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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 ("Shieldalloy") and Cyprus Foote Mineral Company ("Cyprus Foote") ("Defendants", as defined in Section IV. DEFINITIONS) 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 an injunction for Defendants to investigate, to abate and to prevent migration of alleged pollution and contamination and to take other actions at the facility currently owned by Shieldalloy on State Route ("S. R.") 209, Guernsey County, Ohio (the "Site," as defined in Section IV. DEFINITIONS), and alleges violations of Ohio solid waste, hazardous waste, and water pollution and other laws at the Site;

WHEREAS, Shieldalloy, which is the current owner of the Site, and Cyprus Foote, which is the successor to the former owner of the Site, entered into a Consent Order for Preliminary Injunction ("COPI") with the State of Ohio which the Court issued on July 11, 1995;

WHEREAS, the COPI provided for the Defendants to complete a Remedial Investigation and Feasibility Study ("RI/FS") for the Site, the objectives of which were: (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, Ohio EPA has approved Defendants' RI/FS report;

WHEREAS, Ohio EPA has issued a Preferred Plan that sets forth Ohio EPA's preferred alternative for remediation at the Site, and issued public notice of the Preferred Plan to solicit public comments;

WHEREAS, Ohio EPA has planned a public meeting in order to provide information and answer questions about the Preferred Plan to the general public, and to receive both oral and written comments from the public about the Preferred Plan;

WHEREAS, Ohio EPA will issue a Decision Document that selects the remedy for the Site, which will be based on the analysis presented in the Preferred Plan and RI/FS report, comments received from the public, and any other new or significant information received and generated, during and after the public comment period (once issued, the Decision Document will become Appendix C to this Consent Order);

WHEREAS, Shieldalloy and Cyprus Foote have agreed to enter into this Consent Order with the State of Ohio;

WHEREAS, the objectives of this Consent Order include the protection of human health and the environment by requiring Defendants to abate and to prevent the migration of alleged pollution and contamination through implementation of a Remedial Design ("RD") and Remedial Action ("RA")

(collectively "RD/RA"), performance of Operation and Maintenance ("O&M") and other Work at the Site, and the taking of certain other actions.

WHEREAS, the remediation and other Work to be performed under this Consent Order apply to alleged pollution and contamination from radioactive waste and other Waste Material at the Site;

WHEREAS, on May 27, 1987, the U.S. Nuclear Regulatory Commission ("NRC") issued License No. SMB-1507 to Shieldalloy concerning the possession of certain radioactive material at the Site, which license has been amended from time to time;

WHEREAS, Shieldalloy is preparing to decommission certain radioactive material at the Site under the Atomic Energy Act, 42 U.S.C. 2014, et seq., and regulations of NRC promulgated thereunder;

WHEREAS, on July 25, 1996, NRC published in the Federal Register (61 FR 38789) notice of the availability of its Draft Environmental Impact Statement concerning the decommissioning of certain radioactive material at the Site;

WHEREAS, R.C. Chapter 3748 provides the Ohio Department of Health with regulatory authority over "radioactive material" within the meaning of R.C. Section 3748.01;

WHEREAS, R.C. Section 3748.03 directs the Ohio Department of Health to enter into negotiations with NRC for an agreement for the State of Ohio to exercise licensing and other regulatory authority in lieu of regulation by NRC under the

Atomic Energy Act, 42 U.S.C. 2014, et seq. (i.e., for the State of Ohio to become an “Agreement State”);

WHEREAS, the Ohio Environmental Protection Agency confers with NRC and the Ohio Department of Health on matters relating to radioactive waste at the Site;

WHEREAS, the Ohio Environmental Protection Agency confers with the Department of the Interior, U.S. Fish and Wildlife Service, on matters relating to natural resource damages at the Site;

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

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

WHEREAS, Shieldalloy believes that expeditious resolution of the State of Ohio’s enforcement action against Shieldalloy in this Case and claims in the Bankruptcy Case will facilitate reorganization in its Bankruptcy Case;

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 Consent Order. Solely for purposes of this Consent Order, and the underlying Complaint, the Complaint states a claim upon which relief can be granted and Defendants are proper parties to this action.

III. PARTIES BOUND

2. The provisions of this Consent Order shall apply to and be binding upon Plaintiffs and the Defendants, their successors in interest and assigns, and others to the extent provided by Ohio Civil Rule 65(D). Nothing herein is intended to expand or limit the scope of Ohio Civil Rule 65(D).

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' rights or obligations under this Consent Order. Defendants shall provide a copy of this Consent Order 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 Consent Order to each general contractor and subcontractor hired by, or who will provide Work or services on behalf of, Defendants related to this Consent Order.

IV. DEFINITIONS

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

- A. "CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9601, et seq., as amended.
- B. "Certification of Completion" shall mean the approval of Defendants' construction completion report pursuant to Section 3.4.3 of the RD/RA SOW.
- C. "Consent Order" shall mean this Permanent Injunction Consent Order.
- D. "COPI" shall mean the Consent Order for Preliminary Injunction issued by this Court on July 11, 1995.
- E. "Contractor" shall mean a qualified contractor retained by the Defendants pursuant to this Consent Order, and any subcontractor, representative, agent, employee, or designee thereof.
- F. "Days" shall mean calendar days, including weekends and holidays.
- G. "Decision Document" shall mean the document issued by Ohio EPA setting forth the remedial action requirements for the Site.
- H. "Defendants" shall mean the Shieldalloy Metallurgical Corporation and Cyprus Foote Mineral Company, individually and collectively.
- I. "Director" shall mean the Director of the Ohio Environmental Protection Agency and the Director's duly authorized representatives.
- J. "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 Waste Material 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 Consent Order.

- K. "Effective Date" shall mean the date that the Guernsey County Court of Common Pleas enters this Consent Order.
- L. "Feasibility Study" ("FS") shall mean the development, evaluation, and analysis of remedial alternatives in accordance with state and federal environmental laws and with the COPI.
- M. "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.
- N. "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, or successor agencies.
- O. "Operation and Maintenance" ("O&M") shall mean all activities required to maintain the effectiveness of the Remedial Action as required under the approved Operation and Maintenance Plan required or contemplated by this Consent Order and the Statement of Work (SOW).
- P. "Oversight Costs" shall mean all direct and indirect costs of oversight incurred by the State of Ohio in verifying the work to be performed by Defendants pursuant to the COPI and this Consent Order, or otherwise implementing or enforcing the COPI and this Consent Order, including but not limited to the costs of payroll, fringe benefits, 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 the COPI and this Consent Order.

- Q. "Paragraph" shall mean a portion of the Consent Order identified by an arabic numeral or an upper case letter.
- R. "Parties" shall mean the State of Ohio and the Defendants.
- S. "Performance Standards" shall mean the cleanup standards and other measures of achievement of the goals of the Remedial Action, set forth in Section 6 of the Decision Document and Section 2.0 of the RD/RA SOW.
- T. "Preferred Plan" shall mean the document prepared by Ohio EPA that presents to the public Ohio EPA's preferred alternative for the pollution abatement/cleanup 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 selection of the preferred alternative.
- U. "Remedial Action" ("RA") shall mean those activities, except for Operation and Maintenance, to be undertaken by Defendants to implement the approved Remedial Design, and other plans approved by Ohio EPA, in accordance with the RD/RA Statement of Work, the final Remedial Design and Remedial Action Workplan, the Decision Document and other plans approved by Ohio EPA.
- V. "Remedial Design" ("RD") shall mean the design of, in accordance with Ohio law and this Consent Order, detailed engineering plans, specifications, construction drawings and other plans deemed by Ohio EPA to be sufficient to implement the remedy selected by Ohio EPA in the Decision Document, in accordance with the RD/RA Statement of Work, the final Remedial Design and Remedial Action Workplan and other plans approved by Ohio EPA.
- W. "Remedial Design/Remedial Action" ("RD/RA") shall mean the Remedial Design and the Remedial Action together.

- X. "RD/RA Statement of Work" ("RD/RA SOW") shall mean the Statement of Work for implementation of the Remedial Design, Remedial Action, and Operation and Maintenance at the Site, as set forth in Appendix A to this Consent Order and any modifications made in accordance with this Consent Order. The RD/RA Statement of Work is not specific to this Site, and shall be used as an outline in developing workplans specific to this Site.
- Y. "Remedial Investigation/Feasibility Study" ("RI/FS") shall mean the Remedial Investigation and Feasibility Study together.
- Z. "Remedial Investigation" ("RI") shall mean the investigation conducted in accordance with state environmental laws and the 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.
- AA. "Response Costs" shall mean all costs incurred by the State of Ohio pursuant to the COPI and this Consent Order verifying the Work, doing the Work or otherwise implementing or enforcing the COPI and this Consent Order, 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.
- BB. "Section" shall mean a portion of this Consent Order identified by a roman numeral.
- CC. "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 property, where the treatment, storage, and/or disposal of Waste Material have occurred, and/or the discharge of Waste Material into waters of the State have occurred, including any area inside or outside of the property where Waste Material from the property have migrated.
- DD. "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, and R.C. Chapter 3748, and naturally-occurring radioactive material and accelerator-produced radioactive material as those terms are defined under R.C. Chapter 3748.

EE. "Work" shall mean all activities Defendants are required to perform under this Consent Order.

FF. "Workplans" shall mean those documents which are to be submitted to Ohio EPA by Defendants pursuant to this Consent Order detailing the requirements for support of the RD/RA, O&M, Additional Work, Wetlands Work and other Work required under this Consent Order. Each required workplan shall include a detailed description of the proposed design and/or implementation activities; a time schedule for conducting those activities; and personnel and equipment needs.

6. Except as otherwise defined above, the terms used in this Consent Order shall have the same meaning as used in R.C. Chapters 3734 and 6111 and the regulations promulgated thereunder.

V. COMPUTATION OF TIME

7. In computing any period of time under this Consent Order, where the last day would fall on a Saturday, Sunday or State of Ohio or federal holiday, the

period shall run until the end of the next day that is not a Saturday, Sunday or State of Ohio or federal holiday.

VI. DESIGNATION OF SITE COORDINATORS

8. The Defendants shall designate a site coordinator and an alternate site coordinator to oversee and implement all Work required by this Consent Order and to coordinate with the Ohio EPA site coordinator.

9. Within ten (10) days of the Effective Date of this Consent Order, 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.

10. To the maximum extent practicable, except as specifically provided in this Consent Order, communications between the Parties regarding the implementation of this Consent Order 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 Consent Order. 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.

11. 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 Consent Order, 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 Consent Order;
- E. Inspecting and copying records, operating logs, contracts and/or other documents related to the implementation of this Consent Order subject to Section XVII. ACCESS TO INFORMATION AND RECORDS RETENTION;
- F. Assessing Defendants' compliance with this Consent Order;
- G. Conducting inspections at any time of all areas of the Site (see Section VII. SITE ACCESS RESTRICTIONS);
- H. Directing actions taken at the Site pursuant to this Consent Order; and,
- I. Reviewing and approving or disapproving all Workplans, reports, studies and other documents that Defendants are

required to submit pursuant to this Consent Order, including authorities as provided under Section XIV. REVIEW OF SUBMITTALS.

VII. SITE ACCESS RESTRICTIONS

12. Defendants shall implement the Site Access Restrictions Workplan as approved by Ohio EPA under the COPI, until new Site Access Restrictions are approved and implemented pursuant to the approved RD/RA Workplan. This Section does not limit the right of the State of Ohio to access the Site under Section XVIII. SITE ACCESS.

VIII. REMEDIAL DESIGN/REMEDIAL ACTION AND OPERATION AND MAINTENANCE

13. Defendants shall implement Remedial Design/Remedial Action ("RD/RA") and Operation and Maintenance ("O&M") for the Site pursuant to the terms of this Consent Order. All Work performed pursuant to this Consent Order shall be under the direction and supervision of a contractor(s) with expertise in remediation of the Waste Material at the Site. Defendants shall notify Ohio EPA in writing of the name of the supervising contractor and any and all subcontractors to be used in carrying out the terms of this Consent Order. The RD/RA Workplan and O&M Workplan shall be developed and will be reviewed for consistency with the NCP, and the most current version of applicable guidance documents as set forth in Appendix B hereto.

A. Within fourteen (14) days of the Effective Date of this Consent Order, Defendants shall meet with the Ohio EPA to discuss the requirements of the RD/RA Workplan, unless otherwise mutually agreed upon by the Parties.

B. Within sixty (60) days of the Effective Date of this Consent Order, Defendants shall submit to Ohio EPA for review and approval pursuant to Section XIV. REVIEW OF SUBMITTALS a Workplan for the implementation of the Remedial Design and Remedial Action for the Site ("Remedial Design and Remedial Action Workplan" or "RD/RA Workplan"). The RD/RA Workplan shall provide for the design and implementation of the remedial action as set forth in the Decision Document issued by Ohio EPA consistent with Section X. SELECTION OF THE REMEDY of the COPI.

C. By ninety (90) days prior to the scheduled completion date of the Remedial Action as specified in the approved RD/RA Workplan, Defendants shall submit to Ohio EPA for review and approval, pursuant to Section XIV. REVIEW OF SUBMITTALS, a plan for the implementation of Operation and Maintenance at the Site, including provision for Operation and Maintenance of the East Slag Pile and West Slag Pile for one thousand (1000) years or such shorter period as may be approved by Ohio EPA ("O&M Workplan").

D. The RD/RA and O&M Workplans shall be developed in conformance with this Consent Order, the RD/RA SOW, the guidance documents listed in Appendix B, attached hereto and incorporated fully herein, the National Contingency Plan 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 RD/RA Workplan and/or the O&M Workplan, Ohio EPA will notify Defendants, and Defendants shall modify the RD/RA Workplan, O&M Workplan and other affected documents accordingly.

E. Upon approval of the RD/RA Workplan by Ohio EPA, Defendants shall implement the Work detailed therein in accordance with the schedule contained in the approved RD/RA Workplan. Upon approval of the O&M Workplan by Ohio EPA, Defendants shall implement the Work detailed therein in accordance with the schedule contained in the approved O&M Workplan. Defendants shall submit all plans, reports, or other deliverables required under the approved RD/RA Workplan and under the approved O&M Workplan, in accordance with the approved schedule, for review and approval pursuant to Section XIV. REVIEW OF SUBMITTALS of this Consent Order.

F. The requirements of this Section as to RD/RA Work only (not O&M Work) shall terminate upon issuance by Ohio EPA of a Certification of Completion.

IX. PERIODIC REVIEW TO ASSURE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

14. If the Work performed by the Defendants pursuant to this Consent Order results in any Waste Material remaining at the Site, the State of Ohio may review the Work at least once every five (5) years after approval by Ohio EPA of the

Certification of Completion of the Remedial Action to evaluate whether the Remedial Action continues to be protective of human health and the environment.

15. During the 30-year period following Ohio EPA's approval of the Certification of Completion, upon written request of Ohio EPA, Defendant shall conduct and submit to Ohio EPA pursuant to Section XIV. REVIEW OF SUBMITTALS such studies and investigations as are necessary to evaluate whether the remedial action continues to be protective of human health and the environment; provided, Ohio EPA may request not more than six distinct sets of studies and investigations during the 30-year period pursuant to this paragraph.

16. If Ohio EPA determines that further response action is appropriate for protection of human health and the environment at the Site, then Ohio EPA may take any appropriate action, including any of the following actions: 1) initiate Additional Work under Section X. ADDITIONAL WORK, to the extent such Section is applicable; 2) exercise any lawful authority under this Consent Order or in any other proceeding, including issuance of an administrative order or initiation of judicial proceedings, to compel Defendants and/or any other person to perform additional response action to assure protection of human health and the environment; or 3) institute proceedings against Defendants to recover the State of Ohio's costs of doing remediation activities at the Site.

X. ADDITIONAL WORK

17. Ohio EPA or Defendants may determine that in addition to the tasks defined in the approved RI/FS Workplan, RD/RA Workplan, and O&M Workplan and other requirements of this Consent Order, additional Work may be necessary to achieve and maintain the Performance Standards or to carry out and maintain the effectiveness of the remedy set forth in the Decision Document.

18. In the event that Ohio EPA determines that additional Work is necessary to achieve and maintain the Performance Standards or to carry out and maintain the effectiveness of the remedy set forth in the Decision Document, 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 thirty (30) 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 this Consent Order, the RI/FS SOW or RD/RA SOW as applicable, the National Contingency Plan, the guidance documents listed in Appendix B, and R.C. Chapters 3734 and 6111. Upon approval of the Workplan by Ohio EPA pursuant to Section XIV. REVIEW OF SUBMITTALS, Defendants shall implement the Workplan for additional Work in accordance with the schedules contained therein.

19. In the event that Defendants determine that additional Work is necessary to achieve and maintain the Performance Standards or to carry out and maintain the effectiveness of the remedy set forth in the Decision Document. 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 this Consent Order, the applicable SOW, National Contingency Plan, the guidance documents listed in Appendix B, and R.C. Chapter 3734 and 6111. Upon approval of the Workplan by Ohio EPA pursuant to Section XIV. REVIEW OF SUBMITTALS, Defendants shall implement the Workplan for additional Work in accordance with the schedules contained therein.

20. In the event that additional Work is necessary for any task described in this Consent Order, 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 Ohio EPA for the performance of such Work.

21. Any determination(s) that additional Work is necessary pursuant to this Section X. ADDITIONAL WORK must be made on or before the thirtieth anniversary of the Certification of Completion.

22. Defendants may invoke the procedures set forth in Section XXVIII. DISPUTE RESOLUTION to dispute Ohio EPA's determination that Additional

Work is necessary to achieve and maintain the Performance Standards or to carry out and maintain the effectiveness of the remedy set forth in the Decision Document.

XI. WETLANDS WORK

23. Within ninety (90) days after approval of the Remedial Design in accordance with the approved RD/RA Workplan, Defendants shall submit to Ohio EPA for review and approval pursuant to Section XIV. REVIEW OF SUBMITTALS a Workplan ("Wetlands Workplan") for the enhancement and/or restoration, and preservation, of approximately 40 to 45 acres of wetlands in the vicinity of the Site consistent with the terms of this Section. Should such acreage not be reasonably available within the vicinity of the Site, Defendants' Workplan shall provide for the enhancement and/or restoration, and preservation, of approximately 50 acres of wetlands in the Cambridge, Ohio area, subject to Ohio EPA approval. Property priced at a significant cost over reasonable market rates is not "reasonably available." The Wetlands Workplan shall contain work schedules and shall be developed in accordance with Appendix D.

24. Upon approval of the Wetlands Workplan by Ohio EPA, Defendants shall implement the approved Wetlands Workplan in accordance with the schedule contained in the approved Workplan. Defendants shall submit all plans, reports, or other deliverables required under the approved Wetlands Workplan, in accordance

with the approved schedule, for review and approval pursuant to Section XIV. REVIEW OF SUBMITTALS of this Consent Order.

25. Defendants may petition Ohio EPA for approval to cease doing work otherwise required under the approved Wetlands Workplan to the extent the cost will exceed the sum of Two Hundred Seventy-Six Thousand Dollars (\$276,000). Defendants must show that they have spent, or will spend, the sum of Two Hundred Seventy-Six Thousand Dollars (\$276,000) pursuant to the approved Wetlands Workplan. Defendants shall provide details in the Wetlands Workplan of cost estimates for the Work thereunder. This Section does not require Defendants to spend more than Two Hundred Seventy-Six Thousand Dollars (\$276,000) in actual costs incurred in performing the Work required under the approved Wetlands Workplan. The purchase price of any property necessary for the creation and/or enhancement shall not be included in the actual costs of the wetlands Work.

26. Defendants shall purchase, or obtain a conservation easement on, real property that is subject to wetlands creation or enhancement under the Wetlands Workplan, and shall maintain such property consistent with the Wetlands Workplan for so long as the Defendants have a real property interest in the wetlands property.

27. Defendants shall not convey any title, easement or other interest in the property that is subject to the Wetlands Workplan which could affect the goals of

this Section of the Consent Order without a provision in the deed requiring compliance with the Wetlands Workplan.

XII. STORMWATER CONTROL

28. Within sixty (60) days from the Effective Date of this Consent Order, Shieldalloy shall submit to Ohio EPA a complete application for a stormwater permit under R.C. Chapter 6111 for the Site in accordance with Section XIV. REVIEW OF SUBMITTALS.

XIII. CLOSURE OF SOUTH BAGHOUSE DUST WASTEPILE

29. Shieldalloy is ordered and enjoined to comply with the closure plan for the south baghouse dust (D007) wastepile located at the Site, as approved by Ohio EPA, including schedules specified therein, and with Ohio Administrative Code ("OAC") Rules 3745-66-10 through 3745-66-20. Nothing in this paragraph is intended to limit Ohio EPA's authority to approve, or Shieldalloy's opportunity to request, a modification to the requirements of the approved closure plan.

30. Within sixty (60) days of completion of closure of the south baghouse dust (D007) wastepile, Shieldalloy shall submit certification of closure to Ohio EPA in accordance with OAC Rule 3745-66-15.

XIV. REVIEW OF SUBMITTALS

31. Ohio EPA agrees to review any Workplan, report, study, or other document that Defendants are required under this Consent Order to submit to Ohio EPA, in accordance with this Consent Order, 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.

32. In the event of approval or approval upon condition by Ohio EPA, Defendants shall proceed to take any action required by the submission as approved or conditionally approved by Ohio EPA. Ohio EPA may approve a modification to an approved submission, including without limitation, a modification based on a requirement imposed by the Atomic Energy Act, 42 U.S.C. 2014, et seq., or regulations promulgated thereunder.

33. 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 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.

34. 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 Work required under this Consent Order and recover all costs associated with such Work not inconsistent with the NCP.

35. Defendants reserve the right to invoke the Dispute Resolution provisions of this Consent Order with respect to any original or revised submission that Ohio EPA disapproves, directs Defendants to modify, or approves upon condition, whether in whole or in part, and with respect to Ohio EPA's decision on a request to modify an approved submission.

36. All Workplans, reports, or other items required to be submitted to Ohio EPA under this Consent Order shall, upon approval by Ohio EPA, be deemed to be incorporated in and made an enforceable part of this Consent Order 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 Consent Order.

37. 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 any desired modification by Defendants. 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.

38. In the event of disapproval of any second or subsequent submittal under Section XIV. REVIEW OF SUBMITTALS, or any noncompliance with the terms of or deadlines under this Consent Order, Ohio EPA may conduct any of the Work required under this Consent Order and recover all costs associated with such Work.

XV. DOCUMENT SUBMITTAL

39. Unless otherwise provided in this Consent Order, all documents required to be submitted pursuant to this Consent Order shall be sent by certified

mail return receipt requested, overnight mail, or personal delivery, or equivalent, to the following addresses:

Ohio Environmental Protection Agency
1800 WaterMark Drive
P.O. Box 1049
Columbus, Ohio 43216-1049
ATTN: Records Officer, DERR

and

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

and

Ohio Department of Health
246 North High Street, 7th Floor
Columbus, Ohio 43266
ATTN: Site Contact Shieldalloy Metallurgical Corp. Site

Defendants shall provide the State of Ohio with additional copies of documents upon request.

40. 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

XVI. DEFENDANTS' PROGRESS REPORTS

41. Unless otherwise directed by Ohio EPA, Defendants shall submit a written progress report to Ohio EPA by the tenth (10th) 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 Consent Order 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.

XVII. ACCESS TO INFORMATION AND RECORDS RETENTION

42. Upon written request, Defendants shall promptly provide to Ohio EPA 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.

43. Unless Defendants claim upon submittal and show that a document or other information submitted to Ohio EPA pursuant to this Consent Order 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.

44. 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.

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

46. Defendants shall preserve and maintain in a readable format 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 under this Consent Order, or Work under the COPI, notwithstanding any document retention policies to the contrary. Defendants may preserve such documents by microfiche, or other electronic or photographic device. Unless otherwise agreed by the parties, on or after the fifteenth (15th) anniversary of the issuance of the Certification of Completion, Defendants may discard such documents; provided, that Defendants have given Ohio EPA six (6) months advance notice of their intent to discard such documents, and have made the documents available to Ohio EPA for Ohio EPA to review, copy and retain them.

XVIII. SITE ACCESS

47. The State of Ohio, 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 Consent Order. Access under this Consent Order shall be for the limited purpose of carrying out the following activities and related activities of this Consent Order:

- 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 Consent Order;
- D. Verifying any data and/or other information submitted to Ohio EPA; and,

E. Doing Work or other remediation activities at this Site not inconsistent with the Decision Document or this Consent Order.

48. To the extent that the Site or any other property to which access is required for the implementation of this Consent Order 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 Consent Order. 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 Consent Order is not obtained within thirty (30) days of the Effective Date of this Consent Order, 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.

49. This Section shall not be construed to eliminate or restrict any right of access or right to seek access to the Site which the State may otherwise have under federal or state law.

XIX. DEED RESTRICTION

50. Within thirty (30) days of approval of the Remedial Design under Section VIII. REMEDIAL DESIGN/REMEDIAL ACTION AND OPERATION AND MAINTENANCE of this Consent Order, Shieldalloy shall place a deed restriction on the deed to property at the Site owned by Shieldalloy with the County Recorders

Office for Guernsey County, Ohio. The deed restriction shall describe this Consent Order and any monitoring or containment devices and/or development or use restriction on the Site. The deed restriction shall be developed in accordance with the RD/RA Workplan and O&M Workplan and approved by Ohio EPA.

51. Shieldalloy shall not convey any title, easement or other interest in the property which is part of the Site which could affect the goals of this Consent Order without a provision in the deed requiring continued compliance with this Consent Order.

52. Shieldalloy shall not remove, alter or terminate the deed restriction in the property which is part of the Site without prior approval of Ohio EPA.

XX. PERMANENT INJUNCTION

53. Shieldalloy is hereby permanently enjoined and ordered to comply with R.C. Chapters 3734 and 6111 and rules promulgated thereunder, including but not limited to any terms or conditions of any permits and any renewals or modifications thereof issued under these statutes. Shieldalloy is further permanently enjoined from discharging any pollutants, industrial waste or other wastes into waters of the State without first obtaining an NPDES permit issued by the Director of Environmental Protection, and any other permit required by state and/or federal law.

XXI. FINANCIAL ASSURANCE

54. Within thirty (30) days from the Effective Date of this Consent Order, Defendants (individually and/or collectively) shall provide financial assurance for remediation of the West Slag Pile and East Slag Pile in the amount of \$5.6 million in accordance with OAC Rule 3745-66-43. Each year by the anniversary date of the Effective Date of this Consent Order, Defendants (individually and/or collectively) shall perform an annual review and adjustment of such financial assurance in accordance with OAC Rules 3745-66-42 and 3745-66-43.

55. Within thirty (30) days of approval of the "Derivation of Cleanup Levels for Wetland Soils" (a document that is part of the Remedial Design) or within fourteen (14) months from the Effective Date of this Consent Order, whichever is earlier, Defendants (individually and/or collectively) shall provide financial responsibility for remediation of the wetlands, sediments, soils, and other areas surrounding the West Slag Pile and East Slag Pile at the Site in accordance with OAC Rule 3745-66-43 in an amount up to \$3.4 million. Each year by the anniversary date of the Effective Date of this Consent Order, Defendants (individually and/or collectively) shall perform an annual review and adjustment to provide financial assurance in accordance with OAC Rules 3745-66-42 and 3745-66-43

56. Within thirty (30) days from the Effective Date of this Consent Order, Defendants shall provide financial assurance for Operation and Maintenance of the Site, including one thousand (1000) years of Operation and Maintenance of the East

Slag Pile and West Slag Pile in accordance with an annuity/trust option approved by Ohio EPA consistent with Appendix E or with OAC Rules 3745-66-44 and 3745-66-45. Each year by the anniversary date of the Effective Date of this Consent Order, Defendants shall perform an annual review and adjustment of such financial assurance in accordance with OAC Rules 3745-66-44 and 3745-66-45.

57. Nothing in this Section XXI. FINANCIAL ASSURANCE prevents the use of alternative language for financial mechanisms as approved by Ohio EPA.

XXII. REIMBURSEMENT OF COSTS

58. Defendants shall reimburse the State of Ohio for all Response Costs incurred by the State of Ohio in connection with oversight of remediation of the Site, including without limitation Response Costs incurred for Oversight or other activities contemplated by this Consent Order that are not inconsistent with the NCP. The obligations of Section XXVI of the COPI on reimbursement of costs shall continue in effect as provided in Section XXIX. TERMINATION OF CONSENT ORDER FOR PRELIMINARY INJUNCTION of this Consent Order.

59. Within thirty (30) days of the Effective Date of this Consent Order, or of the confirmation of Shieldalloy's Plan of Reorganization in the Bankruptcy Case, whichever is later, unless otherwise agreed to by the Parties, Defendant Shieldalloy shall pay the amounts specified below:

- A. An Allowed General Unsecured Claim that Ohio shall have against Shieldalloy in the Bankruptcy Case in the amount of (i) Sixteen Thousand Five Hundred Sixty-Two Dollars and Fifty-Five cents (\$16,562.55) for prepetition response costs incurred by

Ohio EPA at the Site; and (ii) Ten Thousand Three Hundred Dollars (\$10,300.00) for prepetition response costs incurred by the Ohio Department of Health at the Site;

- B. An Allowed Administrative Claim that Ohio shall receive from Shieldalloy in the Bankruptcy Case in the amount of One Hundred and Two Thousand Six Hundred Twenty Dollars and Eighty-Six cents (\$102,620.86) for Ohio EPA's postpetition response costs incurred for the Site, including time and analytical lab charges, for the period from September 3, 1993 through January 17, 1995.

60. Within thirty (30) days of the Effective Date of this Consent Order, Defendant Cyprus Foote shall remit payment of One Hundred Twenty-Five Thousand Eight Hundred Eighty-Three Dollars and Forty-Two Cents (\$125,883.42) for Response Costs incurred by the State of Ohio prior to January 18, 1995. (\$119,183.42 for Ohio EPA; \$6,700 for ODH).

61. Ohio EPA will submit to Defendants at least annually an itemized statement of the State of Ohio's Response Costs. Defendants shall pay such Response Costs, subject to Section XXVIII. DISPUTE RESOLUTION, within thirty (30) days of receipt of the itemized statement. Failure to include response costs in an annual statement does not preclude submission of such costs in a subsequent annual statement. With respect to this Section XXII. REIMBURSEMENT OF COSTS, Section XXVIII. DISPUTE RESOLUTION of this Consent Order shall apply only to disputes over the accuracy of the State of Ohio's request for reimbursement and over whether the costs are not inconsistent with the NCP.

62. Defendants shall remit payments to the State of Ohio under this Section as follows:

- A. For costs incurred by Ohio EPA, 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 43216-1049, ATTN: Edith Long (or successor). A copy of the transmittal shall be sent to the Fiscal Officer, DERR, Ohio EPA, P.O. Box 1049, 1800 WaterMark Drive, Columbus, Ohio 43216-1049, ATTN: Patricia Campbell (or successor).
- B. For costs incurred by the Ohio Department of Health, payment shall be made by certified check payable to "Treasurer, State of Ohio" and shall be forwarded to the Fiscal Officer, Ohio Department of Health, 7th Floor, 246 North High Street, Columbus, Ohio 43215 Attn: Fiscal Officer. A copy of the transmittal shall be sent to the Fiscal Officer, DERR, Ohio EPA, P.O. Box 1049, 1800 WaterMark Drive, Columbus, Ohio 43216-1049, 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.
- D. For costs incurred by any other agency of the State of Ohio in connection with oversight of remediation or Work at the Site, payment shall be made by certified check payable to "Treasurer, State of Ohio", and shall be forwarded as specified in writing by the Ohio Attorney General's Office.

XXIII. POTENTIAL FORCE MAJEURE

63. If any event occurs which causes or may cause a delay in Defendants' compliance with any requirement of this Consent Order, Defendants shall notify Ohio EPA in writing within fourteen (14) days from when a Defendant knew, or by the exercise of due diligence should have known, of the event, describing in detail

the anticipated length of the delay, the precise cause or causes of delay, the measures taken and to be taken by Defendants to prevent or minimize the delay and the timetable by which those measures will be implemented. Defendants will adopt all reasonable measures to avoid or minimize any such delay.

64. In any action by the State of Ohio to enforce any of the provisions of this Consent Order, or in a dispute resolution under Section XXVIII. DISPUTE RESOLUTION, Defendants may raise at that time the question of whether they are entitled to a defense that their conduct was caused by circumstances beyond their control such as, by way of example and not limitation, acts of God, strikes, acts of war, civil disturbances. While the State of Ohio does not agree that such a defense exists, it is, however, hereby agreed by Defendants and the State of Ohio that it is premature at this time to raise and adjudicate the existence of such a defense and that the appropriate point at which to adjudicate the existence of such a defense is at the time, if ever, that a proceeding to enforce this Consent Order is commenced by the State or during dispute resolution pursuant to Section XXVIII. DISPUTE RESOLUTION. At that time the burden of proving that any delay was or will be caused by circumstances beyond the control of Defendants shall rest with Defendants. Failure by Defendants to timely comply with the notice requirements of this Section shall constitute a waiver by Defendants of any right they may have to raise such a defense. Changes in Defendants' financial circumstances shall not in any event constitute circumstances beyond the control of Defendants.

XXIV. STIPULATED PENALTIES

65. In the event that Defendants fail to comply with any requirement of this Consent Order, Defendants are liable for and shall immediately pay stipulated penalties in accordance with the following schedule for each failure to comply:

- a. For each day of each failure to comply with a requirement or deadline of this Consent Order, up to and including fifteen (15) days -- Two Hundred and Fifty Dollars (\$250) per day for each requirement or deadline not met.
- b. For each day of each failure to comply with a requirement or deadline of this Consent Order, from sixteen (16) days to thirty (30) days -- Five Hundred Dollars (\$500) per day for each requirement or deadline not met.
- c. For each day of each failure to comply with a requirement or deadline of this Consent Order, from thirty-one (31) days to sixty (60) days -- One Thousand Dollars (\$1,000) per day for each requirement or deadline not met.
- d. For each day of each failure to comply with a requirement or deadline of this Consent Order, over sixty-one (61) days -- One Thousand Five Hundred Dollars (\$1,500) per day for each requirement or deadline not met.

66. Any payment required to be made under the provisions of this Section of the Consent Order shall be made by delivering to Plaintiff, c/o 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, a certified check or checks made payable to "Treasurer, State of Ohio", for the appropriate amount within forty-five (45) days from the date of the failure to meet the requirement or deadline of this Consent Order. The payment of the stipulated penalty shall be accompanied by a letter briefly describing the type of violation, deadline or requirement not met and date upon which the violation of

this Consent Order occurred. The payment of stipulated penalties by Defendants and the acceptance of such stipulated penalties by Plaintiff for specific violations pursuant to this Section shall not be construed to limit Plaintiff's authority to seek additional relief or to otherwise seek judicial enforcement of this Consent Order. The check will be paid pursuant to R.C. 3734.28.

67. On or after the tenth (10th) anniversary of the Certification of Completion, Defendants may ask the State of Ohio to agree to terminate the requirements of this Section in whole or in part based upon a showing that Defendants have been in full compliance with the Consent Order for the most recent ten (10) years, including having performed all Work and paid all Response Costs due and owing.

XXV. CIVIL PENALTY

68. Within thirty (30) days of the Effective Date of this Consent Order or of confirmation of Defendant Shieldalloy's Plan of Reorganization in the Bankruptcy Case, whichever is later, Defendant Shieldalloy shall pay to the State of Ohio a civil penalty of Fifty-Five Thousand Dollars (\$55,000).

69. Within thirty (30) days of the Effective Date of this Consent Order, Defendant Cyprus Foote shall pay to the State of Ohio a civil penalty of One Hundred Thousand Dollars (\$100,000).

70. Payments required by this section shall be paid by delivering a certified check or checks to c/o Matthew A. Sanders, Administrative Assistant, or his

successor, at the Office of the Attorney General of Ohio, Environmental Enforcement Section, 30 East Broad Street, 25th Floor, Columbus, Ohio 43215-3428. The checks shall be made payable to "Treasurer, State of Ohio" and will be paid pursuant to the requirements of R.C. 6111.09(B) for Defendant Cyprus Foote's civil penalty and pursuant to R.C. 3734.28 for Defendant Shieldalloy's civil penalty.

XXVI. SUPPLEMENTAL ENVIRONMENTAL PROJECT

71. In lieu of paying additional civil penalties and in furtherance of the mutual objectives of Ohio EPA and Defendant Cyprus Foote in improving the environment and reducing impacts to waters of the State of Ohio, and in furtherance of settlement of natural resource damages under Section 107(a) of CERCLA, Defendant Cyprus Foote shall: (1) pay to the Ohio EPA Forty-Nine Thousand Nine Hundred Dollars (\$49,900) for a study on cost effective water pollution prevention, such as a Great Lakes Initiative study, to be performed by the Ohio EPA or its designated contractor; and (2) be required to perform Wetlands Work as required in Section XI. WETLANDS WORK.

72. Within thirty (30) days from the Effective Date of this Consent Order, Defendant Cyprus Foote is required to pay and deliver a certified check in the amount of Forty-Nine Thousand Nine Hundred Dollars (\$49,900) as required in the preceding paragraph to c/o Matthew A. Sanders, Administrative Assistant, or his successor, at the office of the Attorney General of Ohio, Environmental Enforcement Section, 30 East Broad Street, Columbus, Ohio 43215-3428. The check

shall be made payable to "Treasurer, State of Ohio" and will be deposited into the State Account established as "4K4 Line item #715_650, for the Division of Surface Water-Foster Wheeler Contract" fund of the Ohio EPA or such other fund as may be specified by Ohio EPA for conducting a study on water pollution control.

XXVII. INDEMNITY

73. 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 Consent Order, and/or acts or omissions of the Defendants, their officers, employees, receivers, trustees, agents, or assigns, in carrying out any activities pursuant to this Consent Order. 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 Consent Order. Consistent with federal, state and common law, nothing in this Consent Order 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 Consent Order. 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.

XXVIII. DISPUTE RESOLUTION

74. The site coordinators shall, whenever possible, operate by consensus. In the event that Defendants have a good faith dispute involving the implementation of this Consent Order, the site coordinators shall have ten (10) days from the date the dispute arises to negotiate in good faith in an attempt to resolve the dispute. This ten (10) day period may be extended by mutual agreement of the Parties.

75. 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 ten (10) 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 ten (10) days to resolve the dispute.

76. If Ohio EPA does not concur with the position of the Defendants, the Ohio EPA site coordinator will notify Defendants in writing. Upon receipt of such written notice, Defendants shall have ten (10) 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 Consent Order, 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.

77. Any Defendant may petition the Court within fourteen (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 within the meaning of R.C. Chapter 3745 or inconsistent with the Consent Order.

78. 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 Consent Order, unless otherwise agreed by the Parties. Ohio EPA will agree to a reasonable extension of time for performance of Work required under this Consent Order to the extent that such Work is directly affected by the dispute.

79. 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 Consent Order according to the amended Workplans, schedule or procedures as approved.

80. Unless otherwise expressly provided for in this Consent Order, the Dispute Resolution procedures of this Section shall be the exclusive mechanism for Defendants to resolve disputes arising under or with respect to this Consent Order. Nothing herein alters the jurisdiction of the Environmental Review Appeals Commission under R.C. Chapter 3745.

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

XXIX. TERMINATION OF CONSENT ORDER FOR PRELIMINARY INJUNCTION

82. As of the Effective Date of this Consent Order, the COPI is terminated except as to Section XVI of the COPI and except as otherwise provided in Section XXVI of the COPI.

XXX. SATISFACTION OF LAWSUIT

83. Plaintiff alleged in its Complaint that Defendants operated the facility at the Site in such a manner as to cause violations of R.C. Chapters 3734 and 6111, the rules promulgated thereunder, as well as other state laws. Except as otherwise provided in Section XXXII. RESERVATIONS OF RIGHTS, compliance with the terms of this Consent Order shall constitute full satisfaction of any civil liability by Defendants for all claims alleged in the Complaint. Nothing in this Section shall apply to new conditions at or new information about the Site, or to any violations arising out of acts or omissions first occurring after the Effective Date of this Consent Order.

XXXI. COVENANT NOT TO SUE

84. In consideration of the actions that will be performed and the payments that will be made by Defendants under this Consent Order, and except as

provided under Section XXXII. RESERVATION OF RIGHTS, the State covenants not to sue Defendants pursuant to Section 107(a) of CERCLA for (1) recovery of Response Costs for approved Work performed under this Consent Order; and (2) recovery of damages to natural resources. These covenants not to sue are conditioned upon compliance by Defendants with this Consent Order. These covenants not to sue do not extend to persons other than Defendants and their successors and assigns.

XXXII. RESERVATION OF RIGHTS

85. The State of Ohio reserves the right to seek additional relief from this or any other Court, including, but not limited to, additional preliminary and/or permanent injunctive relief, civil penalties and cost recovery for work beyond this Consent Order. Except as specifically provided otherwise in Section XXXI. COVENANT NOT TO SUE, the State of Ohio reserves any and all claims it may have against Defendants under CERCLA, except for natural resource damages and Response Costs incurred prior to issuance of the COPI. This reservation also explicitly includes any and all claims the State of Ohio may have concerning any disposal of Waste Material by Defendant(s) at any location other than the Site. This Consent Order in no way waives any defenses which Defendants may have as to such additional relief.

86. Except as otherwise specifically provided under Section XXX. SATISFACTION OF LAWSUIT, the State of Ohio expressly reserves, and this

Consent Order 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 Consent Order in no way waives any defenses which Defendants may have as to such claims, demands, rights or causes of action.

87. All Workplans, reports or other items required to be submitted to Ohio EPA under this Consent Order, and approved by Ohio EPA, are deemed not inconsistent with the National Contingency Plan in the opinion of Ohio EPA.

88. 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. The State reserves all rights under R.C. Section 3734.20. This Consent Order in no way waives any defenses which Defendants may have as to such claims, demands, rights or causes of action.

89. Nothing herein shall be construed to relieve Defendants of any obligation to comply with the Atomic Energy Act, 42 U.S.C. 2014, et seq., or regulations promulgated thereunder, and R.C. Chapters 3734, 3748 and 6111 including, without limitation, any regulation, license or order issued under these Chapters, and any other applicable federal, state or local statutes, regulations or ordinances, including but not limited to permit requirements.

90. Entering into this Consent Order, the Consent Order 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 any of the counts of the Complaint or any other 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, other pollutants listed in the Complaint, 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 the COPI or this Consent Order. Nothing in this Consent Order is intended to limit any settlement that one or more of the Parties may reach concerning an agreed discharge of a claim and/or administrative expense against Shieldalloy in the Bankruptcy Case. Nothing herein absolves Defendants from the duty to comply with this Consent Order and surviving provisions of the COPI.

91. 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.

92. The State of Ohio reserves all rights as to any person other than Defendants.

XXXIII. APPENDICES

93. All appendices to this Consent Order are incorporated by reference as if fully restated herein into and are an enforceable part of this Consent Order. The following appendices are or will be attached to this Consent Order at the time of signing by the Parties on the Effective Date:

- A. "Appendix A" is the RD/RA Statement of Work;
- B. "Appendix B" is the List of U.S. EPA and Ohio EPA Guidance Documents;
- C. "Appendix C" is the Decision Document;
- D. "Appendix D" is a list of the monitoring requirements for wetland mitigation.
- E. "Appendix E" describes the use of annuities and trusts to provide financial assurance for Operation and Maintenance at the Site.

XXXIV. MODIFICATION

94. No modification shall be made to this Consent Order without the written agreement of the Parties and the Court.

XXXV. RETENTION OF JURISDICTION

95. This Court shall retain jurisdiction of this matter for the purpose of administering and enforcing Defendants' compliance with this Consent Order.

XXXVI. COURT COSTS

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

XXXVII. SIGNATORIES

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

XXXVIII. ENTRY OF CONSENT ORDER AND FINAL JUDGMENT BY CLERK

98. The Parties recognize that entry of this Consent Order will avoid the potential of prolonged and complicated litigation between the Parties. The Parties further recognize, and the Court by entering this Consent Order finds, that this Consent Order is fair, reasonable and in the public interest.

99. The parties agree and acknowledge that this Consent Order is being made available for public participation under state requirements and in a manner consistent with 40 C.F.R. §123(d)(1)(iii), by providing for notice of the lodging of this Consent Order, opportunity for public comment and the consideration of any public comment. The State of Ohio and each Defendant reserve the right to withdraw consent to this Consent Order upon filing with this Court notice of such withdrawal in the event that (1) the remedial activities selected in the Decision Document issued by Ohio EPA differ in any material respect from the remedial activities proposed by Ohio EPA in the Preferred Plan; or (2) the parties cannot agree to changes proposed by the State of Ohio to this Consent Order as a result of public comment. The right to withdraw consent as set forth in this paragraph shall only

exist for the period of time between issuance of the Decision Document and the end of the fifteenth (15) day after issuance of the Decision Document, unless otherwise agreed in a joint notice filed by the Parties with the Court. After expiration of the time period for withdrawal of consent as set forth in this paragraph, the Parties agree that as of March 31, 1997 this Court may enter this Consent Order, provided no withdrawal of consent has been timely filed with the Court.

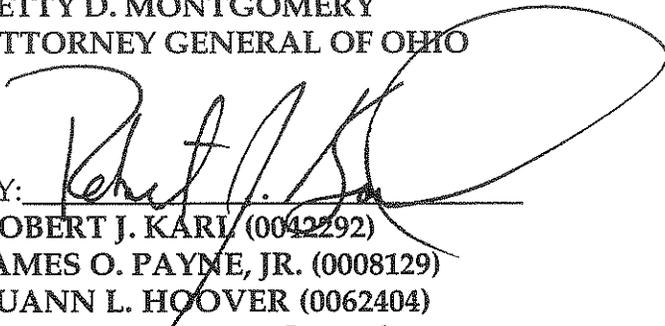
100. Upon the signing of this Consent Order by the Court, the Clerk of Courts is hereby directed to enter it upon the journal. Within three (3) days of entering the judgment upon the journal, the Clerk is hereby directed to serve upon all parties notice of the judgment and its date of entry upon the journal in the manner prescribed by Rule 5(B) of the Ohio Rules of Civil Procedure and note the service in the appearances docket.

IT IS SO ORDERED:

EFFECTIVE UPON AND ENTERED THIS _____ DAY OF _____, 1997.

JUDGE DAVID E. ELLWOOD
COURT OF COMMON PLEAS
GUERNSEY COUNTY

BETTY D. MONTGOMERY
ATTORNEY GENERAL OF OHIO

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CYPRUS FOOTE MINERAL COMPANY

BY: _____

Name _____

Title _____

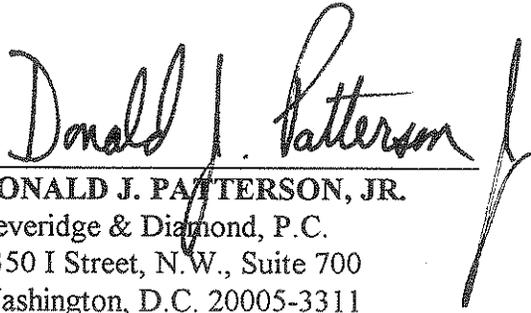
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Date: December 23, 1996

Appendix A

STATE OF OHIO MODEL STATEMENT OF WORK FOR THE REMEDIAL DESIGN AND REMEDIAL ACTION AT

Shieldalloy Metallurgical Corp. Site
Cambridge, Ohio

1.0 PURPOSE

The purpose of this Remedial Design/Remedial Action Statement of Work (RD/RA SOW) is to define the procedures the Respondents shall follow in designing and implementing the selected remedy for the **Shieldalloy Metallurgical Corp. Site** as described in this SOW and the Director's Final Findings and Orders (Orders) to which it is attached. The Division of Emergency and Remedial Response (DERR) will document the selection of a remedy for the site in a Decision Document. The intent of the remedy is to protect the public health and/or the environment from the actual or potential adverse effects of the contaminants discovered at and related to the site. Further guidance for performing the RD/RA work tasks may be found in the U.S. EPA Superfund Remedial Design and Remedial Action Guidance document (OSWER Directive 9355.0-4A). All applicable regulatory requirements pertaining to the selected remedy and RD/RA activities shall be followed.

The Ohio EPA shall provide oversight of the Respondent's activities throughout the RD/RA. The Respondent's shall support the Ohio EPA's initiatives and conduct of activities related to the implementation of oversight activities.

2.0 DESCRIPTION OF THE REMEDIAL ACTION/ PERFORMANCE STANDARDS

Specifications of the major components of the remedial action to be designed and implemented by the Respondents are described below. Performance standards shall include cleanup standards, standards of control, quality criteria, and other requirements, criteria or limitations as established in the Decision Document, this SOW and the Orders to which it is attached.

3.0 SCOPE OF THE REMEDIAL DESIGN AND REMEDIAL ACTION

The Remedial Design/Remedial Action (RD/RA) shall consist of seven principal tasks described below. Each task shall be completed and required documentation shall be submitted in accordance with the schedules established in the Orders and in the RD/RA Work Plan approved by Ohio EPA. All work related to this SOW shall be performed by the Respondent(s) in a manner consistent with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA)

as amended, 42 USC 9601, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300 (1990), and other applicable federal and state rules and regulations.

Task Summary

- 3.1 Task I: RD/RA Work Plan
 - 3.1.1 Site Access
 - 3.1.2 Pre-Design Studies Plan
 - 3.1.3 Regulatory Compliance Plan
 - 3.1.4 Natural Resource Damage Assessment

- 3.2 Task II: Pre-Design Studies

- 3.3 Task III: Remedial Design
 - 3.3.1 General Requirements for Plans and Specifications
 - 3.3.2 Design Phases
 - 3.3.3 Estimated Cost for Remedial Action
 - 3.3.4 Remedial Action Implementation Plan
 - 3.3.5 Community Relations Support

- 3.4 Task IV: Remedial Action Construction
 - 3.4.1 Preconstruction Inspection and Conference
 - 3.4.2 Design Changes During Construction
 - 3.4.3 Remedial Action Construction Completion and Acceptance
 - 3.4.4 Community Relations Support

- 3.5 Task V: Five-Year Reviews

- 3.6 Task VI: Operation and Maintenance/Performance Monitoring
 - 3.6.1 Reporting During Operation and Maintenance
 - 3.6.2 Completion of Remedial Action Report

- 3.7 Task VII: Reporting Requirements
 - 3.7.1 Monthly Progress Reports during RD and RA Construction
 - 3.7.2 Summary of Reports and Submittals

3.1 TASK I: RD/RA WORK PLAN

The Respondent(s) shall submit a work plan for the Remedial Design and Remedial Action (RD/RA) to the Ohio EPA for review and approval, which presents the overall strategy for performing the design, construction, operation, maintenance and monitoring of the Remedial Action (RA). The work plan shall provide a detailed discussion of the specific tasks necessary to implement the selected remedy, including a description of the technical approach, personnel requirements, plans, specifications, permit requirements and other reports described in this SOW.

The work plan shall document the responsibilities and authority of all organizations and key personnel involved with the development and implementation of the RD/RA. The qualifications of key personnel directing the RD/RA tasks, including contractor personnel, shall be described.

The work plan shall include schedules fixed in real time for the development of the (RD) and implementation of the RA, including milestones for the submittal of the document packages for Ohio EPA review and meetings for discussion of the submittals. The RD/RA Work Plan must be reviewed and approved by the Ohio EPA prior to initiation of field activities or proceeding with the RD.

Specific requirements to be addressed by the RD/RA Work Plan are described in the following sections.

3.1.1 Site Access

All site access agreements necessary to implement the RD and RA shall be obtained by the Respondent(s) prior to the initiation of any activities to be conducted under the Work Plan. Site access agreements shall extend for the duration of all remedial activities and shall include allowances for all operation and maintenance considerations and State oversight activities. The work plan shall describe the activities necessary to satisfy these requirements.

3.1.2 Pre-Design Studies Plan

The Respondent(s) shall develop a plan to complete the following pre-design studies, which are required to design and fully implement the remedial action.

[Describe any pre-design studies required to support the RD/RA.]

The Pre-Design Studies Plan, as a component of the RD/RA Work Plan, will identify and describe, in detail, activities necessary to conduct the pre-design studies identified above. The plan shall include sufficient sampling, testing, and analyses to develop quantitative performance, cost and design data for the selected remedy.

At the discretion of the Site Coordinator for the Ohio EPA, the PDSP may be submitted for review and comment under separate cover from the work plan in accordance with the schedule established in the Orders. The PDSP must be approved by the Ohio EPA prior to initiation of associated field activities or treatability studies.

The Pre-Design Studies Plan shall include, as necessary, a Field Sampling Plan, a Quality Assurance Project Plan and a Health and Safety Plan (HSP). Section 4.0 of this SOW describes the required content of supporting plans such as the Field Sampling Plans, Quality Assurance Project Plans and Health and Safety Plans.

Prior to development of the Pre-Design Studies Plan, there shall be a meeting of the Site Coordinator for the Ohio EPA and the Project Manager representing the Respondent(s) to discuss scope, objectives, quality assurance and quality control issues, resources, reporting, communication channels, schedule, and roles of personnel involved. Other personnel representing the Respondent(s) and Ohio EPA, who may be needed to fully discuss the issues involved, should also participate in this

meeting. Guidance documents to be consulted in developing the Pre-Design Studies Plan include U.S. EPA's Guidance for Conducting Remedial Investigations and Feasibility Studies (EPA/540/G-89/004, October 1988) and Guide for Conducting Treatability Studies Under CERCLA (EPA/540/2-89/058, December 1989), as well as others listed in Appendix A, attached to this SOW.

The pre-design studies will be conducted as described under Task II.

3.1.3 Regulatory Compliance Plan

It shall be the responsibility of the Respondent(s) to ensure compliance with all applicable regulatory state and federal requirements for the RD/RA activities to be conducted at the site. The Respondent(s) shall develop a plan to identify and to satisfy all applicable state and federal laws and regulations for the RD/RA. The plan will include the following information:

- 1) Permitting authorities
- 2) Permits required to conduct RD/RA activities
- 3) Time required by the permitting agency(ies) to process permit applications
- 4) Identification of all necessary forms
- 5) Schedule for submittal of applications
- 6) All monitoring and/or compliance testing requirements

The Respondent(s) shall identify in the plan any inconsistencies between any regulatory requirements or permits that may affect any of the work required. The plan shall also include an analysis of the possible effects such inconsistencies may have on the remedial action, recommendations, and supporting rationale for the recommendations. The Regulatory Compliance Plan shall be submitted to the Ohio EPA as part of the RD/RA Work Plan.

3.1.4 Natural Resource Damage Assessment

If natural resources are or may be injured as a result of a release, the Respondent(s) shall ensure that the trustees of the effected natural resources are notified. The trustees will initiate appropriate actions and provide input into the RD/RA in order to minimize or mitigate natural resource damages in accordance with the NCP and 43 CFR part 11. Trustees define "injury" as "a measurable adverse change, either long- or short-term, in the chemical or physical quality of a natural resource resulting either directly or indirectly from exposure to a discharge of oil or release of a hazardous substance. The respondent(s) shall make available to the trustees all necessary information and documentation needed to assess actual or potential natural resource injuries.

3.2 TASK II: PRE-DESIGN STUDIES

The Respondent(s) shall schedule and detail the work necessary to accomplish the pre-design studies described in the Pre-Design Studies Plan submitted with the RD/RA Work Plan. The requirements of this section shall apply to studies undertaken to refine the understanding of the nature and extent of contamination at the site, as well as to bench and pilot scale treatability studies.

For any such studies required, the Respondent(s) shall furnish all services, including necessary field work, materials, supplies, labor, equipment, superintendence, and data interpretation. Sufficient sampling, testing, and analyses shall be performed to provide the technical data necessary to support the remedial design effort with the goal of optimizing the required treatment and/or disposal operations and systems.

The Respondent(s) shall submit a draft Pre-Design Studies report for Ohio EPA's review and comment when the investigation and/or testing required by the Pre-Design Studies Plan is complete. The draft report shall present investigation/testing data and results along with an analysis of the implications those results have on the RD/RA, including a cost analysis, when appropriate. The draft report shall be submitted prior to the preliminary design submittal in accordance with the schedule specified in the Orders and approved RD/RA Work Plan. After making any required corrections or modifications based on Ohio EPA comments, the Respondent(s) shall submit the final report with the Preliminary Design Report, unless otherwise specified in the approved RD/RA Work Plan.

3.2.1. Reporting Requirements for Groundwater data.

The respondent(s) shall submit all groundwater data and monitoring well construction data. The respondent(s) shall implement a groundwater monitoring program as identified in the RD workplan or as required by Ohio EPA. Respondents shall submit all groundwater data and monitoring well construction data on a 3.5 inch diskette using the most current version of the U.S.EPA developed Ground Water Information Tracking System (GRITS) database software. GRITS is free software, and can be obtained by calling EPA office of Research and Development (ORD), at 513-569-7562, ask for Document # EPA/625/11-91/002. Respondents shall submit one copy of each round of sampling data on printed paper in addition to the diskette format. The printed copy will be the official copy of the data.

3.3 TASK III: REMEDIAL DESIGN

The Respondent(s) shall prepare and submit to the Ohio EPA, in accordance with the schedule set forth in the compliance schedule of the Orders, construction plans, specifications and supporting plans to implement the remedial action at **Shieldalloy Metallurgical Corp. Site** as defined in the Purpose and Description of the Remedial Action sections of this SOW, the Decision Document, and the Orders.

3.3.1 General Requirements for Plans and Specifications

The construction plans and specifications shall comply with the standards and requirements outlined below. All design documents shall be clear, comprehensive and organized. Supporting data and documentation sufficient to define the functional aspects of the remedial action shall be provided. Taken as a whole, the design documents shall demonstrate that the remedial action will be capable of meeting all objectives of the Decision Document, including any performance standards.

The plans and specifications shall include the following:

- 1) Discussion of the design strategy and design basis including:

- a. Compliance with requirements of the Decision Document and the Orders and all applicable regulatory requirements;
 - b. Minimization of environmental and public health impacts;
- 2) Discussion of the technical factors of importance including:
 - a. Use of currently accepted environmental control measures and technologies;
 - b. The constructability of the design;
 - c. Use of currently accepted construction practices and techniques;
 - 3) Description of the assumptions made and detailed justification for those assumptions;
 - 4) Discussion of possible sources of error and possible operation and maintenance problems;
 - 5) Detailed drawings of the proposed design including, as appropriate:
 - a. Qualitative flow sheets;
 - b. Quantitative flow sheets;
 - 6) Tables listing equipment and specifications;
 - 7) Tables giving material and energy balances;
 - 8) Appendices including:
 - a. Sample calculations (one example presented and clearly explained for significant or unique calculations);
 - b. Derivation of equations essential to understanding the report;
 - c. Results of laboratory tests, field tests and any additional studies.

3.3.2 Design Phases

The Respondent(s) shall meet when necessary with Ohio EPA representatives to discuss design issues. The design shall be developed and submitted in the phases outlined below to facilitate progression toward an acceptable and functional design. Submittals shall be made in accordance with the compliance schedule in the Orders, and the schedule in the approved RD/RA Work Plan.

3.3.2.1 Preliminary Design

A Preliminary Design, which reflects the design effort at approximately 30% completion, shall be submitted to the Ohio EPA for review and comment. At this stage of the design process, the Respondent(s) shall have verified existing conditions at the site that may influence the design and implementation of the selected RA. The Preliminary Design shall demonstrate that the basic technical requirements of the remedial action and any permits required have been addressed. The Preliminary Design shall be reviewed to determine if the final design will provide an operable and usable RA that will be in compliance with all permitting requirements and response objectives. The Preliminary Design submittal shall include the following elements, at a minimum:

- Preliminary plans, drawings and sketches, including design calculations;

- Results of treatability studies and additional field sampling;
- Design assumptions and parameters, including design restrictions, process performance criteria, appropriate unit processes for treatment systems, and expected removal or treatment efficiencies for both the process and waste (concentration and volume);
- Proposed cleanup verification methods, including compliance with applicable laws and regulations;
- Outline of design specifications;
- Proposed sitting/locations of processes/construction activity;
- Expected long-term operation and monitoring requirements;
- Real estate and easement requirements;
- Preliminary construction schedule, including contracting strategy.

The supporting data and documentation necessary to define the functional aspects of the RA shall be submitted with the Preliminary Design. The technical specifications shall be outlined in a manner that anticipates the scope of the final specifications. The Respondents shall include design calculations with the Preliminary Design completed to the same degree as the design they support.

If the Pre-Design Studies Report required under Task II have not been submitted prior to submission of the Preliminary Design, it shall be submitted with the Preliminary Design. Any revisions or amendments to the Preliminary Design required by the Ohio EPA shall be incorporated into the subsequent design phase.

3.3.2.2 Intermediate Design

Complex project designs necessitate preparation and Ohio EPA review of design documents between the preliminary and prefinal design phases. The Respondent(s) shall submit intermediate design plans and specifications to the Ohio EPA for review and comment when the design is approximately 60% complete in accordance with the schedule in the approved RD/RA Work Plan. All plans, specifications, design analyses and design calculations submitted to the Ohio EPA shall reflect the same degree of completion. The Respondent(s) shall ensure that any required revisions or amendments resulting from the Ohio EPA's review of the Preliminary Design are incorporated into the Intermediate Design.

The Intermediate Design submittal shall include the following components:

- Design Plans and Specifications
- Draft Construction Quality Assurance Plan
- Draft Performance Standard Verification Plan
- Draft Operation and Maintenance Plan
- Health and Safety Plan

The design shall include a Construction Quality Assurance Plan, a Performance Standard Verification Plan, an Operation and Maintenance Plan, and a Health and Safety Plan. The Performance Verification Plan shall include a Field Sampling Plan and a Quality Assurance Project Plan, as necessary. Section 4.0 of this SOW describes the required content of the supporting plans. The final

Pre-Design Studies Report shall also be included, it has not already been submitted. Revisions or amendments to the Intermediate Design required by Ohio EPA shall be incorporated into the Prefinal Design.

3.3.2.3 Prefinal Design

The Respondent(s) shall submit a Prefinal Design for Ohio EPA review in accordance with the schedule in the approved RD/RA Work Plan when the design effort is at least 90% complete. The Respondent(s) shall ensure that any modifications required by the Ohio EPA's prior review of related Pre-design Studies Reports, technical memoranda, the Preliminary and Intermediate Designs, and the QAPP and HSP are incorporated into the Prefinal Design submittal. The Prefinal Design submittal shall consist of the following components, at a minimum:

- Design Plans and Specifications
- Construction Quality Assurance Plan
- Performance Standard Verification Plan
- Operation and Maintenance Plan
- Remedial Action Implementation Plan
- Cost Estimate
- Health and Safety Plan

General correlation between drawings and technical specifications is a basic requirement of any set of working construction plans and specifications. Before submitting the remedial design specifications with the Prefinal Design, the Respondent(s) shall: (1) Coordinate and cross-check the specifications and drawings; (2) Complete the proofing of the edited specifications and required cross-checking of all drawings and specifications.

The Respondent(s) shall prepare and include in the technical specifications governing any treatment systems; contractor requirements for providing appropriate service visits by qualified personnel to supervise the installation, adjustment, startup and operation of the treatment systems; and appropriate training for operational procedures once startup has been successfully accomplished.

The Ohio EPA will provide written comments to the Respondents indicating any required revisions to the Prefinal Design. Comments may be provided as a narrative report and/or markings on design plan sheets. Revisions to the plans and specifications required by Ohio EPA shall be incorporated into the Final Design. At the discretion of the Site Coordinator, the Respondents shall also return to Ohio EPA all marked-up prints as evidence that the plans have been completely checked. The Prefinal Design submittal may serve as the Final Design, if Ohio EPA has no further comments and notifies the Respondent(s) that the Prefinal Design has been approved as the Final Design.

3.3.2.4 Final Design

Following incorporation of any required modifications resulting from the Ohio EPA's review of the Prefinal Design submittal, the Respondent(s) shall submit to the Ohio EPA the Final Design which is 100% complete in accordance with the approved schedule described in the RD/RA Workplan. The Final Design submittal shall include all the components of the Prefinal Design and each of those components shall be complete. At the discretion of the Site Coordinator, any marked-up prints or drawings, which the Ohio EPA may have provided by way of comments on previous design submittals shall be returned to the Ohio EPA, if they have not already been returned.

The Respondent(s) shall make corrections or changes based on Ohio EPA comments on the Final Design submittals. The revised Final Design shall then be submitted in their entirety to the Ohio EPA for approval as the completed Final Design. Upon approval of the Site Coordinator, final corrections may be made by submitting corrected pages to the Final Design design documents. The quality of the Final Design submittal should be such that the Respondent(s) would be able to include them in a bid package and invite contractors to submit bids for the construction project.

3.3.3 Estimated Cost of the Remedial Action

The Respondent(s) shall refine the cost estimate developed in the Feasibility Study to reflect the detailed plans and specifications being developed for the RA. The cost estimate shall include both capital and operation and maintenance costs for the entire project. To the degree possible, cost estimates for operation and maintenance of any treatment system shall be based on the entire anticipated duration of the system's operation. The final estimate shall be based on the final approved plans and specifications. It shall include any changes required by the Ohio EPA during Final Design review, and reflect current prices for labor, material and equipment.

The refined cost estimate shall be submitted by the Respondents with the Prefinal Design and the final cost estimate shall be included with the Final Design submittal.

3.3.4 Remedial Action Implementation Plan

The Respondent(s) shall develop a Remedial Action Implementation Plan to help coordinate implementation of the various components of the RA. It shall include a schedule for the RA that identifies timing for initiation and completion of all critical path tasks. The Respondent(s) shall specifically identify dates for completion of the project and major interim milestones in conformance with the approved RD/RA Workplan schedule. The Remedial Action Implementation Plan is a management tool which should address the following topics:

- 1) Activities necessary to fully implement each of the components of the RA;
- 2) How these activities will be coordinated to facilitate construction/implementation in accordance with the approved schedule;
- 3) Potential major scheduling problems or delays, which may impact overall schedule;

- 4) Lines of communication for discussing and resolving problems, should they arise;
- 5) Common and/or anticipated remedies to overcome potential problems and delays.

The Remedial Action Implementation Plan shall be submitted with the Prefinal Design for review and comment by the Ohio EPA. The final plan and RA project schedule shall be submitted with the Final Design for review and approval.

3.3.5 Community Relations Support

A community relations program will be implemented by the Ohio EPA. The Respondent(s) shall cooperate with the Ohio EPA in community relations efforts. Cooperation may include participation in preparation of all appropriate information disseminated to the public, and in public meetings that may be held or sponsored by the Ohio EPA concerning the site.

3.4 TASK IV: REMEDIAL ACTION CONSTRUCTION

Following approval of the Final Design submittal by the Ohio EPA, the Respondent(s) shall implement the designed remedial action(s) at **Shieldalloy Metallurgical Corp. Site** in accordance with the plans, specifications, Construction Quality Assurance Plan, Performance Standard Verification Plan, Health and Safety Plan, Remedial Action Implementation Plan, Quality Assurance Project Plan, and Field Sampling Plan approved with the final design. Implementation shall include the activities described in the following sections.

3.4.1 Preconstruction Inspection and Conference

The Respondent(s) shall participate in a preconstruction inspection and conference with the Ohio EPA to accomplish the following:

- Review methods for documenting and reporting inspection data
- Review methods for distributing and storing documents and reports
- Review work area security and safety protocol
- Discuss any appropriate modifications to the Construction Quality Assurance Plan to ensure that site specific considerations are addressed. The final CQAP shall be submitted to the Ohio EPA at this time, if it has not already been submitted.
- Introduce key construction contractor, engineering and project management personnel and review roles during construction activities
- Conduct a site walk-around to verify that the design criteria, plans, and specifications are understood and to review material and equipment storage locations

The Respondent(s) shall schedule the preconstruction inspection and conference to be held within 10

days of the award of the construction contract. The preconstruction inspection and conference shall be documented by a designated person and minutes shall be transmitted to all parties by the Respondent(s) to all parties in attendance.

3.4.2 Design Changes During Construction

During construction, unforeseen site conditions, changes in estimated quantities of required construction materials and other problems associated with the project are likely to develop. Such changing conditions may require either major or minor changes to the approved final design. Certain design changes will require approval of the Ohio EPA prior to implementation to ensure that the intent and scope of the remedial action is maintained. Changes, which could alter the intent or scope of the RA, may require a revision to the Decision Document and a public comment period.

Changes to the remedial design which require Ohio EPA written approval prior to implementation include:

- Those that involve the deletion or addition of a major component of the approved remedy (e.g. changing one treatment system for another; deleting any designed layer of a multi-layer cap)
- Those that result in a less effective treatment for wastes associated with the site
- Any changes that may result in an increase of the exposure to chemicals of concern and/or risk to human health or the environment as compared to the goals for the completed remedial action as stated in the Orders and this SOW
- Those that result in a significant delay in the completion of the RA
- Any other changes that alter or are outside of the scope or intent of the approved remedial design

Ohio EPA shall be notified of other changes made during construction through daily inspection reports and monthly progress reports.

3.4.3 Remedial Action Construction Completion and Acceptance

As the construction of the remedial action nears completion, the following activities and reporting shall be completed by the Respondent(s) to ensure proper project completion, approval, closeout and transition to the operation and maintenance/monitoring phase.

3.4.3.1 Prefinal Construction Conference

Within seven days of making a preliminary determination that construction is complete, the Respondent(s) shall provide written notification to the Ohio EPA and a prefinal construction conference shall be held with the construction contractor(s) to discuss procedures and requirements for project completion and closeout. The Respondent(s) shall have responsibility for making arrangements for the conference. Participants should include the Project Manager for the

Respondents, the Site Coordinator for the Ohio EPA, all contractors involved with construction of the remedial action(s) and the remedial design agent (person(s) designed the remedy), if requested.

A list of suggested items to be covered at the conference includes, but is not limited to the following:

- Final Operation and Maintenance (O&M) Plan submission, if it has not been submitted already
- Cleanup responsibilities
- Demobilization activities
- Security requirements for project transfer
- Prefinal inspection schedule
- Operator training

The prefinal conference shall be documented by a designated person and minutes shall be transmitted to all parties in attendance by the respondents.

3.4.3.2 Prefinal Inspection

Following the prefinal construction conference, a prefinal inspection of the project will be conducted. The prefinal inspection will be led by the Ohio EPA with assistance from the party with primary responsibility for construction inspection, if requested.

The prefinal inspection will consist of a walk-through inspection of the entire site. The completed site work will be inspected to determine whether the project is complete and consistent with the contract documents and the approved RD/RA Work Plan. Any outstanding deficient or incomplete construction items should be identified and noted during the inspection.

When the RA includes construction of a treatment system, the facility start-up and "shakedown" shall have been completed as part of the RA. "Shakedown" is considered to be the initial operational period following start-up during which adjustments are made to ensure that the performance standards for the system are reliably being achieved. The contractor shall have certified that the equipment has performed to meet the purpose and intent of the contract specifications. Retesting shall have been successfully completed where deficiencies were revealed. Such shakedown may take several months. Determination of remedy effectiveness for other types of remedial actions will be based on the PSVP.

If construction of major components of a remedial action is performed in distinct phases or under separate contracts due to the complex scope of the site remedy, it may be appropriate to conduct the prefinal inspections of those components separately. The approved RAIP should identify those projects and components, which should be handled in that manner.

Upon completion of the prefinal inspection, an inspection report shall be prepared by the Respondent(s) and submitted to Ohio EPA with the minutes from the prefinal conference. A copy of the report will be provided to all parties in attendance at the inspection. The report will outline the outstanding construction items, actions required to resolve those items, completion date for those items and a date for the final inspection. Ohio EPA will review the inspection report and notify the Respondent(s) of any disagreements with it.

3.4.3.3 Final Inspection

Within seven days following completion of any outstanding construction items, the Respondent(s) shall provide written notification to the Ohio EPA and schedule a final inspection. A final inspection will be conducted by the Ohio EPA with assistance from the party having primary responsibility for construction inspection, if requested.

The final inspection will consist of a walk-through inspection of the project site focusing on the outstanding construction items identified during the prefinal inspection. The Prefinal Inspection Report shall be used as a checklist. The contractor's demobilization activities shall have been completed, except for equipment and materials required to complete the outstanding construction items. If any items remain deficient or incomplete, the inspection shall be considered a prefinal inspection requiring another prefinal inspection report and final inspection.

As with the prefinal inspection, it may be appropriate to conduct final inspections of major components of a remedial action separately. Such projects and components should be identified in the approved Remedial Action Implementation Plan.

3.4.3.4 Construction Completion Report and Certification

Upon satisfactory completion of the final inspection, a Construction Completion Report shall be prepared by the Respondent(s) and submitted to the Ohio EPA within 30 days after the final inspection. The report shall include the following elements:

- 1) A brief description of the outstanding construction items from the prefinal inspection and an indication that the items were satisfactorily resolved;
- 2) A synopsis of the work defined in the approved RD/RA Work Plan and the Final Design and certification that this work was performed;
- 3) An explanation of any changes to the work defined in the approved RD/RA Work Plan and Final Design, including as-built drawings of the constructed RA facilities, and why the changes were necessary or beneficial for the project;
- 4) Certification that the constructed RA or component of the RA is operational and functional.

The construction completion report will be reviewed by the Ohio EPA. If Ohio EPA's review indicates that corrections or amendments to the report are necessary, comments will be provided to the Respondent(s). The Respondent(s) shall submit a revised construction completion report based

on Ohio EPA comments to the Ohio EPA within 30 days of receipt of those comments. Upon determination by the Ohio EPA that the report is acceptable, written notice of Ohio EPA's approval of the construction completion report will be provided to the Respondent(s).

3.4.4 Community Relations Support

The Respondents shall provide support for Ohio EPA's community relations program during remedial action implementation as described in Section 3.3.5.

3.5 TASK V: FIVE-YEAR REVIEWS

At sites where contaminants will remain at levels that will not permit unrestricted use of the site, a review will be conducted no less frequently than once every five years to ensure that the remedy continues to be protective of human health and the environment. This is known as the "five-year review". The Respondent(s) shall complete five-year reviews no less often than every five years after the initiation of the remedial action or until contaminant levels allow for unrestricted use of the site. Further guidance for performing five-year review work tasks may be found in the U.S. EPA OSWER Directive 9355.7-02, Structure and Components of Five-Year Reviews.

The more specific purpose of the reviews is two-fold: (1) to confirm that the remedial action as specified in the Decision Document and as implemented continues to be effective in protecting human health and the environment (e.g., the remedy is operating and functioning as designed, institutional controls are in place and are protective); and (2) to evaluate whether original cleanup levels remain protective of human health and the environment. A further objective is to evaluate the scope of operation and maintenance, the frequency of repairs, changes in monitoring indicators, costs at the site, and how each of these relates to protectiveness.

Fifteen months prior to the due date for completion of a five-year review, the Respondent(s) shall meet with Ohio EPA to discuss the requirements of the five-year review. The review must be completed within five years following the initiation of the remedial action. The scope and level of review will depend on conditions at the site. The scoping effort should include a determination by the Site Coordinator and Respondent(s) as to whether available monitoring data and other documentation will be sufficient to perform the five-year review or whether a field sampling effort will be a necessary component of the review. Within three months of the meeting, the Respondent(s) shall develop and submit a workplan to Ohio EPA that shall describe, at a minimum, the following activities and documentation:

1. Document Review

- a. Background Information
 1. Decision Document
 2. Decision Document Summary
 3. Administrative or Judicial Order for RD/RA
 4. Completion of Remedial Action Report

- b. Design Review
 - c. Maintenance and Monitoring
 - 1. O&M Manual
 - 2. O&M Reports
 - 3. Groundwater Monitoring Plan
 - 4. Monitoring Data and Information
2. Standards Review
- a. Specific performance standards required by Decision Document
 - b. Changing Standards
 - 1. Laws and Regulations applicable to conditions and activities at the site
 - c. Risk Assessment
 - 1. As summarized in the Decision Document
 - 2. Review for changes in exposure pathways not previously evaluated
3. Interviews
- a. Background Information
 - 1. Previous Staff Management
 - 2. Nearest Neighbors, Respondent(s)
 - b. Local Considerations
 - 1. State Contacts
 - 2. Local Government Contacts
 - c. Operational Problems
 - 1. Plant Superintendent
 - 2. O&M Contractors
4. Site Inspection/Technology Review
- a. Performance and Compliance
 - 1. Visual Inspection
 - b. Offsite Considerations
 - c. Recommendations
5. Report
- a. Background
 - 1. Introduction

2. Remedial Objectives
 3. Review of Applicable Laws and Regulations
- b. Site Conditions
 1. Summary of Site Visit
 2. Areas of Noncompliance
 - c. Risk Assessment
 - d. Recommendations
 1. Technology Recommendations
 2. Statement on Protectiveness
 3. Timing and Scope of Next Review
 4. Implementation Requirements

If sampling and analysis of environmental samples is required under the five-year review, the Respondent(s) are required to prepare and submit with the workplan other supporting plans. Supporting plans may include a Quality Assurance Project Plan, Field Sampling Plan and Health and Safety Plan. The purpose and content of these supporting plans are discussed in Section 4 of this SOW. The Five-Year Review Workplan must be reviewed and approved by the Ohio EPA prior to initiation of field activities or proceeding with the five-year review.

The Five-Year Review Report will be reviewed by the Ohio EPA. If Ohio EPA's review indicates that corrections or amendments to the report are necessary, comments will be provided to the Respondent(s). The Respondent(s) shall submit a revised Five-Year Review Report based on Ohio EPA comments to the Ohio EPA within 30 days of receipt of those comments.

3.6 TASK VI: OPERATION AND MAINTENANCE/PERFORMANCE MONITORING

The Respondents shall implement performance monitoring and operation and maintenance procedures as required by the approved Performance Standard Verification Plan and approved Operation and Monitoring Plan for the RA once it is demonstrated that the RA components are operational and functional.

3.6.1 Reporting During Operation and Maintenance

3.6.1.1 Operation and Maintenance Sampling and Analysis Data

Unless otherwise specified in the approved O&M Plan, sampling, analysis, and system performance data for any treatment system or other engineering systems required to be monitored during the O&M Phase shall be submitted by the Respondent(s) to the Ohio EPA on a monthly basis. These monthly submittals will form the basis for the annual progress report described below in Section 3.6.1.2

3.6.1.2 Progress Reports During Operation and Maintenance

The Respondent(s) shall prepare and submit annual progress reports during the operation and maintenance/performance monitoring phase of the RA. When appropriate, the RD/RA Work Plan shall specify progress reports during O & M to be submitted more frequently.

The O&M progress reports shall contain the same information as required for the monthly progress reports for the RD and RA construction phases, as specified in Section 3.6.1 of this SOW. It shall also include an evaluation of the effectiveness of any treatment and engineering systems in meeting the cleanup standards, performance standards and other goals of the RA as defined in the Orders, this SOW, the RD/RA Work Plan and the approved Final Design.

3.6.2 Completion of Remedial Action Report

At the completion of the remedial action, the Respondent(s) shall submit a Completion of Remedial Action Report to the Ohio EPA. The RA shall be considered complete when the all of the goals, performance standards and cleanup standards for the RA as stated in the Decision Document, this SOW, and the approved Final Design (including changes approved during construction) have been met. The report shall document that the project is consistent with the design specifications, and that the RA was performed to meet or exceed all required goals, cleanup standards and performance standards. The report shall include, but not be limited to the following elements:

- 1) Synopsis of the remedial action and certification of the design and construction;
- 2) Listing of the cleanup and performance standards as established in the Decision Document and the Orders, any amendments to those standards with an explanation for adopting the amendments;
- 3) Summary and explanation of any changes to the approved plans and specifications. An explanation of why the changes were necessary should be included and ,where necessary, Ohio EPA approval of the changes should be documented.
- 4) Summary of operation of treatment systems including monitoring data, indicating that the remedial action met or exceeded the performance standards or cleanup criteria;
- 5) Explanation of any monitoring and maintenance activities to be undertaken at the site in the future as outlined in Section 3.0 of this RD/RA SOW.

3.7 TASK VII: REPORTING REQUIREMENTS

The Respondent(s) shall prepare and submit work plans, design plans, specifications, and reports as set forth in Tasks I through V of this SOW to document the design, construction, operation, maintenance, and performance monitoring of the remedial action. Monthly progress reports shall be prepared, as described below, to enable the Ohio EPA to track project progress.

3.7.1 Monthly Progress Reports during RD and RA Construction

The Respondent(s) shall at a minimum provide the Ohio EPA with monthly progress reports during the design and construction phases of the remedial action containing the information listed below. When appropriate, the RD/RA Work Plan shall specify progress reports to be submitted more frequently.

- 1) A description of the work performed during the reporting period and estimate of the percentage of the RD/RA completed
- 2) Summaries of all findings and sampling during the reporting period
- 3) Summaries of all changes made in the RD/RA during the reporting period, indicating consultation with Ohio EPA and approval by the Ohio EPA of those changes, when necessary
- 4) Summaries of all contacts with representatives of the local community, public interest groups or government agencies during the reporting period
- 5) Summaries of all problems or potential problems encountered during the reporting period, including those which delay or threaten to delay completion of project milestones with respect to the approved work plan schedule or RAIP schedule
- 6) Summaries of actions taken and being taken to rectify problems
- 7) Summaries of actions taken to achieve and maintain cleanup standards and performance standards
- 8) Changes in personnel during the reporting period
- 9) Projected work for the next reporting period
- 10) Copies of daily reports, inspection reports, sampling data, laboratory/monitoring data, etc.

3.7.2 Summary of Reports and Submittals

A summary of the information reporting requirements contained in this RD/RA SOW is presented below:

- **Draft RD/RA Work Plan**
(Health and Safety Plan)
(Regulatory Compliance Plan)

- **Final RD/RA Work Plan**
(Health and Safety Plan)

(Regulatory Compliance Plan)

- **Draft Pre-Design Studies Plan**
(QAPP)
(FSP)
- **Final Pre-Design Studies Plan**
(QAPP)
(FSP)
- **Pre-Design Studies Reports (Draft)**
- **Preliminary Design Documents**
(Pre-Design Studies Reports - Final)
- **Intermediate Design Documents**
(Draft CQAP)
(Draft PSVP)
(Draft O & M Plan)
(Health and Safety Plan)
- **Prefinal Design Documents**
(CQAP)
(PSVP)
(O & M Plan)
(Draft RAIP)
(Health and Safety Plan)
- **Final Design Documents**
(CQAP)
(PSVP)
(O & M Plan)
(Draft RAIP)
(Health and Safety Plan)
- **Preconstruction Inspection and Conference Report**
- **Monthly Progress Reports During RD/RA**
- **Notification of Preliminary Completion of Construction**
- **Final O & M Plan**
- **Prefinal Inspection Report**
- **Notification for Final Inspection**

- **Construction Completion Report**
- **O & M Sampling Data**
- **Progress Reports during O&M/Performance Monitoring period**
- **Completion of Remedial Action Report**
- **Five-Year Review Workplan**
- **Five-Year Review Report**

4.0 CONTENT OF SUPPORTING PLANS

The documents listed in this section shall be prepared and submitted as outlined in Section 3.0 of this SOW to support the activities necessary to design and fully implement the RA. These supporting documents include a Quality Assurance Project Plan (QAPP), a Field Sampling Plan (FSP), a Health and Safety Plan (HSP), a Construction Quality Assurance Plan (CQAP) and a Performance Standard Verification Plan (PSVP). The following sections describe the required contents of each of these supporting documents.

4.1 QUALITY ASSURANCE PROJECT PLAN

The Respondent(s) shall prepare a site-specific Quality Assurance Project Plan (QAPP) to cover sample analysis and data handling based on guidance provided by the Ohio EPA. Refer to the list of Ohio EPA and U.S. EPA guidance documents in Exhibit A attached to this SOW. A QAPP shall be developed for any sampling and analysis activities to be conducted as pre-design studies and submitted with the Pre-Design Studies Plan for Ohio EPA review and approval.

During the remedial design phase the Respondent(s) shall review all remedial design information and modify or amend the QAPP developed for the Pre-Design Studies Plan, as necessary, to address the sampling and analysis activities to be conducted during implementation of the Remedial Action, including activities covered by the PSVP and O&M Plan. An amended QAPP shall be submitted with the Intermediate Design documents for review and comment by Ohio EPA. A final Quality Assurance Project Plan, which incorporates comments made by the Ohio EPA, shall be submitted for approval with the Final Design documents. Upon agreement of the Site Coordinator, the Respondent(s) may submit only the amended portions of the QAPP developed for the PDSP with the Intermediate, Pre-Final and Final Design documents.

The Respondent(s) shall schedule and attend a pre-QAPP meeting with representatives of Ohio EPA to discuss the scope and format of the QAPP. For sites where the Site Coordinator and Project Manager agree that a pre-QAPP meeting is not needed, this meeting may be omitted. The QAPP shall, at a minimum, include:

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) RD/RA data collected by the Respondent over some time period;
 - ii) RD/RA 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 RD/RA 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.

4.2 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 items 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.

4.3 SITE HEALTH AND SAFETY PLAN

The Respondent(s) shall submit a Health and Safety Plan (HSP) to the Ohio EPA with the RD/RA Work Plan for any on-site activities taking place during the design phase. The Respondent(s) shall review the remedial design information and modify the HSP developed for the RD/RA Work Plan, as necessary, to address the activities to be conducted on the site during implementation of the Remedial Action. It shall be designed to protect on-site personnel and area residents from physical, chemical and other hazards posed by the construction, operation and maintenance activities of the Remedial Action.

The Respondent(s) shall prepare a site HSP which is designed to protect on-site personnel and area residents from physical, chemical and all other hazards posed by RD/RA activities. The HSP shall address the following topics:

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. CERCLA Sections 104(f) and 111(c)(6)
- 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.

4.4 CONSTRUCTION QUALITY ASSURANCE PLAN

The Respondent(s) shall develop a Construction Quality Assurance Plan (CQAP) based on the plans and specifications and performance standards for the RA. The CQAP is a site specific document that shall specify procedures to ensure that the completed remedial action work meets or exceeds all design criteria and specifications. A draft CQAP shall be submitted with the Intermediate Design submittal for review and comment by the Ohio EPA. Subsequent drafts shall be submitted with the Prefinal and Final Design submittals that incorporate comments made by the Ohio EPA. Certain aspects of the CQAP, for example personnel names and qualifications, may not be known at the time of design approval. A complete and final CQAP shall be submitted to Ohio EPA for approval prior to the start of construction. At a minimum, the CQAP shall address the elements listed below.

4.4.1 Responsibility and Authority

The responsibility and authority of all organizations (i.e. technical consultants, construction firms, etc.) and key personnel involved in the construction of the remedial action(s) shall be described fully in the CQAP. The Respondent(s) shall provide a copy of the approved CQAP to each organization with responsibility and authority for implementing the CQAP. The Respondent(s) shall also identify a CQA officer and the necessary supporting inspection staff.

4.4.2 Construction Quality Assurance Personnel Qualifications

The qualifications of the Construction Quality Assurance officer and supporting inspection personnel shall be presented in the CQAP to demonstrate that they possess the training and experience necessary to fulfill their identified responsibilities.

4.4.3 Inspection Activities

The observations and tests that will be used to monitor the construction and/or installation of the components of the remedial action shall be described in the CQAP. The plan shall include scope and frequency of each type of inspection. Inspections shall verify compliance with the design, applicable requirements of state and federal law and performance standards. Inspections shall also ensure compliance with all health and safety standards and procedures. The CQAP shall include provisions for conducting the preconstruction, prefinal and final inspections and associated meetings as described in Section 5.4 of this SOW.

4.4.4 Sampling Requirements

The sampling activities necessary to ensure that the design specifications and performance standards are achieved shall be presented in the CQAP. The description of these activities shall include sample sizes, sample locations, frequency of sampling, testing to be performed, acceptance and rejection criteria, and plans for correcting problems as addressed in the design specifications.

4.4.5 Documentation

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

4.5 PERFORMANCE STANDARD VERIFICATION PLAN

A Performance Standard Verification Plan shall be prepared to consolidate information for required testing, sampling and analyses to ensure that both short-term and long-term performance standards for the RA are met. Performance standards may include clean-up standards for contaminated environmental media as well as the measurement of the effectiveness of engineering controls or other controls used to control migration of or exposure to contaminants. For example, the containment of a plume of contaminated ground water by pumping wells would be a performance standard requiring verification. The PSVP should describe the measurements to be taken, such as water levels in monitoring wells and piezometers, along with any analyses to be conducted on the data obtained, such as ground water modeling, to verify that the plume is contained. The PSVP shall include a FSP and a QAPP for any sampling and analyses to be conducted.

The Draft PSVP shall be submitted with the Intermediate Design for review and comment by the Ohio EPA. The final PSVP, which fully addresses comments made by the Ohio EPA must be submitted with and approved as part of the Final Design.

4.6 OPERATION AND MAINTENANCE PLAN

The Respondent(s) shall prepare an Operation and Maintenance Plan (O&M Plan) to cover long term operation and maintenance of the RA. Operation and maintenance for all components of the remedial action, shall begin after it is demonstrated that those components are operational and functional. The plan, at a minimum, shall be composed of the elements listed below.

1. Normal Operation and Maintenance
 - a. Description of tasks for operation
 - b. Description of tasks for maintenance
 - c. Description of prescribed treatment or operating conditions
 - d. Schedules showing the frequency of each O&M task

2. Potential Operating Problems
 - a. Description and analysis of potential operating problems
 - b. Sources of information regarding potential operating problems
 - c. Description of means of detecting problems in the operating systems
 - d. Common remedies for operating problems

3. Routine Monitoring and Laboratory Testing
 - a. Description of monitoring tasks
 - b. Description of required laboratory tests and interpretation of test results
 - c. Required QA/QC procedures to be followed
 - d. Schedule of monitoring frequency and provisions to discontinue, if appropriate

Note: Information on monitoring and testing that is presented in the PSVP should be referenced, as appropriate, but should not be duplicated in the O&M Plan.

4. Alternative O&M
 - a. Description of alternate procedures to prevent undue hazard, should systems fail
 - b. Analysis of the vulnerability and additional resources requirements should a failure occur

5. Safety Plan
 - a. Description of safety procedures, necessary equipment, etc. for site personnel
 - b. Description of safety tasks required in the event of systems failure (may be linked to the Site Safety Plan developed for the RD/RA)

6. Equipment
 - a. Description of equipment necessary to the O&M Plan
 - b. Description of installation of monitoring components
 - c. Description of maintenance of site equipment
 - d. Replacement schedule for equipment and installed components

7. Annual O&M Budget

- a. Costs for personnel
 - b. Costs for preventative and corrective maintenance
 - c. Costs of equipment and supplies, etc.
 - d. Costs of any contractual obligations (e.g., lab expenses)
 - e. Costs of operation (e.g., energy, other utilities, etc.)
8. Records and Reporting Mechanisms Required
- a. Daily operating logs
 - b. Laboratory records
 - c. Records for operating costs
 - d. Mechanism for reporting emergencies
 - e. Personnel and maintenance records
 - f. Monthly/semi-annual reports to Ohio EPA

The Respondent(s) shall submit a draft O&M Plan to the Ohio EPA for review and comment with the Intermediate Design submittal. Subsequent drafts of the O&M Plan shall be submitted with the Prefinal and Final Design submittals, which reflect the refined plans and specifications of those submittals and any comments made by the Ohio EPA. The final O&M Plan shall be submitted by the Respondent(s) prior to or at the completion of construction of the remedial action and shall incorporate any modifications or corrections required by the Ohio EPA.

EXHIBIT A

OHIO EPA AND U.S. EPA GUIDANCE DOCUMENTS FOR REMEDIAL DESIGN / REMEDIAL ACTION

1. How Clean Is Clean, Final, Ohio EPA, Division of Emergency and Remedial Response, Policy No. DERR-00-RR-009, July 26, 1991
2. Background Guidance, Final, Ohio EPA, Division of Emergency and Remedial Response, July 26, 1991
3. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final, OSWER 9355.3-01, EPA/540/G-89/004, October 1988
4. Technical Guidance Manual for Hydrogeologic Investigations and Ground Water Monitoring Programs, Ohio EPA, Division of Drinking and Ground Waters, Final, February 1995
5. 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
6. Data Quality Objectives for Remedial Response Activities, Volume I - Example Scenario, OSWER Directive 9355.0-7B, EPA/540/G-87/004, March 1987
7. Superfund Remedial Design and Remedial Action Guidance, OSWER 9355.0-4A, June 1986
8. 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
9. CERCLA Compliance With Other Laws Manual - Part I, OSWER Directive 9234.1-01, EPA/540/G-89/006, August 1989, Interim Final
10. CERCLA Compliance With Other Laws Manual - Part II, OSWER Directive 9234.1-02, EPA/540/G-89/009, August 1989, Interim Final
11. U.S. EPA Integrated Risk Information System (IRIS) Data Base
12. U.S. EPA Health Effects Assessment Summary Tables, Office of Emergency & Remedial Response, published annually
13. Guide for Conducting Treatability Studies Under CERCLA, EPA/540/2-89/058,

December 1989, Interim Final

14. Final Covers for Hazardous Waste Landfills and Surface Impoundments, EPA/530/SW-89/047, July 1989
15. Requirements for Hazardous Waste Landfill Design, Construction, and Closure, EPA/625/4-89/022, August 1989
16. Technical Guidance Document: Construction Quality Assurance for Hazardous Waste Land Disposal Facilities, EPA/530/SW-86/031, October 1986
17. Technical Guidance Document: Inspection Techniques for the Fabrication of Geomembrane Field Seams, EPA/530/SW-91/051, May 1991
18. Technical Guidance for Corrective Measures - Subsurface Gas, EPA/530/SW-88/023, March 1985
19. Technical Guidance Document: Quality Assurance and Quality Control for Waste Containment Facilities, EPA/600/R-93/182, September 1993
20. Structure and Components of Five-Year Reviews, OSWER Directive 9355.7-02, May 1991

Appendix B

OHIO EPA AND U.S. EPA GUIDANCE DOCUMENTS

Statement of Purpose and Use of This Guidance Document List:

The purpose of this list of Ohio EPA and U.S. EPA policies, directives and guidance documents is to provide a reference of the documents which provide essential direction and guidance for conducting investigations, evaluating alternative remedial actions, and designing and implementing selected remedial actions at sites for which the Division of Emergency and Remedial Response has authority over such activities. Certain sites may have contaminants or conditions which are not fully addressed by the documents in this list. There is an evolving body of policy directives, guidance and research documentation which should be utilized, as necessary, to address those conditions and contaminants not encompassed by the documents in this list. For sites where activities are conducted in response to an administrative or judicial order, this list would be an attachment to the order and would govern the work conducted pursuant to it. When entering into or issuing an order for a particular site, Ohio EPA reserves the right to modify this list to fully address the site conditions.

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, Final, February 1995

7. Wastewater Discharges Resulting from Clean-Up of Response Action Sites Contaminated with Volatile Organic Compounds, Ohio EPA Policy No. DSW-DERR 0100.027, Final, September 22, 1994

Also, if there are any aquatic ecological concerns for the site under investigation please consult the following Biological Criteria documents:

- 8a. Biological Criteria for the Protection of Aquatic Life: Volume I. The Role of Biological Data in Water Quality Assessment. Ohio EPA, Division of Surface Water, 1987
- 8b. Biological Criteria for the Protection of Aquatic Life: Volume II. Users Manual for Biological Field Assessment of Ohio Surface Waters. Ohio EPA, Division of Surface Water, 1987
- 8c. Addendum to Biological Criteria for the Protection of Aquatic Life: Volume II. Users Manual for Biological Field Assessment of Ohio Surface Waters. Ohio EPA, Division of Surface Water, 1989
- 8d. Biological Criteria for the Protection of Aquatic Life: Volume III. Standardized Biological Field Assessment of Ohio Surface Waters. Ohio EPA, Division of Surface Water, 1989
- 8e. Rankin, E.T. 1989. The Qualitative Habitat Evaluation Index (QHEI): Rationale, Methods, and Application. Ohio EPA, Division of Surface Water, 1990

U.S. EPA GUIDANCE DOCUMENTS AND OTHER USEFUL GUIDANCE

9. CERCLA Compliance with Other Laws Manual - Part I, OSWER Directive 9234.1-01, EPA/540/G-89/006, August 1988, interim final
10. 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

12. A Rationale for the Assessment of Errors in the Sampling of Soils, EPA/600/4-90/013, July 1990
13. Assessment of Technologies for the Remediation of Radioactively Contaminated Superfund Sites, EPA/540/2-90/001, January 1990
14. Closure of Hazardous Waste Surface Impoundments, SW-873, September 1980
15. Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites, OSWER Directive 9355.3-11, EPA/540/P-91/001, February 1991
16. Data Quality Objectives Process for Superfund, Interim Final Guidance, OSWER Directive 9355.9-01, EPA540-R-93-071, September 1993
17. Ecological Assessments of Hazardous Wastes Sites: A Field and Laboratory Reference, EPA/600/3-89/013, March 1989
18. Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments
19. Exposure Factors Handbook, EPA/600/8-89/043, March 1990
- 20.* 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
21. Guidance for Conducting Remedial Investigation and Feasibility Studies under CERCLA, Interim Final, OSWER 9355.3-01, EPA/540/G-89/004, October 1988
- 22.* Guidance on Remedial Actions for Superfund Sites with PCB Contamination, OSWER Directive 9355.4-01, EPA/540/G-90/007, August 1990
23. Guidance Document on the Statistical Analysis of Ground Water Monitoring Data at RCRA Facilities, EPA, 1989
24. 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
25. Guidance for Data Usability in Risk Assessment, OSWER Directive 9285.7-05,

- EPA/540/G-90/008, October 1990, interim final
- 26.* Guide for Decontaminating Buildings, Structures, and Equipment at Superfund Sites, EPA/600/2-85/028, March 1985
 27. Guide for Conducting Treatability Studies Under CERCLA: Soil Vapor Extraction, EPA/540/2-91/019A, September 1991, interim guidance
 28. Guide for Conducting Treatability Studies Under CERCLA: Aerobic Biodegradation Remedy Screening, EPA/540/2-91/013A, July 1991, interim guidance
 29. Guide for Conducting Treatability Studies Under CERCLA, EPA/540/2-89/058, December 1989, interim final
 30. Handbook - Permit Writer's Guide to Test Burn Data - Hazardous Waste Incineration, EPA/625/6-86/012, September 1986
 - 31.* Handbook - Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration, EPA/625/6-89/023, January 1990
 32. Handbook - Dust Control at Hazardous Waste Sites, EPA/540/2-85/003, November 1985
 - 33.* 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
 34. Handbook on In Situ Treatment of Hazardous Waste-Contaminated Soils, EPA/540/2-90/002, January 1990,
 35. Handbook for Stabilization/Solidification of Hazardous Wastes, EPA/540/2-86/001, June 1986
 36. Handbook - Hazardous Waste Incineration Measurement Guidance Manual - Volume III of the Hazardous Waste Incineration Guidance Series, EPA/625/6-89/021, June 1989
 37. Leachate Plume Management, EPA/540/2-85/004, November 1985
 38. Preparation Aids for the Development of Category 1 Quality Assurance Project Plans,

- EPA/6008-91-003, February 1991
39. 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
 40. RCRA Ground Water Monitoring Technical Enforcement Guidance Document (TEGD), OSWER Directive 9950.1, September 1986
 41. Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part A), Interim Final, EPA/540/1-89/002, December 1989
 42. 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
 43. Risk Assessment Guidance for Superfund: Volume II - Environmental Evaluation Manual, OSWER Directive 9285.7-01, EPA/540/1-89/001A, March 1989, interim final
 44. 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
 45. 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
 - 46.* Seminar Publication - Requirements for Hazardous Waste Landfill Design, Construction, and Closure, EPA/625/4-89/022, August 1989
 47. SW 846, Test Methods for Evaluating Solid Waste, 3rd Edition and appropriate updates, November 1986.
 48. Stabilization/Solidification of CERCLA and RCRA Wastes - Physical Tests, Chemical Testing Procedures, Technology Screening and Field Activities, EPA/625/6-89/022, May 1989
 49. Standard Methods for the Examination of Water and Wastewater, American Public Health Association, 18th Edition, 1992

- 50.* Superfund Remedial Design and Remedial Action Guidance, OSWER 9355.0-4A, June 1986
51. Superfund Exposure Assessment Manual, OSWER Directive 9285.5-1, EPA/540/1-88/001, April 1988
52. Superfund Ground Water Issue: Ground Water Sampling for Metals, EPA/540/4-89/001, March 1989
- 53.* Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments, EPA/530-SW-89-047, July 1989
- 54.* Technical Guidance Document: Inspection Techniques for the Fabrication of Geomembrane Field Seams, EPA/530/SW-91/051, May 1991
55. Technical Guidance for Corrective Measures - Subsurface Gas, EPA/530-SW-88-023, March 1985
56. Technical Guidance Document: Construction Quality Assurance and Quality Control for Waste Containment Facilities, EPA/600/R-93/182, September 1993
57. U.S. EPA Integrated Risk Information System (IRIS) Data Base
58. U.S. EPA Health Effects Assessment Summary Tables, Office of Emergency & Remedial Response, published annually
59. U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, EPA-540/R-94-013, February 1994
60. U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, EPA-540/R-94-012, February 1994

Notes:

- 1) Documents and guidances denoted by an 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.

- 2) This list of guidance documents is updated periodically. You should check with Ohio EPA to verify that this list is the most current available.

Appendix C

to be
added later

APPENDIX D

LIST OF MONITORING REQUIREMENTS FOR WETLAND MITIGATION

1. The Wetlands Workplan shall include the following parameters to be sampled during the growing season:
 - a. Soils data: soil probes or test pits to initially delineate hydric soils;
 - b. Vegetative sampling including the following:
 - i. percent vegetative cover by community type; percent unvegetated; percent open water;
 - ii. number of communities and dominant species;
 - c. Hydrology testing: water level readings at selected locations within the mitigation site; and
 - d. Any other parameters specified in the Wetlands Workplan.
2. Nothing in this Appendix D precludes additional monitoring or other requirements in the Wetlands Workplan.

APPENDIX E

FINANCIAL ASSURANCE - ANNUITY/TRUST OPTION

This Appendix describes the use of annuities and trusts as an option to provide financial assurance for Operation and Maintenance (O & M) at the Site for one thousand (1000) years. This annuity/trust option for financial assurance has two parts:

1. For financial assurance for years one to one hundred (1 - 100), Defendants shall establish a trust in accordance with OAC Rule 3745-66-45 (or alternative trust language approved by Ohio EPA) and an annuity approved by Ohio EPA. The initial schedule of cash outlays from the annuity to the trust shall be no less than the amounts set forth in Exhibit 1 to this Appendix E and shall begin January 1, 1998. The beneficiary or annuitant of the annuity will be the trust.
2. For financial assurance for years one hundred to one thousand (100 - 1000), Defendants shall establish a Perpetual Care Trust in accordance with OAC Rule 3745-66-45 (or with alternative trust language approved by Ohio EPA). The initial trust amount shall be \$113,331.00. All proceeds from the trust shall be reinvested into the trust during years one to one hundred (1 to 100).

Shieldalloy Metallurgical Corp.

Cash Flow Schedule for Long-Term Operation and Maintenance Costs for Slag Piles at Cambridge Site*

	Source		*assumes mid-year cash outlays							
Discount Rate	6.00%	PTI								
Inflation Rate	3.40%	10 Average GDP Deflator								
1st year Quarterly Inspection Cost	\$18,700	PTI - 1st 30 years only								
1st year Annual Inspection Cost	\$1,300	PTI - begins 31st year								
Every 5th year Inspection Cost	\$8,060	PTI - begins 31st year								
1st Year Annual topsoil maintenance	\$27,000	PTI - begins year 1								
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	
Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Cash Outlay Quarterly Inspections (30 yrs.)	\$22,475	\$23,239	\$24,030	\$24,847	\$25,691	\$26,565	\$27,468	\$28,402	\$29,368	
Cash Outlay Annual Inspections (1000 yrs.)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Cash Outlay Annual Topsoil Maintenance (1000 yrs.)	\$32,451	\$33,554	\$34,695	\$35,875	\$37,094	\$38,356	\$39,660	\$41,008	\$42,402	
Total	\$54,926	\$56,794	\$58,725	\$60,721	\$62,786	\$64,921	\$67,128	\$69,410	\$71,770	

Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30	Year 31	Year 32
2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
\$43,865	\$45,356	\$46,898	\$48,493	\$50,142	\$51,846	\$53,609	\$55,432	\$57,316	\$59,265		
\$0	\$0	\$0	\$0	\$0	\$0	\$26,833	\$3,854	\$3,985	\$4,120	\$4,260	\$31,716
\$63,334	\$65,487	\$67,714	\$70,016	\$72,397	\$74,858	\$77,404	\$80,035	\$82,756	\$85,570	\$88,480	\$91,488
\$107,199	\$110,844	\$114,612	\$118,509	\$122,538	\$126,705	\$157,846	\$139,321	\$144,058	\$148,955	\$92,740	\$123,204

Year 41	Year 42	Year 43	Year 44	Year 45	Year 46	Year 47	Year 48	Year 49	Year 50	Year 51	Year 52
2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053
\$5,952	\$44,308	\$6,363	\$6,579	\$6,803	\$7,034	\$52,370	\$7,521	\$7,777	\$8,041	\$8,314	\$61,899
\$123,608	\$127,811	\$132,157	\$136,650	\$141,296	\$146,100	\$151,068	\$156,204	\$161,515	\$167,006	\$172,685	\$178,556
\$129,560	\$172,119	\$138,520	\$143,230	\$148,099	\$153,135	\$203,438	\$163,725	\$169,292	\$175,047	\$180,999	\$240,455

Year 61	Year 62	Year 63	Year 64	Year 65	Year 66	Year 67	Year 68	Year 69	Year 70	Year 71	Year 72
2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073
\$11,616	\$86,475	\$12,419	\$12,841	\$13,278	\$13,729	\$102,210	\$14,679	\$15,178	\$15,694	\$16,227	\$120,806
\$241,245	\$249,448	\$257,929	\$266,699	\$275,766	\$285,142	\$294,837	\$304,862	\$315,227	\$325,945	\$337,027	\$348,486
\$252,861	\$335,923	\$270,348	\$279,540	\$289,044	\$298,871	\$397,047	\$319,540	\$330,405	\$341,638	\$353,254	\$469,294

Year 81	Year 82	Year 83	Year 84	Year 85	Year 86	Year 87	Year 88	Year 89	Year 90	Year 91	Year 92
2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093
\$22,670	\$168,773	\$24,238	\$25,062	\$25,914	\$26,795	\$199,483	\$28,648	\$29,622	\$30,629	\$31,670	\$235,780
\$470,836	\$486,845	\$503,397	\$520,513	\$538,210	\$556,509	\$575,431	\$594,995	\$615,225	\$636,143	\$657,772	\$680,136
\$493,506	\$655,617	\$527,635	\$545,575	\$564,124	\$583,304	\$774,913	\$623,643	\$644,847	\$666,772	\$689,442	\$915,916