall be summarized and referenced. This information shall be documented in the RI/FS Work Plan (Task 2.A.).

A. Site Background/Site History

The Respondent shall review and analyze all existing site background information and will conduct a site visit to assist in planning the scope of the RI/FS.

1. Collect and analyze existing data and document the need for additional data

Before planning RI/FS activities, all existing site data will be thoroughly compiled and reviewed by the Respondent. Specifically, this will include presently available data relating to the varieties and quantities of hazardous, industrial and/or other wastes at the Site, and past disposal practices. This will also include results from any previous sampling events that may have been conducted. The Site background may reference applicable existing reports. The Respondent shall

provide, at a minimum, the following:

- a. Map(s) depicting property lines, topography and surface drainage, all known active or past treatment, storage or disposal areas, all known past and present product and waste underground storage tanks and associated piping, surrounding land use and location of wells;
- b. A history and description of ownership and operation;
- c. A summary of past and present permits requested and/or recieved;
- d. A summary of known or suspected source areas; and
- e. A summary of any previous response action conducted by state, local, federal or private parties.

The Respondent shall refer to Table 2-1 of the RI/FS Guidance for a comprehensive list of data collection information sources. This information will be utilized in determining additional data needed to characterize the Site, better define potential applicable requirements, and develop a range of preliminarily identified remedial alternatives. Data Quality Objectives (DQOs) will be established subject to Ohio EPA approval which specify the usefulness of existing data. Decisions on the necessary data and DQOs will be made by the Ohio EPA.

The Respondent shall provide an annotated bibliography of existing reports for the Site, including reports relevant to the RI/FS.

2. Conduct Site Visit

The Respondent shall conduct a site visit during the project scoping phase to assist in developing a conceptual understanding of sources and areas of contamination as well as potential exposure pathways and receptors at the site. During the site visit the Respondent shall observe the Site's physiography, hydrology, geology, and demographics, as well as natural resources, ecological and cultural features and receptors. This information will be utilized to better scope the project and to determine the extent of additional data necessary to characterize the site, better define potentially applicable requirements and narrow the range of preliminarily identified remedial alternatives.

B. Implementation of Interim/Emergency Actions.

1. The Respondent's report shall document any interim or emergency action which were or are being undertaken at the Site. This shall include:
 - a. Objectives of the interim or emergency actions: how the action has mitigated or is mitigating a potential threat to human health and the environment and/or is consistent with and integrated into any long term remedial action at the Site;
 - b. Design, construction, operation and maintenance requirements;
 - c. Schedules for design, construction and monitoring; and
 - d. Schedule for progress reports.

Respondent shall submit a report to the Ohio EPA documenting the results of Tasks 1.A.1., 1.A.2. and 1.B.1. as part of the of the RI/FS Work Plan.

TASK 2 -- RI/FS WORK PLAN REQUIREMENTS

At the conclusion of the scoping phase, the Respondent will submit an RI/FS work plan, a field sampling plan, a Quality Assurance Project Plan (QAPP), and a site health and safety plan. The RI/FS work plan, field sampling plan, and QAPP must be reviewed and approved by Ohio EPA prior to the initiation of field activities.

A. RI/FS Work Plan

A work plan documenting the decisions and evaluations completed during the scoping process will be submitted to Ohio EPA for review and approval. The work plan should be developed in conjunction with the QAPP, field sampling plan and the site health and safety plan, although each plan may be delivered under separate cover. The RI/FS Work Plan will also include a comprehensive description of the work to be performed as outlined in this SOW, including the methodologies to be utilized, as well as a corresponding schedule for completion. In addition, the work plan must include the rationale for performing the required activities.

In the RI/FS Work Plan, the Respondent shall present the

justification for the proposed omission of any tasks of this SOW because of work that has already been performed or work that is not appropriate to the Site.

The RI/FS Work Plan will present a statement of the real or potential problem(s) posed by the Site and the objectives of the RI/FS. Furthermore, the plan will include a site background summary setting forth the Site description including the geographic location of the Site, and to the extent possible, a description of the Site's physiography, hydrology, geology, demographics, ecological, cultural and natural resource features; a synopsis of the site history and a description of previous responses that have been conducted at the site by local, state, federal, or private parties; a summary of the existing data in terms of physical and chemical characteristics of the contaminants identified, and their distribution among the environmental media at the site.

In addition, the plan will include a description of the site management strategy developed during scoping and data needs for evaluation of remedial alternatives. The plan will reflect coordination with treatability study requirements. The RI/FS Work Plan shall provide sufficient information for the Ohio EPA to identify applicable or relevant and appropriate Federal and state requirements (chemical-specific, location-specific and action-specific).

The RI/FS work plan shall provide a detailed description of the tasks to be performed, information needed for each task (e.g., for human health and environmental risk evaluation), information to be produced during and at the conclusion of each task, and a description of the work products that will be submitted to the Ohio EPA. This includes the deliverables set forth in the remainder of this statement of work: a schedule for each of the required activities; the conceptual site model for and the human health baseline risk assessment; the conceptual site model for and the environmental baseline risk assessment; the RI report; the FS report and required interim deliverables; monthly reports to the Ohio EPA; and meetings and presentations to the Ohio EPA at the conclusion of each major phase of the RI/FS.

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

B. Quality Assurance Project Plan

The Respondent shall prepare a plan to document all monitoring and investigation procedures: sampling, field measurements, sample analysis, toxicity testing, bioassays, and all modeling performed during the investigation to characterize the environmental setting, source(s), contamination, and human and biological receptors to ensure that all information, data and resulting decisions are technically sound, statistically valid and properly documented. This plan shall comport with Ohio EPA's Guidelines and Specifications for Preparing Quality Assurance Projects Plans, policy number DERR-00-RR-008. As required by Section VIII, Paragraph C, of this Order, Respondent shall schedule a meeting with this Agency to discuss the requirements of this plan.

1. Data Collection Strategy

The strategy section of the (QAPP) shall include but not be limited to the following:

- a. Description of the types and intended uses for the data, relevance to remediation or restoration goals, and the necessary level of precision, accuracy, and statistical validity for these intended uses;
- b. Description of methods and procedures to be used to assess the precision, accuracy and completeness of the measurement data;
- c. Description of the rationale used to assure that the data accurately and precisely represent a characteristic of a population, variation of physical or chemical parameters throughout the Site, a process condition or an environmental condition. Factors which shall be considered and discussed include, but are not limited to:
 - i) Environmental conditions at the time of sampling;
 - ii) Sampling design (including number, location and distribution);
 - iii) Representativeness of selected media, exposure pathways, or receptors; and
 - iv) Representativeness of selected analytical parameters.

- v) Representativeness of testing procedures and conditions; and
 - vi) Independence of background or baseline from site influences.
- d. Description of the measures to be taken to assure that the following data sets can be compared quantitatively or qualitatively to each other:
- i) RI data collected by the Respondent over some time period;
 - ii) RI data generated by an outside laboratory or consultant employed by the Respondent versus data collected by the Respondent, and;
 - iii) Data generated by separate consultants or laboratories over some time period not necessarily related to the RI effort.
 - iv) Data generated by Ohio EPA or by an outside laboratory or consultant employed by Ohio EPA;
- e. Details relating to the schedule and information to be provided in quality assurance reports. These reports should include but not be limited to:
- i) Periodic assessment of measurement data accuracy, precision and completeness;
 - ii) Results of performance audits;
 - iii) Results of system audits;
 - iv) Significant quality assurance problems and recommended solutions; and
 - v) Resolutions of previously stated problems.

2. Sample Analysis

The Sample Analysis section of the Quality Assurance Project Plan shall specify the following:

- a. Chain-of-custody procedures, including:
- i) Identification of a responsible party to act as sample custodian at the laboratory facility authorized to sign for incoming field samples, obtain documents of shipment and verify the data

- entered onto the sample custody records;
 - ii) Provision for a laboratory sample custody log consisting of serially numbered lab-tracking report sheets; and
 - iii) Specification of laboratory sample custody procedures for sample handling, storage and dispersment for analysis.
- b. Sample storage procedures and storage times;
 - c. Sample preparation methods;
 - d. Analytical procedures, including:
 - i) Scope and application of the procedure;
 - ii) Sample matrix;
 - iii) Potential interferences;
 - iv) Precision and accuracy of the methodology;
 - v) Method detection limits;
 - vi) Special analytical services required to ensure contract required detection limits do not exceed known toxicity criteria; and
 - vii) Verification and reporting of tentatively identified compounds.
 - e. Calibration procedures and frequency;
 - f. Data reduction, validation and reporting;
 - g. Internal quality control checks, laboratory performance and systems audits and frequency, including:
 - i) Method blank(s);
 - ii) Laboratory control sample(s);
 - iii) Calibration check sample(s);
 - iv) Replicate sample(s);
 - v) Matrix-spiked sample(s);
 - vi) "Blind" quality control sample(s);

- vii) Control charts;
 - viii) Surrogate samples;
 - ix) Zero and span gases; and
 - x) Reagent quality control checks.
- h. Preventative maintenance procedures and schedules;
 - i. Corrective action (for laboratory problems); and
 - j. Turnaround time.

3. Modeling

The Modeling section of the Quality Assurance Project Plan shall apply to all models used to predict or describe fate, transport or transformation of contaminants in the environment and shall discuss:

- a. Model assumptions and operating conditions;
- b. Input parameters; and
- c. Verification and calibration procedures.

4. In Situ or Laboratory Toxicity Tests

The Toxicity Test section of the Quality Assurance Project Plan shall apply to all tests or bioassays used to predict or describe impacts of contaminants on a population, community, or ecosystem level.

5. Data Record

The QAPP shall also provide the format to be used to present the raw data and the conclusions of the investigation, as described in a, b, and c below:

- a. The data record shall include the following:
 - i) Unique sample or field measurement code;
 - ii) Sampling or field measurement location and sample or measurement type;
 - iii) Sampling or field measurement raw data;
 - iv) Laboratory analysis ID number;

- v) Property or component measured; and
- vi) Result of analysis (e.g., concentration).

b. Tabular Displays

The following data shall be presented in tabular displays:

- i) Unsorted (raw) data;
- ii) Results for each medium, organism, or for each constituent measured;
- iii) Data reduction for statistical analysis;
- iv) Sorting of data by potential stratification factors (e.g., location, soil layer, topography, vegetation form);
- v) Summary data (i.e., mean, standard deviation, min/max values, and sample number); and
- vi) Comparisons with background or reference data.

c. Graphical Displays

The following data shall be presented in graphical formats (e.g., bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transects, three dimensional graphs, etc.):

- i) Display sampling locations and sampling grid;
- ii) Indicate boundaries of sampling area, and areas where more data are required;
- iii) Display levels of contamination at each sampling location or location from which organism was taken;
- iv) Display geographical extent of contamination;
- v) Display contamination levels, averages and maxima;
- vi) Illustrate changes in concentration in relation to distance from the source, time, depth or other parameters;

- vii) Indicate features affecting intramedia transport and show potential receptors;
- viii. Compare nature and extent of contamination with results of ecological or biological sampling or measurements; and
- ix) Display comparisons with background or reference analyses or measurements.

C. Field Sampling Plan

1. Sampling

The Sampling section of the Field Sampling Plan shall discuss:

- a. Sufficient preliminary sampling to ensure the proper planning of b through o below;
- b. Selecting appropriate sampling locations, depths, vegetation strata, organism age, etc. and documenting relevance of sample for intended biological toxicity tests or analyses;
- c. Providing a sufficient number of samples to meet statistical or other data useability objectives;
- d. Measuring all necessary ancillary data such as ambient conditions, baseline monitoring, etc.;
- e. Determining environmental conditions under which sampling should be conducted;
- f. Determining which media, pathways, or receptors are to be sampled (e.g., ground water, air, soil, sediment, biota, etc.);
- g. Determining which parameters are to be measured and where;
- h. Selecting the frequency and length of sampling period;
- i. Selecting the sample design (e.g., composites, grabs, random, repeated, etc.);
- j. Selecting the number, location, media or organisms for determining background conditions or reference conditions (refer to Appendix B, Background Sampling Guidance, of Ohio EPA's How Clean Is Clean Policy);

- k. Measures to be taken to prevent contamination of the sampling equipment and cross contamination between sampling points;
- l. Documenting field sampling operations and procedures, including;
 - i) Documentation of procedures for preparation of reagents or supplies which become an integral part of the sample (e.g., filters and adsorbing reagents);
 - ii) Procedures and forms for recording the exact location and specific considerations associated with sample acquisition;
 - iii) Documentation of specific sample preservation method;
 - iv) Calibration of field devices;
 - v) Collection of replicate and field duplicate samples;
 - vi) Submission of field-biased and equipment blanks, where appropriate;
 - vii) Potential interferences present at the site or facility;
 - viii) Construction materials and techniques associated with monitoring wells and piezometers;
 - ix) Field equipment listing and sample containers;
 - x) Sampling order; and
 - xi) Decontamination procedures.
- m. Selecting appropriate sample containers;
- n. Sample preservation; and
- o. Chain-of-custody, including:
 - i) Standardized field tracking reporting forms to establish sample custody in the field prior to and during shipment;
 - ii) Sample sealing, storing and shipping

procedures to protect the integrity of the sample; and,

- iii) Pre-prepared sample labels containing all information necessary for effective sample tracking.

2. Field Measurements

The Field Measurements section of the Field Sampling Plan shall discuss:

- a. Selecting appropriate field measurement locations, depths, organism age etc.;
- b. Providing a sufficient number of field measurements that meet statistical or data useability objectives;
- c. Measuring all necessary ancillary data such as ambient or baseline environmental conditions;
- d. Determining conditions under which field measurement should be conducted;
- e. Determining which media, pathways, or receptors are to be addressed by appropriate field measurements (e.g., ground water, air, soil, sediment, biota, etc.);
- f. Determining which physical, chemical, or biological parameters are to be measured and where;
- g. Selecting the frequency and duration of field measurement; and
- h. Documenting field measurement operations and procedures, including:
 - i) Procedures and forms for recording raw data and the exact location, time and Site specific considerations associated with the data acquisition;
 - ii) Calibration of field devices;
 - iii) Collection of replicate measurements;
 - iv) Submission of field-biased blanks, where appropriate;
 - v) Potential interferences present at the Site;

- vi) Construction materials and techniques associated with monitoring wells and piezometers used to collect field data;
 - vii) Field equipment listing;
 - viii) Order in which field measurements were made; and
 - ix) Decontamination procedures; and
- i. Selecting the number, location, media, and organisms for determining background or reference conditions.

D. Health and Safety Plan.

The Respondent shall develop a Health and Safety plan to protect the health and safety of personnel involved in the site investigations and the surrounding community.

1. Major elements of the Health and Safety Plan shall include:
- a. Facility or site description including availability of resources such as roads, water supply, electricity and telephone service;
 - b. Description of the known hazards and an evaluation of the risks associated with the incident and with each activity conducted;
 - c. Listing of key personnel (including the site safety and health officer) and alternates responsible for site safety, response operations, and for protection of public health;
 - d. Delineation of work area, including a map;
 - e. Description of levels of protection to be worn by personnel in the work area;
 - f. Description of the medical monitoring program for on-site responders;
 - g. Description of standard operating procedures established to assure the proper use and maintenance of personal protective equipment;
 - h. The establishment of procedures to control site access;

- i. Description of decontamination procedures for personnel and equipment;
 - j. Establishment of site emergency procedures;
 - k. Availability of emergency medical care for injuries and toxicological problems;
 - l. Description of requirements for an environmental monitoring program. (This should include a description of the frequency and type of air and personnel monitoring, environmental sampling techniques and a description of the calibration and maintenance of the instrumentation used.);
 - m. Specification of any routine and special training required for responders; and
 - n. Establishment of procedures for protecting workers from weather-related problems.
2. The Health and Safety Plan shall be consistent with:
- a. NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);
 - b. Section 111(c)(6) of CERCLA;
 - c. EPA Order 1440.3 -- Respiratory Protection;
 - d. EPA Order 1440.2 -- Health and Safety Requirements for Employees Engaged in Field Activities;
 - e. EPA Occupational Health and Safety Manual;
 - f. EPA Interim Standard Operating Safety Procedures and other EPA guidance as developed by EPA;
 - g. OSHA regulations particularly in 29 CFR 1910 and 1926;
 - h. State and local regulations; and
 - i. Site or facility conditions.

The Safety Plan should identify problems or hazards that may be encountered and their solution. Safety procedures to be followed to protect third parties, such as visitors or the surrounding community, should also be provided.

TASK 3 -- INTERIM ACTIONS

- A. At any time during the Remedial Investigation, the Respondent may propose to conduct or the Ohio EPA may require that the Respondent conduct an interim remedial action(s). Any interim remedial action proposed by the Respondent for the Site must be approved by the Ohio EPA prior to implementation. The following factors shall be considered in determining the appropriateness of an interim remedial action:
1. Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous wastes or substances;
 2. Actual or potential contamination of drinking water supplies or sensitive ecosystems;
 3. Hazardous waste or substances in drums, barrels, tanks or other bulk storage containers that may pose a threat of release;
 4. High levels of hazardous waste or substances in soils largely at or near the surface that may migrate;
 5. Weather conditions that may cause hazardous waste or substances to migrate or be released;
 6. Threat of fire or explosion; and
 7. Other situations or factors that may pose threats to public health, welfare or the environment.
- B. The Respondent shall develop and submit for approval an Interim Action Work Plan that includes, but is not limited to, the following:
1. A discussion of the technical factors of importance for implementing the Interim Action;
 2. A justification for selection of the preferred action and/or system modification based on its ability to meet the interim action criteria of preventing, minimizing or mitigating a substantial threat to the public health or the environment;
 3. Treatment, storage or disposal of contaminated media in a manner that complies with federal and state laws, requirements and guidance documents adopted thereunder. Respondent shall obtain any permits necessary for implementation of the Interim Action. Ohio EPA shall consider, in a timely manner, such permit applications

which Respondent may be required to submit pursuant to the Interim Action Work Plan;

4. A schedule of tasks, length of tasks and completion times, including any permits, permits-to-install and permits-to-operate, according to calendar days;
 5. A monitoring strategy to determine the effectiveness of the Interim Action;
 6. A Quality Assurance Project Plan (QAPP) for the Interim Action;
 7. a Health and Safety Plan (HASP) for the Interim Action.
- C. Within twenty (20) calendar days following Ohio EPA approval of the Interim Action Work Plan, Respondent shall commence implementation of the work as approved and in accordance with the schedule contained therein.
- D. Progress on the Interim Action shall be reported in the Monthly Progress Report per Task 11.

TASK 4 -- COMMUNITY RELATIONS

This task shall be completed by the Ohio EPA.

TASK 5 -- REMEDIAL INVESTIGATION

The Respondent shall conduct those investigations necessary to: characterize the site (Environmental Setting); define the source (Source Characterization); define the degree and extent of contamination (Contamination Characterization and Ecological Assessment); and identify actual or potential receptors (Ecological and Human Risk Assessment).

The investigations should result in data of adequate technical quality to support the development of the Human Health Baseline Risk Assessment and the Ecological Risk Assessment and the evaluation of remedial action alternatives of the Feasibility Study.

Remedial Investigation activities shall follow the plans set forth in Task 2. All sampling, analyses, and measurements shall be conducted in accordance with the QAPP. All sampling and measurement locations shall be documented in a log and identified on a detailed site map.

A. Environmental Setting

The Respondent shall collect information to supplement and verify existing information on the environmental setting at the site as well as the environmental setting adjacent to and surrounding the Site. The Respondent shall characterize the following:

1. Regional Hydrogeology

The Respondent shall conduct a program to evaluate the regional hydrogeologic characteristics surrounding the facility. Regional information can be obtained as described in Task 1. This shall include but not be limited to:

- a. Depth to bedrock and lithology;
- b. Characteristics of major stratigraphic units and the depositional environment;
- c. Identification of regional aquifer(s);
- d. Identification of all residential, municipal, industrial and agricultural wells within a four (4) mile radius of the Site. Include any available information such as well logs, construction details, average yield and chemical analyses;
- e. Direction of ground water flow in the regional aquifer(s);
- f. Identification and characterization of recharge and discharge areas, with amount of recharge and discharge;
- g. Description of regional geomorphology, including locations of surface water bodies and floodways, etc. This description should include an analysis of any topographic features that may influence the ground water flow system; and
- h. Description of structural features such as jointing, faulting and folding.

2. Site Hydrogeology and Soil Characteristics

The Respondent shall conduct a program to evaluate site-specific hydrogeologic characteristics and soil characteristics at the Site. This description shall be based on data collected from

bore holes, piezometers, laboratory and field tests. The description shall include:

- a. An accurate classification and description of the consolidated and unconsolidated stratigraphic units beneath the Site. This shall include:
 - i) Hydraulic conductivity (vertical and horizontal);
 - ii) Porosity, effective porosity, and bulk density;
 - iii) Rock and soil (ASTM 2488 and 2487) classification;
 - iv) Grain size distribution (sieve and hydrometer) curves;
 - v) Thickness;
 - vi) Lateral extent;
 - vii) Moisture content;
 - viii) The attenuation capacity and mechanisms of attenuation of the natural earth material and/or fill (i.e., ion exchange capacity, base saturation, organic carbon content, mineral content, soil sorptive capacity, storage capacity);
 - ix) Soil Ph;
- b. The Respondent shall conduct a program to characterize the near surface soil and rock units. This shall include:
 - i) SCS soil classification;
 - ii) Surface soil distribution;
 - iii) Infiltration;
 - iv) Evapotranspiration;
- c. A discussion of the local occurrence of ground water including:
 - i) Identification of all aquifer systems, including depth from the surface and lateral

and vertical extent. (Aquifer system means one or more geologic unit or formation that is wholly or partly saturated with water and is able to store, transmit and yield significant amounts of water to wells or springs.);

- ii) Identification of all significant saturated zones above the aquifer systems;
 - iii) Depth to the water table;
 - iv) Ground water flow direction and rates in the aquifers and all strata above the aquifers;
 - v) Effects of stratification on saturated and unsaturated flow;
 - vi) Description of the interconnection between the saturated zones and the aquifers, surface water, seeps and springs;
 - vii) Description of recharge and discharge areas within the site boundaries. This shall include any relationship between ground water and springs, streams and other surface water features;
 - viii) Temporal fluctuations (i.e., seasonal and man-made) in ground water levels and their effects on ground water flow direction; and
 - ix) Identification of zones of high permeability that may act as a migration route for contaminants.
- d. Hydrogeologic cross sections showing the extent (depth, thickness and lateral extent) of each hydrogeologic unit shall be developed. Cross sections shall be developed in various orientations across the Site (e.g., in the direction of ground water flow and orthogonal to ground water flow). At a minimum the following shall be identified:
- i) Structures such as zones of fracturing or channeling likely to influence contaminant migration in the consolidated or unconsolidated deposits;

- ii) Zones of higher permeability, such as sand and gravel deposits, that might direct the flow of contaminants;
 - iii) Zones of low permeability that may restrict and/or attenuate the flow of contaminants; and
 - iv) Water-bearing zones above the confining layer that may serve as pathways for contaminant migration including perched zones of saturation.
- e. Based on data obtained from ground water monitoring wells and piezometers installed upgradient and downgradient of the potential contaminant source, a representative description of water level or fluid pressure monitoring including:
- i) Water level contour and/or potentiometric surface maps;
 - ii) Hydraulic cross sections showing vertical gradients;
 - iii) Flow nets, including the vertical and horizontal components of flow and the interconnection between waterbearing strata; and
 - iv) Any temporal changes in hydraulic gradients and flow directions due, for example, to seasonal or man-made influences.
- f. A description of man-made influences that may affect the hydrogeology of the Site, identifying:
- i) Active and inactive water supply and production wells with appropriate pumping schedules; and
 - ii) Man-made structures such as pipelines, french drains, ditches, unlined and lined ponds, lagoons, septic tanks, NPDES permitted outfalls, retention areas and utility lines.
- g. An area-specific description of the geomorphology at the Site. At a minimum this shall include;
- i) An analysis of any topographic feature that may influence the ground water flow system;

- ii) A surface topography map depicting (at a minimum) streams, wetlands, topographic depressions and springs. The topographic map shall be constructed by a qualified professional and shall provide contour intervals at a level of detail appropriate for the site specific hydrogeologic investigation (e.g., two-foot intervals). The map shall depict the location of all borings, monitoring wells and cross sections.
- h. An area-specific description of the structural geology at the Site;
- i. The RI report shall document the methods and procedures used to gather and evaluate the hydrogeologic data. These methods and procedures shall be in accordance with Ohio EPA and U.S. EPA guidance. This may include but is not limited to:
 - i) The drilling and soil sampling methods used in characterizing the soil and hydrogeologic characteristics of the Site (including all boring logs and raw data);
 - ii) The analytical procedures and methods used to characterize the soil and rock materials obtained from the borings and/or test pits;
 - iii) The methods, equipment and procedures used to define the aquifer systems and all significant zones of saturation above the uppermost aquifer system including:
 - 1) Well and piezometer location, depth, construction and installation specifications (including diagrams);
 - 2) Water level measurements and procedures;
 - 3) Ground water seepage observations during drilling; and
 - 4) Pumping tests and slug tests (including type, description and rationale for its use, raw data and method of interpreting the results).
 - iv) A description, rationale and raw data of indirect methods such as soil survey, geophysical and modeling. (These methods can be used to infer ground water characteristics and support or guide direct methods. However, no

site remedial investigation can be based strictly on these methods.)

3. Surface Water and Sediment

The Respondent shall conduct a program to characterize any surface water bodies in the vicinity of the Site. Such characterization shall include, but not be limited to, the following activities and information:

- a. Description of the temporal and permanent surface water bodies including:
 - i) For lakes and estuaries: location, elevation, surface area, inflow, outflow, depth, temperature stratification and volume;
 - ii) For impoundments: location, elevation, surface area, depth, volume, freeboard and purpose of impoundment;
 - iii) For streams, ditches, drains, swamps and channels: location, elevation, flow, velocity, depth, width, seasonal fluctuations and flood zones (i.e., 50 and 100 year events);
 - iv) Drainage patterns;
 - v) Evapotranspiration; and
 - vi) Any other known discharges including those permitted by NPDES.
- b. Description of the chemistry of the surface water and sediments. This includes determining the Ph, total dissolved solids, total suspended solids, biological oxygen demand, alkalinity, conductivity, dissolved oxygen profiles, nutrients, chemical oxygen demand, total and dissolved organic carbon, specific contaminant concentrations, etc.
- c. Description of sediment characteristics including:
 - i) Deposition area, patterns, and rates;
 - ii) Thickness profile; and
 - iii) Physical and chemical parameters (e.g., grain size, density, organic carbon content, ion exchange capacity, Ph, etc.)

4. Air

The Respondent shall provide information characterizing the climate in the vicinity of the Site in general, and at the time of the investigation(s). Such information shall include, but not be limited to:

- a. A description of the following parameters:
 - i) Annual and monthly rainfall averages;
 - ii) Monthly temperature averages and extremes;
 - iii) Wind speed and direction;
 - iv) Relative humidity/dew point;
 - v) Atmospheric pressure;
 - vi) Evaporation data;
 - vii) Development of inversions; and
 - viii) Climate extremes that have been known to occur in the vicinity of the facility, including frequency of occurrence.

- b. A description of topographic and man-made features which affect air flow or emission patterns, including:
 - i) Ridges, hills or mountain areas;
 - ii) Canyons or valleys;
 - iii) Surface water bodies (e.g. rivers, lakes, bays, etc.);
 - iv) Wind breaks and forests; and
 - v) Buildings; and
 - vi) Any other features that may affect air flow or emission patterns.

B. Source Characterization

The Respondent shall collect analytical data to completely characterize the wastes and the areas where wastes have been placed, collected, came to be located or removed including: type (hazardous, solid, residential, industrial, etc.); quantity; physical form; disposition

(containment or nature of deposits); and Site characteristics affecting release (e.g., Site security and engineering barriers). Data shall include all information referenced in the Remedial Investigation Work Plan (Task 2). This shall include quantification of the following specific characteristics, at each source area:

1. Unit/Disposal Area characteristics:

- a. Location of unit/disposal area;
- b. Type of unit/disposal area;
- c. Design features;
- d. Operating practices (past and present);
- e. Period of operation;
- f. Age of unit/disposal area;
- g. General physical conditions; and
- h. Method used to close the unit/disposal area.

2. Waste Characteristics:

- a. Type of waste placed in the unit;
 - i) Hazardous classification (e.g., listed, flammable, reactive, corrosive, oxidizing or reducing agent);
 - ii) Quantity; and
 - iii) Chemical composition.
- b. Physical and chemical characteristics;
 - i) Physical form (solid, liquid, gas);
 - ii) Physical description (e.g., powder, oily sludge);
 - iii) Temperature;
 - iv) Ph;
 - v) General chemical class (e.g., acid, base, solvent);
 - vi) Molecular weight;

- vii) Density;
- viii) Boiling point;
- ix) Viscosity;
- x) Solubility in water;
- xi) Cohesiveness of the wastes;
- xii) Vapor pressure; and
- xiii) Flash point.

c. Migration and dispersal characteristics of the waste;

- i) Sorption;
- ii) Biodegradability, bioconcentration, biotransformation;
- iii) Photodegradation rates;
- iv) Hydrolysis rates;
- v) Chemical transformations;
- vi) Chemical interactions; and
- vii) Products of all such reactions or processes.

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

C. Contamination Characterization

The respondent shall collect analytical data on air, ground water, soils, surface water, sediment and subsurface gas contamination in the vicinity of the Site. This data shall be sufficient to define the extent, origin, direction and rate of movement of contaminants. Data shall include all information referenced in the Remedial Investigation Work Plan (Task 2). The Respondent shall address the following types of contamination at the Site:

1. Ground Water Contamination

The Respondent shall conduct a ground water investigation to characterize the nature and extent of any plumes of contamination at the Site. The investigation shall include a description and quantification of ground water quality in the aquifer systems and all

significant zones of saturation or permeable zones that may act as pathways for contaminant migration. This investigation shall at a minimum provide the following information:

- a. A description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the Site;
- b. The horizontal and vertical direction of contamination movement;
- c. The velocity of contaminant movement;
- d. The horizontal and vertical concentration profiles of Appendix VIII constituents in the plume(s);
- e. An evaluation of site specific factors influencing the plume movement;
- f. An extrapolation of future contaminant movement; and
- g. An investigation to characterize the nature and extent of contamination of residential, municipal, industrial and agricultural wells within the vicinity of the Site.

The Respondent shall document the procedures used in making the above determinations (e.g., well design, well construction, geophysics, modeling, etc.). These procedures shall comport with appropriate U.S. EPA and Ohio EPA guidance.

2. Soil Contamination

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

- a. A description of the vertical and horizontal extent and pattern of contamination;
- b. A description of contaminant and soil chemical physical, and biological properties within the contaminant source area and plume. This includes a site specific discussion of contaminant solubility, speciation, adsorption, leachability, exchange capacity, biodegradation, hydrolysis, photolysis, oxidation and other factors that might affect contamination migration and transformation;

- c. Specific contaminant concentrations;
- d. The velocity and direction of contaminant movement;
and
- e. An extrapolation of future contaminant movement.

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

3. Surface Water and Sediment Contamination

The Respondent shall conduct an investigation to characterize the nature and extent of contamination in surface water bodies and sediment resulting from contaminant releases at the Site. The investigation shall include, but not be limited to, the following information:

- a. A description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the Site, and the extent of contamination in underlying sediments;
- b. The horizontal and vertical direction of contaminant movement in surface water and sediment;
- c. The contaminant velocity;
- d. An evaluation of the physical, biological and chemical factors influencing contaminant movement;
- e. An extrapolation of future contaminant movement;
and
- f. A description of the chemistry 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

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

- a. A description of the horizontal and vertical direction and velocity of contaminant movement;

- b. The rate and amount of the release;
- c. Chemical and physical nature of contaminated particulates including respirable portion, source emission rates, contaminant concentrations in respirable portions;
- d. Existing or potential human or biological receptors, of air contaminants, including respirable contaminant concentrations at known or potential receptors; and
- e. The chemical and physical composition of the contaminant(s) released, including vertical and horizontal concentration profiles; and
- f. Environmental factors that alter or mitigate fate and transport of contaminants in the atmosphere.

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

5. Subsurface Gas Contamination

The Respondent shall conduct an investigation to characterize the nature and extent of subsurface gases emitted from buried hazardous, industrial and/or other waste and hazardous constituents in the soil and/or ground water. This investigation shall include the following information:

- a. A description of the horizontal and vertical extent of subsurface gases migration;
- b. The chemical composition of the gases being emitted from the subsurface or surface;
- c. The rate, amount, and density of the gases being emitted; and
- d. Horizontal and vertical concentration profiles of the subsurface gases emitted.

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

D. Ecological Assessment

The Respondent shall conduct an investigation to characterize any adverse effects to flora and fauna, at the population, community or ecosystem level, that is or has been caused or influenced by contamination from the facility. The data from

this investigation shall be collected in a manner that is compatible and concurrent with the other sections of Task 4. The activities described for this section may be performed iteratively and/or in a phased approach as more data is gathered during other portions of the remedial investigation. Therefore, parts of the work plans(s) for this section may be submitted as separate deliverables from Task 2.C., Phase I Ecological Assessment.

1. Site Characterization

Based on existing data and limited field work, the respondent shall consider the following:

- a. See Task 1.A. (Site Background/Site History);
- b. Identification of potential and probable ecological receptors including threatened and endangered species, unique and sensitive habitats or resources, etc.;
- c. Identification of potential or probable exposure points for ecological receptors;
- d. Document known or suspected effects of site contaminants to biota; and
- e. Additional data needed for site characterization and the rationale for its necessity.

2. Additional Site Characterization (Phase Ib Ecological Assessment)

Based on evaluations from Task 5.D.1. above, if existing information is insufficient to determine the extent and magnitude of adverse impacts and whether a Phase II Ecological Assessment is warranted, the Respondent shall develop work plans for and implement the following in keeping with the requirements of Tasks 2.B. and 2.C.:

- a. Identification and evaluation of habitats that are or may be exposed to contamination;
- b. Semiquantitative surveys of flora and fauna that are or may be exposed to contamination, which shall include, but not be limited to:
 - i) All vegetative strata;
 - ii) Flora and fauna in all contaminated media;
 - iii) Population parameters (e.g., density, frequency, age distribution); and

- iv) Community parameters (e.g., diversity, structure, stability).
 - c. Identification of background or reference area for each exposed population, community or ecosystem and completion of surveys for comparison to Tasks 5.D.2.a. and 5.D.2.b. above; and
 - d. Sampling of media or biota for accumulation or intake studies and toxicity tests to determine the extent of toxicity as related to areas of known or potential contamination of contaminant concentrations or intakes.
3. Initial Toxicity Assessment (to be performed in conjunction with 5.D.1. and 5.D.2. above, as applicable)
- The respondent shall perform a literature review of information regarding the toxicity, fate and transport characteristics, ecological effects, and likely biological receptors for the contaminants of concern.
4. Preliminary Ecological Assessment
- The respondent shall combine the results of Tasks 5.D.1. to 5.D.3., above in order to define or evaluate the following on a site-specific basis:
- a. Initial identification of exposure pathways and ecological receptors;
 - b. The existence of or potential for current and future adverse effects to occur on a population, community or ecosystems level; and
 - c. Determine if the results of the Phase I Ecological Assessment indicate the need for further ecological studies.
5. Phase II Ecological Assessment
- Respondent shall prepare and implement, following Ohio EPA approval, a detailed work plan for further site investigations that shall be compatible with requirements listed in 4.D.3, but also include the following:
- a. Study objectives and relevance to risk assessment objectives;
 - b. Identification of ecological measurement endpoints, assessment endpoints, and endpoint selection criteria;

- c. Semiquantitative and quantitative surveys of flora and fauna;
- d. Chemical sampling in potentially exposed habitats and reference sites;
- e. Laboratory and in situ toxicity testing; and
- f. Tissue analyses.

6. Ecological Assessment Report

The respondent shall prepare a report including all results from Tasks 5.D.1. to 5.D.5. above for incorporation into the Environmental Risk Assessment (see Task 6).

Special Note: Because seasonal effects can impart a profound influence on the results of biological or ecological sampling, the Ohio EPA requires that all sampling or testing of flora and fauna shall take place between April 1 and October 30 unless otherwise approved by the Site Coordinator.

E. Potential Receptor Identification

The Respondent shall collect data describing the human populations, plant and animal populations, communities, and ecosystems that are or may be susceptible to contaminant exposure from the Site. Chemical analysis of biological samples or data on observable effects in ecosystems may be needed to properly identify biological receptors. Some of this information shall be obtained from information gathered during the Ecological Assessment (see Task 5.D.). The following characteristics shall be identified:

1. Local current and potential future uses of ground water:
 - a. Type of use (e.g., municipal or residential, agricultural, domestic/non-potable and industrial, nonagricultural use by flora and fauna); and
 - b. Location of ground water users including wells and discharge areas.
2. Local current and potential future uses of surface waters in the vicinity of the Site:

- a. Type of use (e.g., municipal or residential, agricultural, domestic/non-potable and industrial, nonagricultural use be flora and fauna); and
 - b. Location of surface water users or use areas.
3. Use of or access by humans or biota to the site or facility and adjacent lands, including but not limited to:
- a. Recreational;
 - b. Hunting;
 - c. Residential;
 - d. Commercial;
 - e. Zoning;
 - f. Nonagricultural use by flora and fauna; and
 - g. Future land use or access.
4. A demographic profile of the people who use or who have access to the facility and adjacent land including, but not limited to age, sex and sensitive subgroups.

F. RI Report

The Respondent shall prepare a Remedial Investigation (RI) Report to present Task 5, above, and Tasks 6 and 7, described below. The RI Report shall be developed in draft form for Ohio review and approval (refer to Section XIV of this Order, Review of Submittals). The report shall describe the nature and extent of contamination (qualitative/quantitative) in relation to background areas indicative for the area.

TASK 6 -- HUMAN HEALTH BASELINE RISK ASSESSMENT

The Respondent shall prepare a thorough analysis and summary of all Site investigations and their results. The objective of this task will be to ensure that the investigation data are sufficient in quality (e.g, quality assurance procedures have been followed) and quantity to adequately describe the nature and extent of contamination, actual and potential future threats to human health and/or the environment and to support the feasibility study.

The results and data from all site, investigations shall be or-

ganized and presented logically so that the relationships between and among remedial investigations for all media and receptors are apparent.

A. Conceptual Site Model.

In order to expedite review and approval of the Human Risk Assessment by the Ohio EPA the Respondent shall prepare a Conceptual Site Model (CSM) prior to completing the Human Risk Assessment Report. The CSM is an interim document that shall briefly describe the following in tables or lists based on pre-existing site information and information gathered to date during the RI:

1. Goals of the assessment;
2. Types and sources of information or data that will be used in the assessment;
3. Major assumptions or limitations influencing the application of the assessment;
4. Criteria for selecting chemicals of concern;
5. Exposure pathways, scenarios, and assumptions; and
6. Other interim deliverables.

B. Human Risk Assessment Report.

Based upon the CSM, the Respondent shall prepare a risk assessment which shall contain a discussion of and present the data required in the tasks outlined below:

1. Selection of Contaminants of Concern. Respondent shall:
 - a. Evaluate data based on approved data useability procedures (e.g., laboratory or data validation qualifiers, frequency and contaminant concentrations);
 - b. Further reduce the number of chemicals of concern based on chemical toxicity to human and biological receptors, number of chemicals, environmental mobility, background data, etc.; and
 - c. Develop a final list of Contaminants of Concern.
2. Estimate of Exposure Point Concentrations of Indicator Chemicals. Respondent shall:

- a. Combine site monitoring data and environmental modeling results to:
 - i) identify exposure pathways;
 - ii) estimate exposure point concentrations; and
 - iii) compare these concentrations to requirements, standards and criteria.
3. Estimate of Chemical Intakes. Respondent shall:
 - a. Provide estimates of chemical intakes from:
 - i) Air
 - ii) Ground water
 - iii) Surface water
 - iv) Other exposure pathways (soils, food-stuffs, recreation, etc.)
 - b. Combine pathway-specific intakes to yield total oral and total inhalation routes.
4. Respondent shall evaluate critical toxicity values (i.e., numerical values describing a chemical toxicity) and review general toxicological information for the indicator chemicals.
5. Risk Characterization. Respondent shall provide a detailed characterization of the risk posed by releases of toxic chemicals from the site. The characterization shall include the following elements:
 - a. Noncarcinogenic effects using the Hazard Index approach, where:

$$HI = E(1)/RL(1) + E(2)/RL(2) + \dots E(i)/RL(i)$$

$E(i)$ = Exposure level (or intake) for the (i)th toxicant

$RL(i)$ = Reference level (or intake) for the (i)th toxicant
 - b. Potential carcinogenic effects using the predicted risk approach, where:

$$\text{Risk} = \text{CDI} \times \text{Carcinogenic Potency Factor}$$

CDI = Chronic Daily Intake

It is assumed that risks are additive and there is independence of action by the compounds involved. Therefore, the following equations are used:

$$\text{Carcinogenic risk for chemical X} = [\text{CDI (inhalation)} \times \text{PF (inhalation)}] + [\text{CDI (oral)} \times \text{PF (oral)}]$$
$$\text{Total carcinogenic risk} = (\text{carcinogenic risk for chemical 1} + \text{carcinogenic risk for chemical 2} + \dots + \text{carcinogenic risk for chemical (i)})$$

c. Uncertainties.

Respondent shall provide a discussion of the uncertainties and assumptions made in the assessment process.

TASK 7 -- ENVIRONMENTAL BASELINE RISK ASSESSMENT.

The Respondent shall prepare a risk assessment which shall contain a discussion of present and future potential risk to ecosystems and populations exposed to contamination; information necessary to evaluate the environmental impact of proposed remedial alternatives; and information that can be utilized for the development of subsequent cleanup criteria in the tasks outlined below (note the Site Coordinator may approve combination of Tasks 6 and 7 into a single set of deliverables):

A. Conceptual Site Model.

The respondent shall prepare an interim document as defined in Task 6.A. above with emphasis on site ecology and biological receptors.

B. Environmental Risk Assessment Report

1. Briefly Describe the Site and Study Area:

- a. Describe physical and chemical factors that impact site ecology (e.g., fate and transport of contaminants, bioavailability, etc.);
- b. Describe past or current practices, disturbances, or stresses that impact(ed) site ecology;
- c. Describe the areal extent of environmental assessment;

- d. Provide a full account of ecosystems and populations potentially exposed to contamination; and
 - e. Describe current and projected land use in and around the site as relevant to site ecology.
2. Describe Contaminants and Ecological Endpoints of Concern:
- a. (See Task 6.B.1);
 - b. Specifically consider contaminants that pose toxicity or bioaccumulation potential to biological receptors and/or are available for exposure to populations and ecosystems; and
 - c. Measurement and assessment endpoints and indicator species and rationale for their selection.
3. Characterize Exposure:
- a. Combine site data, environmental modeling results and peer reviewed scientific literature to:
 - i) identify exposure pathways; and
 - ii) estimate exposure point concentrations by species, habitat, and exposure scenario; and
 - iii) identify site specific fate and transport processes.
 - b. Verify exposure to populations or ecosystems:
 - i) show correlations between concentrations and appropriate ecological endpoints (e.g., toxicity tests and population studies) along likely exposure pathways; and
 - ii) compare data from other toxicity tests, population studies, modeled uptakes, or reference areas to show exposure has occurred.
4. Characterize Risk or Threat.

The Respondent shall discuss and reduce the uncertainty over the receptor populations, communities, or ecosystems that are or may be affected; the estimation that adverse effect(s) will or are occur(ring); the magnitude of such an effect(s); and the temporal character of such an effect(s) by:

- a. Identifying requirements, standards and criteria;
 - b. Identifying relevant, peer reviewed literature toxicity values or toxicological effects where the above are lacking;
 - c. Comparison of exposure concentrations to a. and b. above, using suitable uncertainty factors and considering both chronic and acute endpoints;
 - d. Presenting the number and magnitude of exceedances of a and b above;
 - e. Presenting supporting evidence of risk from:
 - i) contaminant concentrations in biota;
 - ii) toxicity test results;
 - iii) supporting literature;
 - iv) field surveys of receptor populations;
 - v) measures of community structure and ecosystem function;
 - vi) comparison with reference or background data or observations; and
 - f. Discussing adverse or potential adverse effects under future use conditions.
5. Summary and Conclusions:
- a. Summarize effects or potential effects of contamination to biological populations, communities or ecosystems under current and future use conditions;
 - b. Describe future effects in absence of remedial action; and
 - c. Describe population, community or ecosystem characteristics that may impact the nature of remedial actions.
6. Assessment of Uncertainties and Limitations:
- a. Describe all sources of uncertainty (e.g., variance estimates, underlying model assumptions, lack of toxicity information, unexpected influences on ecological assessment, etc.), their magnitude and direction of impact on estimation of risk; and

- b. Describe assessment limitations (e.g., deviations from intended goals, data gaps, etc.).

TASK 8-DEVELOPMENT AND SCREENING OF REMEDIAL ALTERNATIVES

The development and screening of remedial alternatives is performed to develop an appropriate range of waste management options that will be evaluated. This range of alternatives should include as appropriate, options in which treatment is used to reduce the toxicity, mobility, or volume of wastes, but varying in the types of treatment, the amount treated, and the manner in which long-term residuals or untreated wastes are managed; options involving containment with little or no treatment; options involving both treatment and containment; and a no-action alternative. The following activities will be performed by the Respondent as a function of the development and screening of remedial alternatives.

The Respondent will begin to develop and evaluate a range of appropriate waste management options that at a minimum ensure protection of human health and the environment, concurrent with the RI site characterization tasks.

A. Remedial Action Objectives

1. Develop and document remedial action objectives

The Respondent shall develop preliminary remedial objectives, specifying the contaminant(s) and media or medium of interest, exposure pathway and preliminary remediation goals that establish a range of treatment and containment alternatives to be evaluated.

These remedial action objectives shall be based on information gathered during the Remedial Investigation, Ohio EPA's How Clean Is Clean policy and other pertinent Ohio EPA guidance, chemical specific ARAR's, when available other information (e.g., Rfds) and site specific factors, and shall be not inconsistent with section 300.430 of the NCP. Final remediation goals shall be determined by the Ohio EPA at or after the point the remedy is selected and are not part of this order.

In order to expedite review and approval of the Feasibility Study, the Respondent shall prepare a technical memorandum outlining the remedial action objectives.

B. Technologies Screening

1. Develop general response actions

The Respondent shall develop general response actions for each medium of interest defining containment, treatment, excavation, pumping, or other actions, singly or in combination, to satisfy the remedial action objectives.

2. Identify areas or volumes of media

The Respondent shall identify volumes of media to which general response actions may apply, taking into account requirements for protectiveness as identified in the remedial action objectives. The chemical and physical characterization of the Site will also be taken into account.

3. Identify, screen, and document remedial technologies

The Respondent shall identify and evaluate technologies applicable to each general response action to eliminate those that cannot be implemented at the Site. General response actions will be refined to specify remedial technology types. Technology process options for each of the technology types will be identified either concurrent with the identification of technology types, or following the screening of the considered technology types. Process options shall be evaluated on the basis of effectiveness, implementability, and cost factors to select and retain one or, if necessary, more representative process for each technology type. Evaluation should typically focus on effectiveness factors at this stage with less effort directed at the implementability and cost factors. The technology types and process options will be documented for inclusion in the Alternatives Array Report as described below under Task 8.C.4. The reasons for eliminating technologies must be specified.

C. Alternatives Array

1. Assemble and document alternatives

The Respondent shall assemble selected representative technologies into alternatives for each affected medium or operable unit. Together, all of the alternatives will represent a range of treatment and containment combinations that will address either the Site or the operable unit as a whole. A summary of the assembled alternatives will be prepared by the Respondent for

inclusion in the Alternatives Array Report described below. The reasons for eliminating alternatives during the preliminary screening process must be specified.

2. Refine alternatives

The Respondent shall refine the remedial alternatives to identify contaminant volume addressed by the proposed process and sizing of critical unit operations as necessary. Sufficient information will be collected for an adequate comparison of alternatives. Remedial action objectives for each medium will also be refined as necessary to incorporate any new risk assessment information being generated from the remedial investigation. Additionally, Ohio EPA will update ARARs as the remedial alternatives are refined.

3. Conduct and document screening evaluation of each alternative

The Respondent may perform a final screening process based on short and long term aspects of effectiveness, implementability, and relative cost. Generally, this screening process is only necessary when there are many feasible alternatives available for detailed analysis. If necessary, the screening of alternatives will be conducted to assure that only the alternatives with the most favorable composite evaluation of all factors are retained for further analysis.

As appropriate, the screening will preserve the range of treatment and containment alternatives that was initially developed. The range of remaining alternatives will include options that use treatment technologies and permanent solutions to the maximum extent practicable, and minimize media transfer. The Respondent shall prepare a summary of the results and reasoning employed in the screening, the assembly of alternatives that remain after screening. The summary will be submitted with the Alternatives Array Report as described below.

4. Alternatives Development and Screening Deliverables

In order to expedite review and approval of the Feasibility Study, the Respondent will prepare an Alternatives Array Report summarizing the work performed in and the results of each activity described above under Task 8, including an Alternatives Array summary. These alternatives shall be modified by the Respondent, if required by Ohio EPA's comments to assure identification of a complete and appropriate range of viable alternatives to be considered in the detailed analysis.

This interim deliverable will document the methods, rationale, and results of the alternatives screening process. The Respondent will refer to the U.S.EPA Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA for an outline of the report format and the required report contents. This report will become a major portion of the Feasibility Study Report to be submitted as part of Task 10.B.

Based upon the Alternatives Array Report, the Ohio EPA shall identify and provide to the Respondent ARARs for the range of alternatives presented. These ARARs may be modified by the Agency based upon the results of other tasks of this SOW.

TASK 9 -- TREATABILITY STUDY

A. Treatability Study Work Plan

1. Determining the Need for Treatability Studies

a. Ohio EPA Required Treatability Studies

The Respondent shall conduct any necessary laboratory and treatability study(ies) required by the Ohio EPA to determine the applicability of remedial technologies.

b. Respondent-Proposed Treatability Studies

Upon approval by the Ohio EPA, the Respondent may conduct any laboratory and treatability study(ies) that it has proposed to the Agency to determine the applicability of remedial technologies.

2. Treatability Study Work Plan

When required or approved of by the Ohio EPA, the Respondent shall develop and submit to this Agency for approval a testing work plan identifying the type(s) and goal(s) of the treatability study(ies), the level of effort needed, the experimental design, and the procedures to be used for data management, validation and interpretation. This work plan shall comport with U.S. EPA's guidance document, Guide for Conducting Treatability Studies Under CERCLA (Interim Final) EPA/540/2-89/058.

The work plan shall include the following elements:

a. Establishing data quality objectives

- b. Selecting a contracting mechanism
- c. Issuing the Work Assignment
- d. Compliance with regulatory requirements
- e. Execution of the study
- f. Analyzing and interpreting the data
- g. Reporting the results
- h. Sampling and Analysis Plan
- i. Health and Safety Plan

B. Treatability Study Evaluation Report

1. Conducting a Treatability Study

The Respondent will perform the treatability study in accordance with the approved work plan in a systematic fashion to ensure that the data generated can support the remedy evaluation process.

2. Submission of Treatability Study Evaluation Report

Upon completion of the treatability study(ies), the Respondent will prepare a treatability study evaluation report. The Respondent will follow U.S. EPA's guidance document, Guide for Conducting Treatability Studies Under CERCLA (Interim Final) EPA/540/2-89/058, for the appropriate format and content.

TASK 10 -- DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

A. Detailed Analysis of Alternatives Report

The detailed analysis will be conducted by the Respondent to provide the Ohio EPA with the information needed for the selection of a site remedy. Respondent shall conduct a detailed analysis of the alternatives that pass through the initial screening. This detailed analysis shall consist of an analysis of each option against a set of eight evaluation criteria and a comparative analysis of all options using the same evaluation criteria as a basis for comparison.

The detailed analysis shall consist of the following elements:

1. Detailed Description

The detailed description of each remaining alternative shall include as a minimum:

- a. Description of appropriate treatment and disposal technologies;
- b. Special engineering considerations required to implement the alternative, e.g., pilot treatment facility or additional studies needed to proceed with final remedial design;
- c. Operation, maintenance and monitoring requirements of the completed remedy;
- d. Off-site disposal needs and transportation plans;
- e. Temporary storage requirements;
- f. Safety requirements for remedial implementation, including both on-site and off-site health and safety considerations;
- g. An analysis of how the alternatives could be phased into individual operations and a discussion of how these operations could best be implemented (individually or in groups) to produce significant environmental improvement;
- h. A review of any off-site treatment or disposal facilities to ensure compliance with RCRA, TSCA and State requirements, both current and proposed; and
- i. An analysis of the projected performance and expected results of the alternative with emphasis on potential for further future release of hazardous substances.

2. Environmental Assessment

An Environmental Assessment (EA) shall be performed for each alternative including, as a minimum, an evaluation of each alternative's environmental effects, an analysis of measures to mitigate adverse effects, physical or legal constraints and compliance with Federal and State regulatory requirements.

Each alternative will be assessed in terms of the extent to which it will mitigate damage to or protect public health, welfare and the environment, in comparison to the other remedial alternatives.

The no action alternative will be fully evaluated to describe the current site conditions and anticipate environmental conditions if no actions are taken. The no action alternative will serve as a baseline for the Environmental Assessment.

3. Apply Eight Criteria and Document Analysis

The respondent shall apply the eight evaluation criteria described below to the assembled remedial alternatives.

a. Overall Protection of Human Health and the Environment.

Alternatives shall be assessed as to whether they can adequately protect human health and the environment from unacceptable risks posed by hazardous substances, pollutants or contaminants present at the site by eliminating, reducing or controlling exposures to levels established during development of remediation goals. This is a threshold requirement and the primary objective of the remediation program.

b. Compliance with Applicable or Relevant and Appropriate Requirements.

The alternatives shall be assessed as to whether they attain applicable or relevant and appropriate standards, criteria and requirements of state and federal environmental and public health laws.

c. Long-term Effectiveness and Permanence.

Alternatives shall be assessed for the long-term effectiveness and permanence they afford, along with the degree of certainty that the alternative will prove successful. Factors that shall be considered, as appropriate, include the following:

- i) Nature and magnitude of total residual risks; potential for exposure of human and environmental receptors; concentrations of hazardous substances, pollutants or contaminants remaining following implementation of remedial alternative, considering the persistence, toxicity, mobility and propensity to bioaccumulate of such hazardous substances and their constituents;
- ii) The type, degree and adequacy of long-term management required for untreated substances and treatment residuals, including engineering con-

trols (such as containment technologies), institutional controls, monitoring and operation and maintenance;

- iii) Long-term reliability of the engineering and institutional controls, including uncertainties associated with land disposal of untreated hazardous substances, pollutants and contaminants, as well as treatment residuals, and;
- iv) Potential need for replacement of the remedy, as well as the continuing need for repairs to maintain the performance of the remedy.

d. Reduction of Toxicity, Mobility or Volume.

The degree to which alternatives employ treatment that reduces toxicity, mobility or volume of contaminants shall be assessed. Alternatives which, at a minimum, address the principal threats posed by the site through treatment shall also be identified. Factors that shall be considered, as appropriate, include the following:

- i) The treatment or recycling processes the alternatives employ and materials they will treat;
- ii) The amount of hazardous substances, pollutants or contaminants that will be destroyed, or treated, or recycled;
- iii) The degree of expected reduction in toxicity, mobility or volume of the waste due to treatment or recycling and the specifications of which reduction(s) are occurring;
- iv) The degree to which the treatment is irreversible;
- v) The type and quantity of residuals that will remain following treatment, considering the persistence, toxicity, mobility and propensity to bioaccumulate;
- vi) The degree to which treatment will reduce the inherent hazards posed by the principal threats at the Site; and
- vii) The degree to which the treatment processes employed reduce the transfer of contaminants

between environmental media.

e. Short-term Effectiveness.

The short-term impacts of the alternatives during the construction and implementation phase, and until the objectives of the remedial action have been met, shall be assessed considering the following:

- i) Short-term risks that may be posed to the community during construction and implementation of an alternative and until the remedial action objectives have been met;
- ii) Potential impacts on workers during remedial action and with the objectives of remedial action have been met, the effectiveness and reliability of protective measures;
- iii) Potential environmental impacts that may result from the remedial action and the effectiveness and reliability of mitigative measures during implementation and until the objectives of the remedial action have been met; and
- iv) Time until response action objectives are achieved.

f. Implementability.

The technical and administrative feasibility of implementing the alternatives shall be assessed by considering the following types of factors, as appropriate:

- i) Technical Feasibility
 - Degree of difficulty or uncertainty associated with construction and operation of the alternative;
 - Expected operational reliability of the alternative;
 - Ease of undertaking, additional remedial action(s); and
 - Ability to monitor the effectiveness of the remedy.
- ii) Administrative Feasibility

- Activities needed to coordinate state, local, and federal agencies (e.g., obtaining necessary approvals and permits, right-of-way for construction)
- iii) Feasibility of Obtaining Services and Materials
 - Capacity and location of adequate treatment, storage, and disposal services;
 - Availability of necessary equipment and specialists and provisions to ensure any necessary additional resources;
 - Availability of services and materials; and
 - Availability of prospective technologies

g. Cost.

The types of costs that shall be assessed include the following:

- i) Direct and indirect capital costs, including contingency and engineering fees;
- ii) Annual operation and maintenance costs; and
- iii) Net present value of capital and O&M costs.

h. Community Acceptance.

This assessment includes determining which components of the alternatives interested persons in the community support, have reservations about, or oppose. This assessment, which will be completed by the Ohio EPA, will occur throughout the implementation of this RI/FS and will be completed after comments on the proposed remedy are received. It is not part of this order.

4. Compare Alternatives Against Each Other and Document the Comparison of Alternatives

The Respondent will perform a comparative analysis between the remedial alternatives. That is, each alternative will be compared against the others using the evaluation criteria as a basis of comparison. Identification and selection of the preferred alternative are reserved by the Ohio EPA and are not part of this Order. The comparative analysis will be documented and presented in the Feasibility Study Report described

below.

B. Feasibility Study Report

The Respondent will submit a draft feasibility study report to the Ohio EPA for review, comment, and approval. This report will include the results of Tasks 9 and 10. The respondent will refer to the U.S.EPA Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA for an outline of the report format and the required report content. Upon satisfactorily addressing Ohio EPA's comments, the Respondent will prepare and submit a final feasibility study report.

TASK 11 -- Monthly Progress Reports

Monthly Technical Progress Reports are required of the Respondent. For each on-going work assignment, Respondent shall submit progress reports with the following elements:

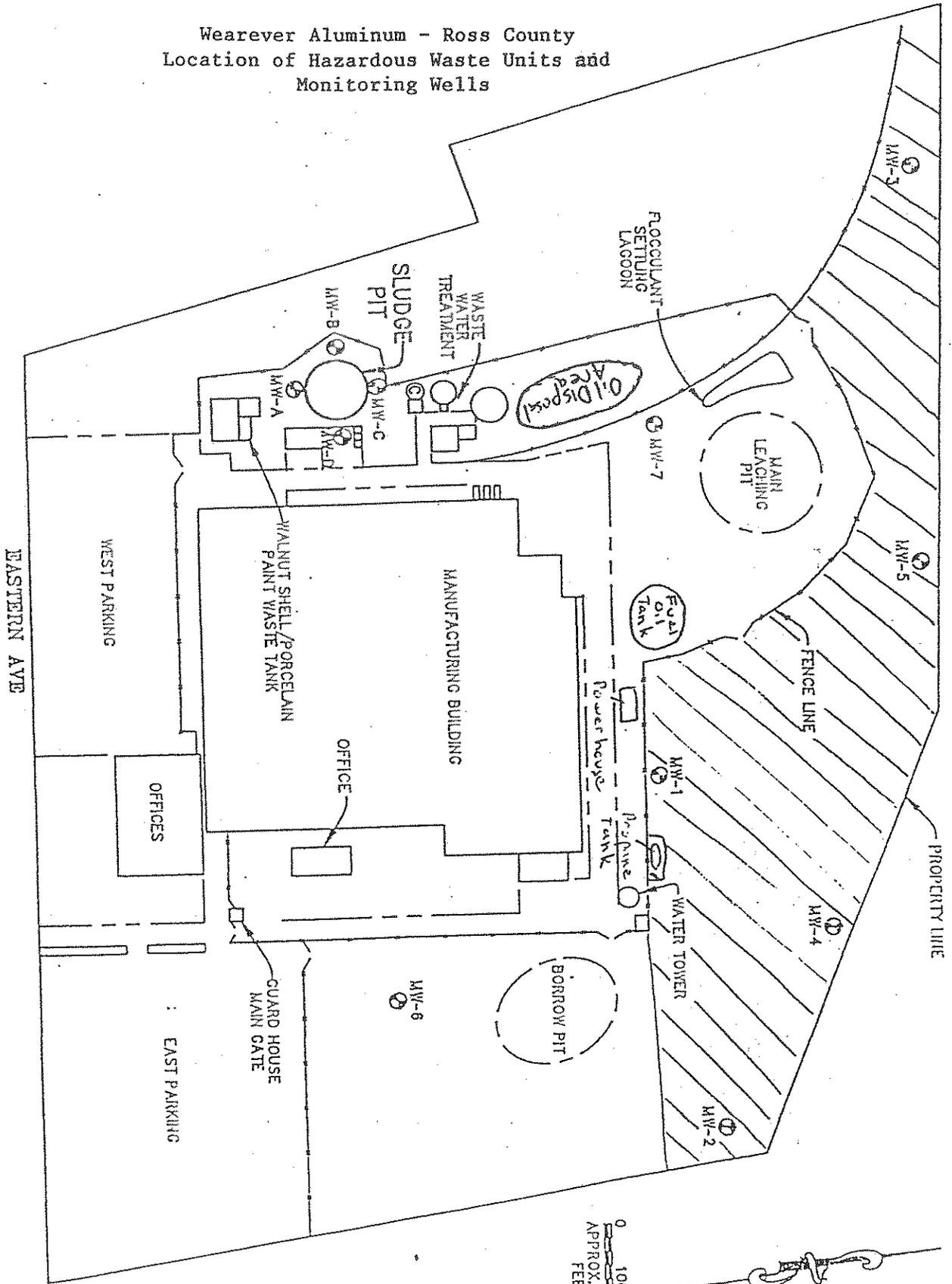
1. Identification of site and activity.
2. Status of work at the site and progress to date.
3. Percentage of completion.
4. Data generated to date
5. Difficulties encountered during the reporting period.
6. Actions being taken to rectify problems.
7. Activities planned for the next month.
8. Changes in personnel.

The monthly progress report will list target and actual completion dates for each activity including project completion and provide an explanation of any deviation from the milestones in the work plan schedule.

ATTACHMENT B

Wearever Aluminum - Ross County
Location of Hazardous Waste Units and
Monitoring Wells

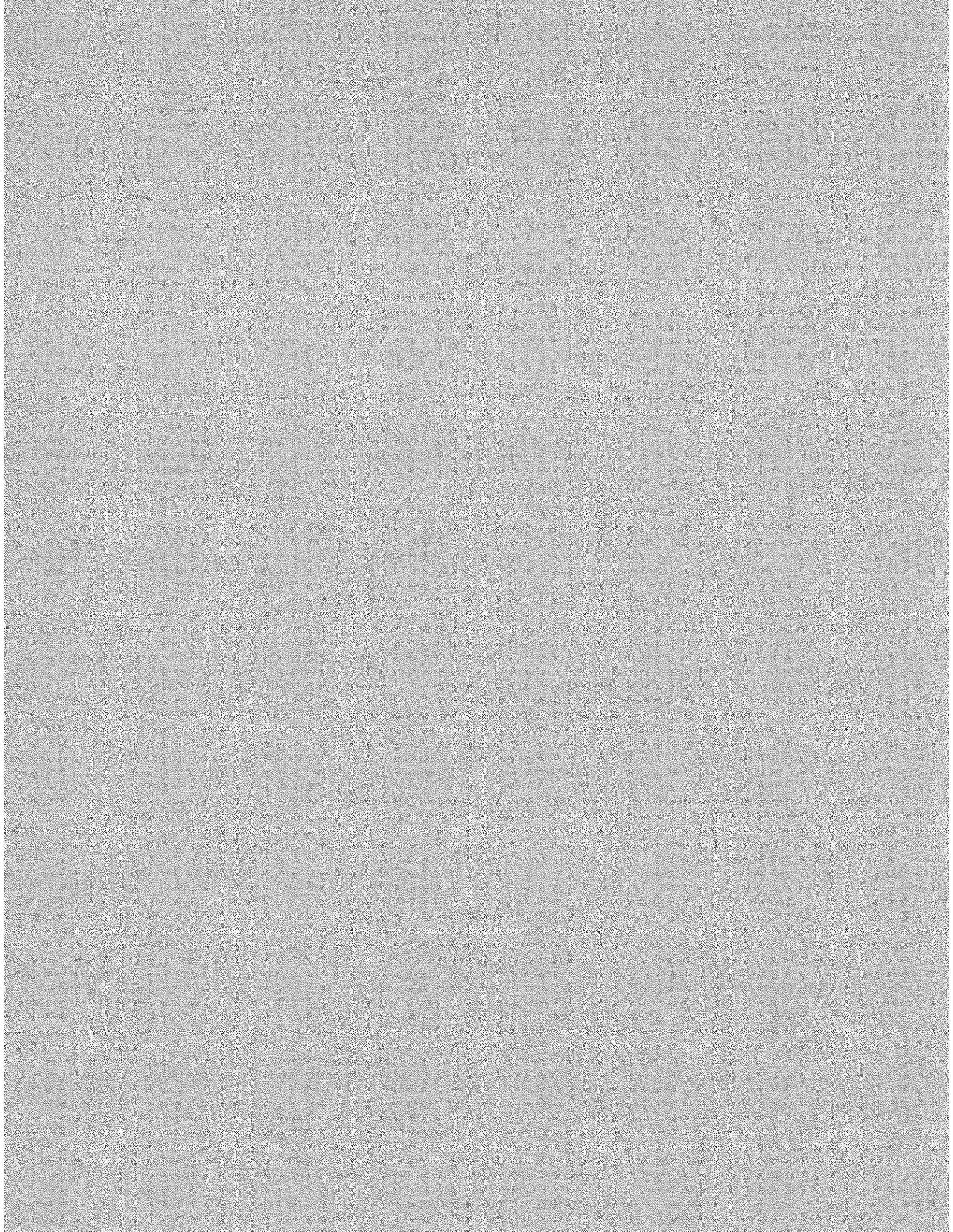
LEGEND
⊙ - EXISTING WELL



0 100 200
APPROX. SCALE
FEET



Approximate Location of Hazardous Waste Dump



OHIO EPA AND U.S. EPA GUIDANCE DOCUMENTS

OHIO EPA POLICIES AND GUIDANCE DOCUMENTS

1. Background Sampling Guidance, Final, Ohio EPA, Division of Emergency and Remedial Response, July 26, 1991
2. Best Available Treatment Technologies (BATT) for Remedial Response Program Sites, Ohio EPA Policy No. DERR-00-RR-016, Final, October 23, 1992
3. Guidelines and Specifications for Preparing Quality Assurance Project Plans, Ohio EPA, Division of Emergency and Remedial Response, Policy No. DERR-00-RR-008, March 1990
4. How Clean is Clean, Final, Ohio EPA, Division of Emergency and Remedial Response, Policy No. DERR-00-RR-009, July 26, 1991
5. Procedures for Evaluation of Response Action Alternatives and Remedy Selection for Remedial Response Program Sites, Ohio EPA Policy No. DERR-00-RR-019, Final, October 23, 1992
6. Technical Guidance Manual for Hydrogeologic Investigations and Ground Water Monitoring Programs, Ohio EPA, Division of Drinking and Ground Waters, Draft, June 1993
7. Wastewater Discharges Resulting from Clean-Up of Response Action Sites Contaminated with Volatile Organic Compounds, Ohio EPA Policy No. DSW-DERR 0100.027, Draft, February 22, 1994

U.S. EPA GUIDANCE DOCUMENTS AND OTHER USEFUL GUIDANCE

8. CERCLA Compliance with Other Laws Manual - Part I, OSWER Directive 9234.1-01, EPA/540/G-89/006, August 1988, interim final
9. CERCLA Compliance with Other Laws Manual - Part II, OSWER 9234.1-01, EPA/540/G-89/006, August 1988, interim final
10. A Compendium of Technologies Used in the Treatment of Hazardous Wastes, EPA/625/8-87/014, September 1987
11. A Rationale for the Assessment of Errors in the Sampling of Soils, EPA/600/4-90/013, July 1990

12. Assessment of Technologies for the Remediation of Radioactively Contaminated Superfund Sites, EPA/540/2-90/001, January 1990
13. Closure of Hazardous Waste Surface Impoundments, SW-873, September 1980
14. Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites, OSWER Directive 9355.3-11, EPA/540/P-91/001, February 1991
15. Data Quality Objectives Process for Superfund, Interim Final Guidance, OSWER Directive 9355.9-01, EPA/540-R-93-071, September 1993
16. Ecological Assessments of Hazardous Wastes Sites: A Field and Laboratory Reference, EPA/600/3-89/013, March 1989
17. Exposure Factors Handbook, EPA/600/8-89/043, March 1990
18. Guidance for Remedial Actions for Contaminated Ground Water at Superfund Sites, OSWER Directive 9283.1-2, EPA/540/G-88/003, December 1988, interim final
19. Guidance for Conducting Remedial Investigation and Feasibility Studies under CERCLA, Interim Final, OSWER 9355.3-01, EPA/540/G-89/004, October 1988
20. Guidance on Remedial Actions for Superfund Sites with PCB Contamination, OSWER Directive 9355.4-01, EPA/540/G-90/007, August 1990
21. Guidance Document on the Statistical Analysis of Ground Water Monitoring Data at RCRA Facilities, EPA, 1989
22. Guidance on Applying the Data Quality Objectives Process for Ambient Air Monitoring Around Superfund Sites (Stages 1 & 2), EPA/450/4-89/015, August 1989
23. Guidance for Data Usability in Risk Assessment, OSWER Directive 9285.7-05, EPA/540/G-90/008, October 1990, interim final
24. Guide for Decontaminating Buildings, Structures, and Equipment at Superfund Sites, EPA/600/2-85/028, March 1985
25. Guide for Conducting Treatability Studies Under CERCLA: Soil Vapor Extraction,

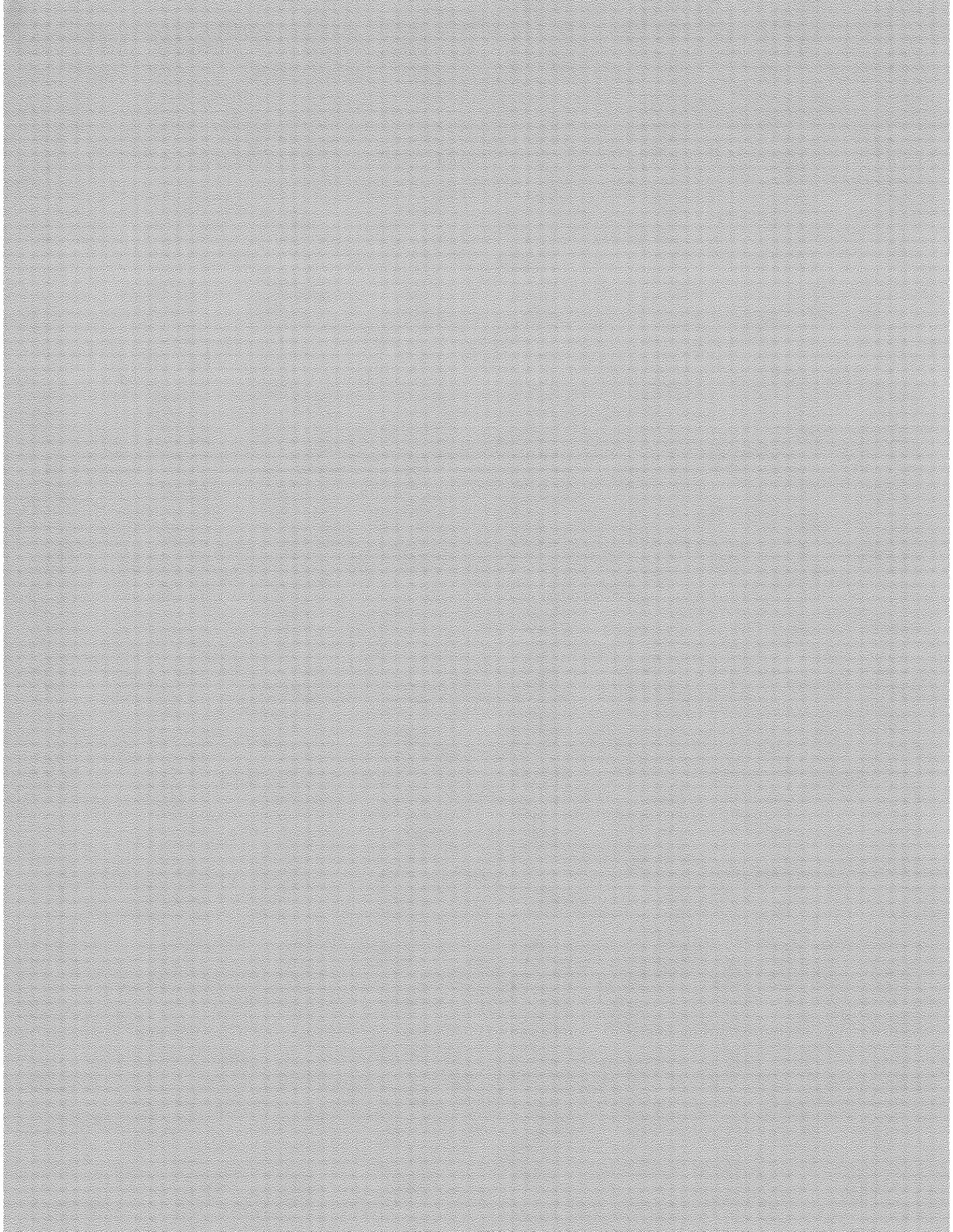
- EPA/540/2-91/019A, September 1991, interim guidance
26. Guide for Conducting Treatability Studies Under CERCLA: Aerobic Biodegradation Remedy Screening, EPA/540/2-91/013A, July 1991, interim guidance
 27. Guide for Conducting Treatability Studies Under CERCLA, EPA/540/2-89/058, December 1989, interim final
 28. Handbook - Permit Writer's Guide to Test Burn Data - Hazardous Waste Incineration, EPA/625/6-86/012, September 1986
 29. Handbook - Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration, EPA/625/6-89/023, January 1990
 30. Handbook - Dust Control at Hazardous Waste Sites, EPA/540/2-85/003, November 1985
 31. Handbook - Guidance on Setting Permit Conditions and Reporting Trial Burn Results - Volume II of the Hazardous Waste Incineration Guidance Series, EPA/625/6-89/019, January 1989
 32. Handbook on In Situ Treatment of Hazardous Waste-Contaminated Soils, EPA/540/2-90/002, January 1990,
 33. Handbook for Stabilization/Solidification of Hazardous Wastes, EPA/540/2-86/001, June 1986
 34. Handbook - Hazardous Waste Incineration Measurement Guidance Manual - Volume III of the Hazardous Waste Incineration Guidance Series, EPA/625/6-89/021, June 1989
 35. Leachate Plume Management, EPA/540/2-85/004, November 1985
 36. Preparation Aids for the Development of Category 1 Quality Assurance Project Plans, EPA/6008-91-003, February 1991
 37. Quality Assurance/Quality Control Guidance for Removal Activities: Sampling QA/QC Plan and Data Validation Procedures, Interim Final, EPA/540/G-90/004, April 1989

38. RCRA Ground Water Monitoring Technical Enforcement Guidance Document (TEGD), OSWER Directive 9950.1, September 1986
39. Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part A), Interim Final, EPA/540/1-89/002, December 1989
40. Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part B), "Development of Risk-based Preliminary Remediation Goals," OSWER Directive 9285.7-01B, December 1991, Interim
41. Risk Assessment Guidance for Superfund: Volume II -Environmental Evaluation Manual, OSWER Directive 9285.7-01, EPA/540/1-89/001A, March 1989, interim final
42. Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors," OSWER Directive 9285.6-03, March 1991, interim final
43. Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part C), "Risk Evaluation of Remedial Alternatives," OSWER Directive 9285.7-01C, December 1991, Interim
44. Seminar Publication - Requirements for Hazardous Waste Landfill Design, Construction, and Closure, EPA/625/4-89/022, August 1989
45. Stabilization/Solidification of CERCLA and RCRA Wastes - Physical Tests, Chemical Testing Procedures, Technology Screening and Field Activities, EPA/625/6-89/022, May 1989
46. Standard Methods for the Examination of Water and Wastewater, American Public Health Association, 18th Edition, 1992
47. Superfund Remedial Design and Remedial Action Guidance, OSWER 9355.0-4A, June 1986
48. Superfund Exposure Assessment Manual, OSWER Directive 9285.5-1, EPA/540/1-88/001, April 1988
49. Superfund Ground Water Issue: Ground Water Sampling for Metals, EPA/540/4-89/001, March 1989

50. Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments, EPA/530-SW-89-047, July 1989
51. Technical Guidance Document: Inspection Techniques for the Fabrication of Geomembrane Field Seams, EPA/530/SW-91/051, May 1991
52. Technical Guidance for Corrective Measures - Subsurface Gas, EPA/530-SW-88-023, March 1985
53. Technical Guidance Document: Construction Quality Assurance and Quality Control for Waste Containment Facilities, EPA/600/R-93/182, September 1993
54. U.S. EPA Integrated Risk Information System (IRIS) Data Base
55. U.S. EPA Health Effects Assessment Summary Tables, Office of Emergency & Remedial Response, published annually

Notes:

- 1) Documents and guidances denoted by an asterisk (*) are those which are important to the Remedial Investigation/ Feasibility Study process but generally will have limited relevance to the Remedial Design/Remedial Action phase of a project.
- 2) Documents and guidances denoted by a double asterisk (**) are those which may be important to the Remedial Design/ Remedial Action phase of a project but generally will have limited relevance to the Remedial Investigation/Feasibility Study process.
- 3) This list of guidance documents is updated periodically. You should check with Ohio EPA to verify that this list is the most current available.



NUMBER: DERR-00-RR-013
ISSUED: DECEMBER 20, 1991
STATUS: DRAFT
PAGE 1 OF 6

SUBJECT: PREFERRED PLANS AND DECISION DOCUMENTS

PURPOSE: This policy describes Preferred Plans and Decision Documents which are used by the Ohio Environmental Protection Agency (OEPA) to meet the statutory requirements of Chapter 3734 of the Ohio Revised Code (ORC) and to facilitate public participation in the identification of the preferred alternative for cleanup at a state lead site. This policy also sets forth the roles and responsibilities of the Division of Emergency and Remedial Response (DERR), the Public Information Center (PIC), and the Legal staff in preparing, distributing and issuing Preferred Plans and Decision Documents.

BACKGROUND: Section 3734.20 of the ORC provides that the Director of OEPA has the authority to initiate appropriate action under Chapters 3704, 3734, or 6111 of the ORC to abate pollution or contamination or to protect public health or safety if the Director determines that condition at a hazardous waste facility, solid waste facility, or other location where waste was treated, stored, or disposed of constitute a substantial threat to public health or safety or are causing or contributing to or threatening to cause or contribute to air or water pollution or soil contamination.

According to Section 3734.21 (B) of the ORC, prior to beginning the cleanup of a hazardous waste facility, the Director shall develop a plan for the cleanup which includes those measures necessary to abate conditions at the facility that are causing or contributing to pollution or contamination or that constitute a substantial threat to public health or safety.

Section 3734.22 of the ORC provides that before OEPA begins the cleanup of a facility, the Director shall endeavor to enter into an agreement with the owner of the land on which the facility is located, or the owner of the facility. The agreement shall specify the measures to be taken and provide authorization to the Director and OEPA employees to enter upon the land and perform the specified measures. The costs of performing the measures shall also be included in the agreement. Preferred

SUBJECT: PREFERRED PLANS AND DECISION DOCUMENTS

Plans and Decision Documents explain to the public the evaluation of alternatives that has taken place in the development of measures and plans that will result in cleanup at a state lead site.

According to Section 3745.04 of the ORC, any person may appeal an action of the Director to the Environmental Board of Review. An "action" includes the issuance, modification, or revocation of any lawful order. The development and distribution of Preferred Plans and Decision Documents does not constitute an action of the Director. However, administrative orders for cleanups, which include the Decision Document, are issued to govern action at state lead sites. Administrative orders are actions of the Director that may be appealed to the Environmental Board of Review.

DEFINITIONS:

As used in this policy, the term Preferred Plan shall mean a document prepared by DERR which presents to the public DERR's preferred alternative for cleanup at a site. This document includes a brief summary of the alternatives evaluated in the detailed analyses of the Feasibility Study, highlighting the key factors that led to the identification of the preferred alternative.

Decision Document shall mean the report which evidences DERR's cleanup plan for a site. Any comments received on the preferred plan are taken into consideration during preparation of this document.

PROCEDURES:

The following are the requirements that shall be followed by DERR in the development of Preferred Plans and Decision Documents. The Public Participation Policy shall be consulted to insure efficient coordination of public participation activities with PIC.

- (A) Preferred Plans
- (1) The Preferred Plan shall be drafted by the Site Coordinator and

SUBJECT: PREFERRED PLANS AND DECISION DOCUMENTS

approved by the District Office Group Leader and Unit Supervisor. The Preferred Plan shall include at a minimum the following information:

- (a) Environmental conditions at the site as determined by the Remedial Investigation (RI);
 - (b) Remedial alternatives evaluated in the Feasibility Study (FS);
 - (c) OEPA's preferred alternative;
 - (d) Identification and summarization of statutory requirements and any proposed waivers of those requirements; and
 - (e) A brief analysis of the preferred alternatives discussed in terms of the eight evaluation criteria.
- (2) The draft Preferred Plan shall be distributed to the Manager, Technical and Program Support Section, Central Office, the assigned DERR attorney for the Site and PIC for review. Comments on the Preferred Plan shall be coordinated through the Manager, Technical and Program Support Section, Central Office, to the Site Coordinator for revision.
 - (3) The final Preferred Plan shall be routed to the Chief, DERR, with attached sign-off sheet through the following individuals: District Office Unit Supervisor; Manager, Technical and Program Support Section, Central Office; and Assistant Chief, DERR.
 - (4) A copy of the final Preferred Plan shall be distributed by the District office to the following individuals: Manager, Technical and Program Support Section, Central Office; Manager, Investigation and Field Support Section, Central Office; and DERR assigned attorney.
 - (5) Once approved by the Chief, DERR, the Preferred Plan shall be routed to PIC for newspaper notification in a newspaper of general circulation.
 - (6) The public notice shall provide sufficient information to provide

SUBJECT: PREFERRED PLANS AND DECISION DOCUMENTS

a reasonable explanation of the Preferred Plan. The notice shall emphasize that the agency is soliciting public comment on all of the alternatives evaluated in the detailed analysis of the FS as well as the preferred alternative. The notice shall inform the public of its role in the remedy selection process and shall provide the following information:

- (a) The location of the information repositories and administrative record file (see the Public Participation Policy for information on establishing the document repository and administrative record files);
 - (b) The methods by which the public may submit comments; and
 - (c) The dates of the public comment period, which shall not be shorter than thirty (30) calendar days.
- (7) During the public comment period, PIC shall schedule a public meeting. The first portion of the meeting shall be used to explain the Preferred Plan and answer questions. The Site Coordinator and other agency staff (as required) shall participate. The second half of the meeting shall be a formal hearing conducted by an OEPA attorney or hearing officer to record comments on the Preferred Plan. A transcript shall be taken of the hearing and made available to the public in the information repository. A news release shall be prepared and issued by PIC to announce the public meeting.
- (8) After the public comment period ends, a final remedial alternative shall be selected by DERR. The remedy shall be selected on the basis of analysis presented in the Preferred Plan and RI/FS report, comments received from the public and any other new and significant information received or generated.
- (9) DERR may reevaluate the preferred alternative in light of comments and any new information received. DERR may change a component of the preferred remedy or choose to implement a remedy other than the preferred alternative. If a change is made in the Preferred Plan, the change shall be explained in the Decision Document. Significant changes may

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warrant issuance of a revised Preferred Plan and additional public comment. Significant changes include those changes that modify the selected alternative or change the preferred alternative to another. Changes to the preferred alternative shall be coordinated among the District Office, Central Office, and Legal staff. The final decision regarding any changes to the preferred alternative shall be made by the Chief, DERR.

(B) Decision Documents

- (1) The Decision Document shall be drafted by the Site Coordinator in the District Office. It shall consist of three components:
 - (a) The Declaration, which shall be an abstract of the key information;
 - (b) The Decision Summary, which shall provide an overview of the site characteristics, the alternatives evaluated, and an analysis of the options considered, including a comparison of the costs of each of the alternatives; and
 - (c) The Responsiveness Summary, which shall address public comments received on the Preferred Plan, RI/FS report, and other information in the administrative record.
- (2) The draft Decision Document shall be forwarded to the Manager, Technical and Program Support Section, and the assigned DERR attorney for review and comment. The Manager, Technical and Program Support Section, shall communicate comments received back to the District Office.
- (3) The Site Coordinator, District Office, shall make necessary revisions to the Decision Document and forward a final draft to the Chief, DERR after sign-off by the following individuals: District Office Unit Supervisor; Manager, Technical and Program Support Section; Assistant Chief, DERR.

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- (4) A copy of the final Decision Document shall be distributed to the following individuals by the District Office: Manager, Technical and Program Support Section; Manager, Investigation and Field Support Section; and the DERR assigned attorney.
- (5) The final Decision Document shall be placed in the Administrative Record Files (see the Public Participation Policy for information on establishing the document repository, the administrative record files and communication of the contents of the Decision Document to the public) and a copy shall be incorporated into any administrative orders for remedial action issued by DERR.