

BEFORE THE
OHIO ENVIRONMENTAL PROTECTION AGENCY

OHIO EPA
DEC 29 2003
ENTERED IN DIRECTOR'S JOURNAL

In the Matter of:	:	
	:	
	:	
Meritor Heavy Vehicle Systems, LLC;	:	Director's Final Findings and Orders
	:	
Respondent	:	
	:	
	:	
For the Site commonly known as:	:	
Rockwell International Corporation	:	
On-Highway Products	:	

PREAMBLE

It is hereby agreed to by the Parties hereto as follows:

I. JURISDICTION

1. These Director's Final Findings and Orders ("Orders") are issued to Meritor Heavy Vehicle Systems, LLC ("Respondent"), successor in interest to Rockwell International Corporation, pursuant to the authority vested in the Director of Ohio EPA under Ohio Revised Code ("ORC") §§ 3734.13, 3734.20, 6111.03, and 3745.01. Respondent consents to and agrees not to contest Ohio EPA's jurisdiction to issue and enforce these Orders.

II. PARTIES BOUND

2. These Orders shall apply to and be binding upon Respondent and its successors in interest liable under Ohio law.

3. No change in ownership or corporate status of the Respondent including, but not limited to, any transfer of assets or real or personal property shall in any way alter Respondent's obligations under these Orders.

4. Respondent shall provide a copy of these Orders to all contractors, subcontractors, laboratories and consultants retained to perform any portion of the Work pursuant to these Orders. Respondent shall ensure that all contractors, subcontractors, laboratories and consultants retained to perform Work pursuant to these Orders also

Authority to be a true and correct copy of the
original document is hereby certified by the Ohio
Environmental Protection Agency.

Joseph Kuchan 12-29-03

comply with the applicable provisions of these Orders.

III. DEFINITIONS

5. Unless otherwise expressly provided herein, all terms used in these Orders or in any appendices shall have the same meaning as defined in ORC Chapters 3734 and 6111. Whenever the terms listed below are used in these Orders or in any appendices, attached hereto and incorporated herein, the following definitions shall apply:

- a. "Day" means a calendar day unless expressly stated to be a business day. "Business day" shall mean a day other than a Saturday, Sunday, or state holiday. In computing any period of time under these Orders, where the last day would fall on a Saturday, Sunday, or state holiday, the period shall run until the close of the next business day.
- b. "Decision Document" means the document attached to these Orders as Appendix A.
- c. "NCP" means the National Oil and Hazardous Substances Pollution Contingency Plan, codified at 40 C.F.R. Part 300 (1990), as amended.
- d. "Ohio EPA" means the Ohio Environmental Protection Agency and its designated representatives.
- e. "Paragraph" means a portion of these Orders identified by an arabic numeral or an uppercase or lowercase letter.
- f. "Party" or "Parties" means Respondent and Ohio EPA.
- g. "Remedial Action" ("RA") means those activities to be undertaken by Respondent to implement and maintain the effectiveness of the final plans and specifications submitted by Respondent pursuant to the Remedial Design and Remedial Action Work Plan
- h. "Remedial Design" ("RD") means those activities to be undertaken by Respondent to develop the final plans and specifications for the Remedial Action pursuant to the Remedial Design and Remedial Action Work Plan.
- i. "Remedial Design and Remedial Action Work Plan" ("RD/RA Work Plan") means the document submitted by Respondent pursuant to the Performance of the Work by Respondent Section of these Orders
- j. "Respondent" means Meritor Heavy Vehicle Systems, LLC, successor in interest to

Rockwell International Corporation, and owner of the Rockwell International site ("Site") located in Heath, Licking County, Ohio.

- k. "Response Costs" means all costs including, but not limited to, payroll costs, contractor costs, travel costs, direct costs, indirect costs, legal and enforcement related costs, oversight costs, laboratory costs, and the costs of reviewing or developing plans, reports, and other items pursuant to these Orders, verifying the Work, or otherwise implementing or enforcing these Orders.
- l. "Section" means a portion of these Orders identified by a Roman numeral.
- m. "Site" means the Rockwell International Corporation, On-Highway Products site located at 444 Hebron Road (State Route 79), in the City of Heath, Licking County, Ohio where the treatment, storage, and/or disposal of hazardous waste, and/or the discharge into waters of the state of industrial waste or other waste are alleged to have occurred, including any other area where such hazardous wastes, industrial wastes, and/or other wastes have migrated or threaten to migrate.
- n. "Statement of Work" ("SOW") means the statement of work for the implementation of the Remedial Design and Remedial Action at the Site, as set forth in Appendix B to these Orders. The SOW is not specific to this Site, and shall be used as an outline in developing Site-specific work plans.
- o. "Transferee" means any future owner of any interest in the Site, including, but not limited to, owners of an interest in fee simple, mortgagees, easement holders, and/or lessees.
- p. "Waste Material" means (1) any "hazardous waste" under ORC § 3734.01(J); (2) any "solid waste" under ORC § 3734.01(E); (3) any "industrial waste" under ORC § 6111.01(C); and (4) any "other wastes" under ORC § 6111.01(D) of the ORC.
- q. "Work" means all activities Respondent is required to perform under these Orders.

IV. FINDINGS

6. All of the findings necessary for the issuance of these Orders pursuant to ORC §§ 3734.01(E), 3734.01(J), 6111.11(C), 6111.01(D), and 3745.01 have been made and are outlined below. Nothing in the Findings, however, shall be considered to be an admission by Respondent of any matter of or fact. The Director of Ohio EPA has determined the following findings:

Director's Final Findings and Orders
Meritor Heavy Vehicle Systems, LLC
Heath, Licking County, Ohio

- a. The Rockwell International Corporation, On-Highway Products site ("Site") is located at 444 Hebron Road, (State Route 79), Heath, Licking County, Ohio.
- b. The Site is a hazardous waste facility, solid waste facility or other location where hazardous waste was treated, stored or disposed.
- c. The Respondent Meritor Heavy Vehicle Systems, LLC, successor in interest to Rockwell International Corporation, On-Highway Products, is the owner of the Site.
- d. Respondent is a "person" as defined under ORC §§ 3734.01(G) and 6111.01(I).
- e. Respondent is or has been a generator of "Waste Material." The Respondent has directly or indirectly allowed and/or directed the placement and/or disposal of waste material at the Site.
- f. On November 28, 1990, the Director of Ohio EPA issued an Administrative Order on Consent (AOC) to Respondent to complete a remedial investigation and feasibility study (RI/FS) at the Site. The AOC divided the Site into two operable units: (1) The Closed Lagoon Operable Unit (CLOU); and (2) the Demolition Debris Operable Unit (DDOU). The CLOU is defined as the four lagoons, the fill area between Lagoon 3 and Lagoon 4, and any contamination migrating from the CLOU. The DDOU is defined as the fill area adjacent to the Rockwell plant and includes any contamination migrating from the DDOU.
- g. Ohio EPA approved the RI Report on February 10, 1998 and approved the FS Report on March 8, 2002. The RI identified human health and environmental risks at the Site as a result of the contaminated ground water, soil and waste fill material. The principal contaminants of concern are vinyl chloride, cis 1,2 dichloroethene (cis 1,2 DCE), and polychlorinated biphenyls (PCBs). The principal health risk at the Site is the potential ingestion of vinyl chloride in ground water.
- h. On September 25, 2002, Ohio EPA notified the public of its Preferred Plan for the remedy of the Site and solicited public comments. The Preferred Plan summarizes the information presented in the Remedial Investigation (RI) and Feasibility Study (FS) prepared by Meritor Heavy Vehicle Systems, Inc., and identifies and explains Ohio EPA's preferred alternative for the remedial action at the Site. The preferred remedial alternative in this Preferred Plan includes the following elements:
 - i. Enhanced in-situ anaerobic reductive dechlorination;
 - ii. Extraction of light non-aqueous phase liquid (LNAPL)

Director's Final Findings and Orders
Meritor Heavy Vehicle Systems, LLC
Heath, Licking County, Ohio

- iii. Soil cover;
 - iv. Monitoring; and
 - v. Institutional/engineering controls.
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- i. On October 2, 2002, Ohio EPA held a public meeting and hearing on the Preferred Plan. The public comment period ended on October 25, 2002.
 - j. On March 4, 2003 Ohio EPA issued a Decision Document, which selected the remedy for the Site. The Decision Document is attached hereto as Appendix A, and incorporated by reference herein.
 - k. The RI characterized the nature and extent of the contaminants released at the Site and the potential risks to public health and safety and the environment. The RI revealed that the ground water is contaminated with cis 1,2 dichloroethene, trans 1,2 dichloroethene, vinyl chloride and polychlorinated biphenyls (PCBs).
 - l. Because of their quantity, concentration, physical or chemical characteristics, some of the contaminants found at the Site are "hazardous wastes" as defined in ORC § 3734.01(J).
 - m. Contaminants found at the Site are "industrial wastes" or "other wastes" as defined in ORC § 6111.01(C) and (D).
 - n. The ground and surface waters at the Site are "waters of the state" as defined in ORC § 6111.01(H).
 - o. Conditions at the Site constitute a substantial threat to public health or safety or are causing or contributing or threatening to cause or contribute to air or water pollution or soil contamination in accordance with ORC § 3734 20(B).
 - p. The migration and threatened migration of these industrial wastes, and/or hazardous wastes, into soil, ground water, and surface water at or from the Site constitutes a discharge of industrial wastes and/or hazardous wastes into waters of the state. The Work required pursuant to these Orders will contribute to the prohibition or abatement of the discharge of industrial wastes or other wastes into the waters of the state.
 - q. The City of Heath has approved an ordinance prohibiting the extraction of ground water at the Site including the residential area adjacent to the Site. A copy of Ordinance Number 81-2003 as approved by the City of Heath on October 20, 2003 is attached to these Orders in Appendix C.

- r. In issuing these Orders, the Director has given consideration to, and based his determination on, evidence relating to both technical feasibility and economic reasonableness of complying with these Orders, and to evidence relating to conditions calculated to result from compliance with these Orders, and their relation to the benefits to the people of the state to be derived from such compliance.

V. GENERAL PROVISIONS

7. Objectives of the Parties

The objective of the Parties in entering into these Orders is to provide for the protection of public health and safety, and the environment from the disposal, discharge, or release of Waste Material at the Site through the design, construction, operation and maintenance of the remedy as set forth in the Decision Document.

8. Commitment of Respondent

Respondent shall perform the Work in accordance with these Orders including but not limited to the SOW, all relevant guidance documents, and all standards, specifications, and schedules set forth in or developed pursuant to these Orders. Respondent shall also reimburse Ohio EPA for Response Costs as provided in these Orders.

9. Compliance With Law

- a. All activities undertaken by Respondent pursuant to these Orders shall be performed in accordance with the requirements of all applicable federal and state laws and regulations.
- b. Respondent shall perform the activities required pursuant to these Orders in a manner that is not inconsistent with the NCP. Ohio EPA believes that activities conducted pursuant to these Orders, if approved by Ohio EPA, shall be considered necessary and consistent with the NCP.
- c. Where any portion of the Work requires a permit or approval, Respondent shall submit applications in a timely manner and take all other actions necessary to obtain such permits or approval. These Orders are not, and shall not be construed to be, a permit issued pursuant to any statute or regulation.

VI. PERFORMANCE OF THE WORK BY RESPONDENT

10. Supervising Contractor

All Work performed pursuant to these Orders shall be under the direction and supervision of a contractor with expertise in hazardous waste site investigation and remediation. Prior to the initiation of the Work, Respondent shall notify Ohio EPA in writing of the name of the supervising contractor and any subcontractor to be used in carrying out the terms of these Orders.

11. Remedial Design and Remedial Action

- a. Within sixty (60) days after the effective date of these Orders, Respondent shall submit to Ohio EPA a work plan and schedule for implementation of the Remedial Design and Remedial Action for the Site ("RD/RA Work Plan"). The RD/RA Work Plan shall provide for the design, construction, operation and maintenance of the remedy as set forth in the Decision Document.
- b. The RD/RA Work Plan shall be developed in conformance with the SOW, Appendix B of these Orders, and the guidance documents listed in Appendix C of these Orders, attached hereto and incorporated herein. If Ohio EPA determines that any additional or revised guidance documents affect the Work to be performed in implementing the RD/RA, Ohio EPA will notify Respondent, and the RD/RA Work Plan and other affected documents shall be modified accordingly.
- c. Should Respondent identify any inconsistency between any of the laws and regulations and guidance documents that Respondent is required to follow by these Orders, Respondent shall notify Ohio EPA in writing of each inconsistency and the effect of the inconsistencies upon the Work to be performed. Respondent shall also recommend, along with a supportable rationale justifying each recommendation, the requirement Respondent believes should be followed. Respondent shall implement the affected Work as directed by Ohio EPA.
- d. Ohio EPA will review the RD/RA Work Plan pursuant to the procedures set forth in the Review of Submittals Section of these Orders. Upon approval of the RD/RA Work Plan by Ohio EPA, Respondent shall implement the RD/RA Work Plan. Respondent shall submit all plans, reports, or other deliverables required under the approved RD/RA Work Plan, in accordance with the approved schedule, for review and approval pursuant to the Review of Submittals Section.
- e. Within fifteen (15) days of the effective date of these Orders, Respondent shall meet with Ohio EPA to discuss the requirements of the RD/RA Work Plan unless otherwise mutually agreed to by the Parties.

12. Health and Safety Plan

Within sixty (60) days of the effective date of these Orders, Respondent shall submit to Ohio EPA for review and comment a health and safety plan developed in conformance with the criteria listed in Appendix C.

VII. ASSURANCE OF ABILITY TO COMPLETE WORK

13. Within thirty (30) days of the effective date of these Orders, Respondent shall provide Ohio EPA with documentation that evidences Respondent has established and maintains financial security in the amount of \$2,800,000 in order to ensure performance and completion of the Work under these Orders. Evidence of Respondent's financial security shall be Respondent's current annual report and financial statement.

14. Respondent shall submit to the Ohio EPA annually on the anniversary of the effective date of these Orders, Respondent's current annual report and financial statement that evidences Respondent's continued financial security. The Respondent may change the form or amount of the financial assurance mechanism provided under this Section at any time, upon notice to and approval by Ohio EPA. Respondent's inability to demonstrate financial ability to complete the Work shall not excuse performance of any activities required under these Orders.

VIII. LAND USE AND CONVEYANCE OF TITLE

15. Deed Notice

Within sixty (60) days of the effective date of these Orders, or after acquiring an interest in any property which is part of the Site, Respondent shall record a notice on the deed to the property which is part of the Site owned by the Respondent with the County Recorder's Office for Licking County, Ohio. The notice shall reference the existence of these Orders as well as any monitoring, treatment, or containment devices present on Respondent's property. A copy of the recorded notice shall be submitted to Ohio EPA within thirty (30) days of recording the notice. Thereafter, if Respondent conveys any interest in any property included in the Site, each deed, title, or other instrument shall contain a notice stating that the property is subject to these Orders and shall reference and provide for the protection of the integrity of any monitoring, treatment, or containment devices present on the property as a result of these Orders.

16. Use Restriction Agreement

Within thirty (30) days after the effective date of these Orders or such other time period agreed to by the Parties a) Respondent and Ohio EPA shall enter into a Use

Restriction Agreement (Agreement), that contains the legal requirements necessary to create an equitable servitude with provisions to limit the use of the affected portion(s) of the property at the Site to industrial or commercial use only and to limit the use of ground water to non-potable uses only; and b) Respondent shall file the executed Agreement in the office of the County Recorder of Licking County, Ohio in the same manner as a deed for the affected property at the Site.

17. Proof of Filing Use Restriction Agreement

Within thirty (30) days after filing the executed Agreement with the County Recorder, Respondent shall certify to Ohio EPA that the Agreement has been filed for recording, and include with the certification a date-stamped copy of the recorded Agreement. Upon conveyance by Respondent of any interest in any portion of the Site, including but not limited to easements, deeds, leases and mortgages, Respondent shall include in the instrument of conveyance a recital acknowledging and incorporating the Agreement and providing the recording location of the Agreement. The recital shall include a description of the use restriction for the Site established in the Agreement. The terms and conditions of the Agreement are hereby incorporated into these Orders and shall be binding upon the Respondent. If the Agreement is violated or breached by Respondent, the Respondent shall be in violation of these Orders.

18. Land Use Self Reporting Requirement

Respondent shall ensure during its ownership of the Site, that no portion of the Site will be used in any manner that would adversely affect the integrity of any containment, treatment, or monitoring systems at the Site, or violate any use restrictions applicable to the Site under these Orders, including without limitation any institutional controls applicable to the Site. Respondent shall submit on an annual basis, written documentation verifying that any containment, treatment or monitoring systems are in place and operational, and the use restrictions remain in place and are being complied with.

19. Notice of Transfer of Property

Prior to executing any instrument conveying any interest in any portion of the Site, including but not limited to easements, deeds, leases and mortgages, Respondent shall notify the Transferee of the existence of the use restrictions in the Agreement, and shall provide a copy of these Orders and the Agreement to the Transferee. Respondent shall notify Ohio EPA at least thirty (30) days in advance of each conveyance of an interest in any property which is part of the Site. Respondent's notice shall include the name and address of the grantee and a description of the provisions made for the continued access to and maintenance of the containment, treatment, and monitoring systems.

20. Within thirty (30) days after conveyance of any interest in the Site, the Respondent shall submit to Ohio EPA, via certified mail, the following information.

- a. A copy of the deed or other documentation evidencing the conveyance;
- b. The name, address, and telephone number of the new property owner and the name, address, and telephone number of the contact person for the property owner;
- c. A legal description of the property being transferred;
- d. A survey map of the property being transferred;
- e. The closing date of the transfer of ownership of the property.

IX. ADDITIONAL WORK

21. Ohio EPA or Respondent may determine that in addition to the tasks defined in the RD/DA Work Plan, additional work may be necessary to accomplish the Objectives of the Parties as set forth in these Orders.

22. Within forty-five (45) days of receipt of written notice from Ohio EPA that additional work is necessary, unless otherwise specified in writing by Ohio EPA, Respondent shall submit a work plan and schedule for the performance of the additional work. The Ohio EPA's notification that additional work is necessary is subject to the Dispute Resolution provisions set forth in the Dispute Resolution Section of these Orders. The work plan shall conform to the standards and requirements set forth in the documents attached to these Orders as Appendices B and C (SOW and relevant guidance documents). Any impact the additional work has on the overall work schedule shall be reflected on a revised work schedule submitted to the Ohio EPA. Upon approval of the work plan and schedule by Ohio EPA pursuant to the Review of Submittals Section, Respondent shall implement the work plan for additional work in accordance with the schedules contained therein.

23. In the event that Respondent determines that additional work is necessary, Respondent shall submit a work plan and schedule for the performance of additional work. The work plan shall conform to the standards and requirements set forth in the documents attached to these Orders as Appendices B and C. Any impact the additional work has on the overall work schedule shall be reflected on a revised work schedule submitted to the Ohio EPA. Upon approval of the work plan and revised schedule by Ohio EPA pursuant to the Review of Submittals Section, Respondent shall implement the work plan for additional work in accordance with the schedules contained therein.

24. Ohio EPA believes that additional work conducted pursuant to these Orders, if approved by Ohio EPA, shall be considered consistent with the NCP.

X. SAMPLING AND DATA AVAILABILITY

25. Unless otherwise agreed to by Ohio EPA's Site Coordinator, Respondent shall notify Ohio EPA not less than fifteen (15) days in advance of all sample collection activity. Upon request, Respondent shall allow split and/or duplicate samples to be taken by Ohio EPA. Ohio EPA shall also have the right to take any additional samples it deems necessary. Upon request, Ohio EPA shall allow Respondent to take split and/or duplicate samples of any samples Ohio EPA takes as part of its oversight of Respondent's implementation of the Work.

26. Within seven (7) days of a request by Ohio EPA, Respondent shall submit to Ohio EPA copies of the results of all sampling and/or tests or other data, including raw data and original laboratory reports, generated by or on behalf of Respondent with respect to the Site and/or the implementation of these Orders. Respondent may submit to Ohio EPA any interpretive reports and written explanations concerning the raw data and original laboratory reports. Such interpretive reports and written explanations shall not be submitted in lieu of original laboratory reports and raw data. Should Respondent subsequently discover an error in any report or raw data, Respondent shall promptly notify Ohio EPA of such discovery and provide the correct information.

XI. ACCESS

27. Ohio EPA shall have access at all times to the Site and any other property to which access is required for the implementation of these Orders, to the extent access to the property is controlled by Respondent. Access under these Orders shall be for the purposes of conducting any activity related to these Orders including but not limited to the following:

- a. Monitoring the Work;
- b. Conducting sampling;
- c. Inspecting and copying records, operating logs, contracts, and/or other documents related to the implementation of these Orders;
- d. Conducting investigations and tests related to the implementation of these Orders, and

- e Verifying any data and/or other information submitted to Ohio EPA.

28. To the extent that the Site or any other property to which access is required for the implementation of these Orders is owned or controlled by persons other than Respondent, Respondent shall use its best efforts to secure from such persons access for Respondent and the Ohio EPA as necessary to effectuate these Orders. Copies of all access agreements obtained by Respondent shall be provided promptly to Ohio EPA. If any access required to effectuate these Orders is not obtained within sixty (60) days of the effective date of these Orders, or within sixty (60) days of the date Ohio EPA notifies Respondent in writing that additional access beyond that previously secured is necessary, Respondent shall promptly notify the Ohio EPA in writing of the steps Respondent has taken to attempt to obtain access. Ohio EPA may, as it deems appropriate, assist Respondent in obtaining access.

29. Notwithstanding any provision of these Orders, the State of Ohio retains all of its access rights and authorities, including enforcement authorities related thereto, under any applicable statute or regulations, including but not limited to ORC §§ 3734.20 and 6111.05.

XII. DESIGNATED SITE COORDINATORS

30. Within fifteen (15) days of the effective date of these Orders, the Respondent shall notify Ohio EPA, in writing, of the name, address and telephone number of its 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.

31. To the maximum extent practicable, except as specifically provided in these Orders, communications between Respondent and Ohio EPA concerning the implementation of these Orders shall be made between the Site Coordinators. Respondent's Site Coordinator shall be available for communication with Ohio EPA regarding the implementation of these Orders for the duration of these Orders. Each Site Coordinator shall be responsible for assuring that all communications from the other Party are appropriately disseminated and processed. Respondent's Site Coordinator or Alternate Site Coordinator shall be present on the Site or on call during all hours of Work at the Site.

32. Without limitation of any authority conferred on Ohio EPA by statute or regulation, Ohio EPA Site Coordinator's authority includes but is not limited to the following:

- a. Collecting samples and directing the type, quantity and location of samples to be collected by Respondent pursuant to an approved work plan;
- b. Observing, taking photographs, or otherwise recording information related to the implementation of these Orders, including the use of any mechanical or photographic device;
- c. Directing that the Work stop whenever the Site Coordinator for Ohio EPA determines that the activities at the Site may create or exacerbate a 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 these Orders;
- e. Inspecting and copying records, operating logs, contracts and/or other documents related to the implementation of these Orders; and
- f. Assessing Respondent's compliance with these Orders.

XIII. PROGRESS REPORTS AND NOTICE

33. Unless otherwise directed by Ohio EPA, Respondent shall submit a written progress report to Ohio EPA by the tenth (10th) day of every month. At a minimum, the progress reports shall:

- a. Describe the status of the Work and actions taken toward achieving compliance with the Orders during the reporting period;
- b. Describe difficulties encountered during the reporting period and actions taken to rectify any difficulties;
- c. Describe activities planned for the next month;
- d. Identify changes in key personnel;
- e. List target and actual completion dates for each element of activity, including project completion;
- f. Provide an explanation for any deviation from any applicable schedules; and
- g. Indicate how much contaminated soil and waste was treated and/or removed

Director's Final Findings and Orders
Meritor Heavy Vehicle Systems, LLC
Heath, Licking County, Ohio

and contaminated ground water and surface water was pumped and treated, and indicate where such contaminated media were disposed.

34. Progress reports (one copy only) and all other documents (two copies) required to be submitted pursuant to these Orders shall be sent to the following address:

Ohio EPA
Central District Office
3232 Alum Creek Drive
Columbus, Ohio 43207
ATTN: DERR Site Coordinator, Rockwell Site

All correspondence to Respondent shall be directed to the following addresses:

Linda S. Furlough
ArvinMeritor, Inc.
2135 W. Maple Road
Troy, Michigan 48084-7186

and

Ihsan Al-Fayyomi
Brown & Caldwell
2674 Federated Boulevard
Columbus, Ohio 43235

and

Thompson Hine LLP
3900 Key Center
127 Public Square
Cleveland, Ohio 44114-1291
ATTN: David E. Nash, Esq.

XIV. REVIEW OF SUBMITTALS

35. Ohio EPA shall review any work plan, report, or other item required to be submitted pursuant to these Orders. Upon review, Ohio EPA may in its sole discretion: (a) approve the submission in whole or in part; (b) approve the submission upon specified conditions; (c) modify the submission; (d) disapprove the submission in whole or in part, notifying Respondent of deficiencies; or (e) any combination of the above. Ohio EPA shall notify Respondents in writing of the result of its review. No informal advice, guidance,

suggestion, or comment by Ohio EPA regarding reports, plans, specifications, schedules, or any other writing submitted by Respondents shall relieve Respondents of their obligations to obtain such formal approval as may be required by these Orders, and to comply with all requirements of these Orders, unless formally modified.

36. In the event of approval of any submission by the Ohio EPA, Respondent shall proceed to take any action required by the submission as approved by Ohio EPA.

37. In the event that Ohio EPA initially disapproves a submission, in whole or in part, approves a submission upon condition or modifies any submission, and notifies Respondent in writing of the deficiencies, Respondent shall within thirty (30) days, or such longer period of time as specified by Ohio EPA in writing, correct the deficiencies and resubmit the revised submission to Ohio EPA for approval. The revised submission shall incorporate all of the uncontested changes, additions, and/or deletions specified by Ohio EPA in its notice of deficiency. To the extent that Respondent contests any changes, additions, and/or deletions specified by the Ohio EPA, Respondent shall initiate the procedures for dispute resolution set forth in Section XV, Dispute Resolution, within twenty-one (21) days after receipt of Ohio EPA's notification of disapproval of a submission. Notwithstanding the notice of deficiency, Respondent shall proceed to take any action required by a non-deficient portion of the submission.

38. In the event that Ohio EPA disapproves a revised submission, in whole or in part, Ohio EPA may again require Respondent to correct the deficiencies and incorporate all changes, additions, and/or deletions within thirty (30) days, or such period of time as specified by Ohio EPA in writing. If Respondent fails to submit a revised submission incorporating all changes, additions, and/or deletions within thirty (30) days, or such period of time as specified by Ohio EPA in writing, Respondent shall be considered in breach and/or violation of these Orders. If Respondent is in breach and/or violation of these Orders, Ohio EPA retains the right to terminate these Orders, perform any additional remediation, conduct a complete or partial Remedial Design or Remedial Action and/or enforce the terms of these Orders as provided in Section XVIII, Reservation of Rights.

39. All work plans, reports, or other items required to be submitted to Ohio EPA under these Orders shall, upon approval by Ohio EPA, be deemed to be incorporated in and made an enforceable part of these Orders. In the event that Ohio EPA approves a portion of a work plan, report, or other item, the approved portion shall be deemed to be incorporated in and made an enforceable part of these Orders.

XV. DISPUTE RESOLUTION

40. The Site Coordinators shall, whenever possible, operate by consensus. In the

event that there is a dispute about the adequacy of any work plan, report, or other item required to be submitted pursuant to these Orders, the Site Coordinators shall have twenty-one (21) days from the date the dispute arises to invoke the dispute resolution procedures of this Section by notifying the other Site Coordinator in writing. The time period for invoking the dispute resolution procedures of this Section may be extended by mutual agreement of the Site Coordinators. The written notification shall include the technical rationale supporting the Site Coordinator's position. The dispute shall be considered to have arisen when the Site Coordinator seeking to invoke the dispute resolution procedures of this Section becomes aware of or should have become aware of the disputed issue(s). If written notice is not provided within twenty-one (21) days from the date the dispute arises, dispute resolution procedures may not be invoked for the disputed issue(s). The Site Coordinator receiving the written notice shall have twenty-one (21) days from the date the notice is received to reduce her/his position to writing. The writing shall include the technical rationale supporting the Site Coordinator's position. The time period for responding to the written notice may be extended by mutual agreement of the Site Coordinators. Such agreement shall not be unreasonably withheld.

41. Following the exchange of written positions, the Site Coordinators shall have an additional twenty-one (21) days to resolve the dispute. If Ohio EPA concurs with the position of Respondent, then the work plan, report, or other item required to be submitted pursuant to these Orders shall be modified accordingly.

42. If Ohio EPA does not concur with Respondent, the Ohio EPA Site Coordinator shall notify the Respondent in writing. Upon receipt of such written notice, the Respondent shall have twenty-one (21) days to forward a written statement of the dispute to the Division of Emergency and Remedial Response ("DERR") District Manager and request a formal resolution of the dispute. If the Respondent does not forward such a statement and request within twenty-one (21) days, Ohio EPA will adopt the written position of its Site Coordinator and the work plan, report, other item required to be submitted pursuant to these Orders, or any other item subject to the dispute resolution procedures of this Section shall be modified accordingly. If the Respondent forwards such a statement and request within twenty-one (21) days, a DERR Manager will resolve the dispute based upon and consistent with these Orders, the SOW, the RD/RA Work Plan, and other appropriate federal and state laws and regulations.

43. The pendency of a dispute under this Section shall not affect the time period for completion of the Work, except that upon mutual agreement of the Parties, any time period may be extended as appropriate under the circumstances. Such agreement shall not be unreasonably withheld by Ohio EPA. Elements of the Work not affected by the dispute shall be completed in accordance with applicable schedules and time frames. The opportunity to invoke dispute resolution under this Section shall not be available to

Respondent unless otherwise expressly stated with respect to an individual provision of these Orders.

XVI. UNAVOIDABLE DELAYS

44. Respondent shall cause all Work to be performed in accordance with applicable schedules and time frames unless any such performance is prevented or delayed by an event that constitutes an unavoidable delay. For purposes of these Orders, an "unavoidable delay" shall mean an event beyond the control of Respondent which prevents or delays performance of any obligation required by these Orders and which could not be overcome by due diligence on the part of Respondent. Increased cost of compliance shall not be considered an event beyond the control of Respondent.

45. Respondent shall notify Ohio EPA in writing within ten (10) days after the occurrence of an event which Respondent contends is an unavoidable delay. Such written notification shall describe the anticipated length of the delay, the cause or causes of the delay, the measures taken and to be taken by Respondent to minimize the delay, and the timetable under which these measures will be implemented. Respondent shall have the burden of demonstrating that the event constitutes an unavoidable delay.

46. If Ohio EPA does not agree that the delay has been caused by an unavoidable delay, Ohio EPA will notify the Respondent in writing. Ohio EPA reserves the right to terminate these Orders, perform any additional remediation, conduct a partial or complete Remedial Design and Remedial Action, and/or enforce the terms of these Orders in the event that Ohio EPA determines that the delay has not been caused by an unavoidable delay. If Ohio EPA agrees that the delay is attributable to an unavoidable delay, Ohio EPA will notify Respondent in writing of the length of the extension for the performance of the obligations affected by the unavoidable delay.

XVII. REIMBURSEMENT OF COSTS

47. Ohio EPA has incurred and continues to incur Response Costs in connection with the Site. Respondent shall reimburse Ohio EPA for all Response Costs incurred both prior to and after the effective date of these Orders.

48. Within sixty (60) days of receipt of an accounting of Response Costs incurred prior to the effective date of these Orders, Respondent shall remit a check to the Ohio EPA for the full amount claimed.

49. With respect to Response Costs incurred after the effective date of these Orders, Ohio EPA will submit to Respondent on an annual basis an itemized statement of

Director's Final Findings and Orders
Meritor Heavy Vehicle Systems, LLC
Heath, Licking County, Ohio

its Response Costs for the previous year. Within sixty (60) days of receipt of such itemized statement, Respondent shall remit payment for all of Ohio EPA's response costs for the previous year.

50. The Dispute Resolution Section shall apply only to disputes regarding the accuracy of the State of Ohio's request for reimbursement or whether the costs are Response Costs as defined in these Orders and are not inconsistent with the NCP. Should the Respondent dispute a portion of the response costs set forth in an itemized statement, but not all of the costs, Respondent shall pay the uncontested portion pursuant to the provisions of this Section.

51. Respondent shall remit payments to Ohio EPA pursuant to this Section as follows:

- a. Payment shall be made by certified check payable to "Treasurer, State of Ohio" and shall be forwarded to Fiscal Officer, Ohio EPA, P.O. Box 1049, Columbus, Ohio 43216-1049.
- b. A copy of the transmittal letter and check shall be sent to the Fiscal Officer, DERR, Ohio EPA, P.O. Box 1049, Columbus, Ohio 43216-1049, ATTN: Patricia Campbell or her successor, and to the Site Coordinator.

XVIII. ACCESS TO INFORMATION

52. Respondent shall provide to Ohio EPA, upon request and within twenty-one (21) days, copies of all documents and information within its possession or control or that of its contractors or agents, relating to events or conditions at the Site including, but not limited to manifests, reports, correspondence, or other documents or information related to the Work.

53. Respondent may assert a claim that documents or other information submitted to Ohio EPA pursuant to these Orders is confidential under the provisions of OAC § 3745-50-30(A) or ORC § 6111.05(A). If no such claim of confidentiality accompanies the documents or other information when it is submitted to Ohio EPA, it may be made available to the public without notice to Respondent.

54. Respondent may assert that certain documents or other information are privileged under the attorney-client or any other privilege recognized by state law. If Respondent makes such an assertion, it shall provide Ohio EPA with the following: (1) the title of the document or information; (2) the date of the document or information; (3) the

name and title of the author of the document or information; (4) the name and title of each addressee and recipient; (5) a general description of the contents of the document or information; and (6) the privilege being asserted by Respondent.

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

56. Respondent shall preserve for the duration of these Orders and for a minimum of ten (10) years after termination of these Orders, all documents and other information within its possession or control, or within the possession or control of its contractors or agents, which in any way relate to the Work, notwithstanding any document retention policy to the contrary. Respondent may preserve such documents by microfiche, or other electronic or photographic device. At the conclusion of this document retention period, Respondent shall notify Ohio EPA at least sixty (60) days prior to the destruction of these documents or other information; and upon request, shall deliver such documents and other information to Ohio EPA.

XIX. PERIODIC REVIEW

57. Respondent shall conduct studies and investigations as requested by Ohio EPA in order to permit Ohio EPA to conduct reviews at least every five years as described in section 121(c) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, and any applicable regulations.

58. If Ohio EPA determines that information received, in whole or in part, during a review conducted pursuant to the Periodic Review Section, indicates that the Remedial Action is not protective of public health and safety and the environment, the Respondent shall undertake any further response actions Ohio EPA has determined are appropriate. Respondent shall submit a plan for such work to Ohio EPA for approval in accordance with the procedures set forth in the Review of Submittals Section, within sixty (60) days of receiving a request from Ohio EPA to submit such a work plan.

59. Respondent may invoke the procedures in the Dispute Resolution Section, to dispute (1) Ohio EPA's determination that the remedial action is not protective of human health and the environment or (2) Ohio EPA's selection of further response actions.

XX. MODIFICATIONS

60. These Orders may be modified by agreement of the Parties. Modifications shall be in writing, signed by the authorized representative of the Respondent and by the Director, and shall be effective on the date entered in the Journal of the Director of Ohio

EPA.

XXI. INDEMNITY

61. Respondent agrees to indemnify, save, and hold harmless Ohio EPA from any and all claims or causes of action arising from, or related to, the implementation of these Orders or to events or conditions at the Site, including any acts or omissions of Respondent, its officers, employees, receivers, trustees, agents, or assigns. Said indemnification shall not apply to acts or omissions of the State of Ohio, its employees, agents or assigns at, on, upon, or related to the Site if said acts are negligent, performed outside the scope of employment or official responsibilities, or performed with malicious purpose, in bad faith, or in a wanton or reckless manner. Ohio EPA shall not be considered a party to and shall not be held liable under any contract entered into by Respondent in carrying out the activities pursuant to these Orders. Ohio EPA agrees to provide notice to Respondent within thirty (30) days of receipt of any claim that may be the subject of indemnity as provided in this Section, and to cooperate with Respondent in the defense of any such claim or action against Ohio EPA.

XXII. OTHER CLAIMS

62. Nothing in these Orders shall constitute or be construed as a release from any claim, cause of action, or demand in law or equity against any person, firm, partnership, or corporation, not a Party to these Orders for any liability arising from, or related to, events or conditions at the Site.

XXIII. RESERVATION OF RIGHTS

63. Ohio EPA reserves the right to seek legal and/or equitable relief to enforce the terms and conditions of these Orders, including penalties against Respondent for noncompliance with these Orders. Except as provided herein, Respondent reserves any rights it may have to raise any legal or equitable defense in any action brought by Ohio EPA to enforce the terms and conditions of these Orders.

64. Ohio EPA reserves the right to terminate these Orders and/or perform all or any portion of the Work or any other measures in the event that the requirements of these Orders are not wholly complied with within the time frames required by these Orders.

65. Ohio EPA reserves the right to take any action, including but not limited to any enforcement action, action to recover costs, or action to recover damages to natural resources, pursuant to any applicable legal authority as a result of past, present, or future violations of state or federal laws or regulations or the common law, and/or as a result of

events or conditions arising from, or related to, the Site.

XXIV. AGREEMENT NOT TO REFER

66. During the implementation of these Orders, and provided Respondent is considered by Ohio EPA to be in compliance with these Orders, Ohio EPA agrees not to refer Respondent to the Ohio Attorney General's Office, or take administrative enforcement action against Respondent, for Work required by these Orders. Upon completion of these Orders pursuant to the provisions of the Notice of Completion Section of these Orders, and during the term of these Orders so long as Respondent performs the Work pursuant to these Orders, Ohio EPA agrees to not refer Respondent to the Ohio Attorney General's Office, or take administrative enforcement action against Respondent for Work required under these Orders.

XXV. NOTICE OF COMPLETION

67. Following written notice and request from Respondent, when Ohio EPA concurs that Respondent has fully performed all Work in accordance with these Orders, Ohio EPA will provide written notice to the Respondent. Such concurrence shall not terminate the Respondent's obligations under the Reimbursement of Costs, Reservation of Rights, Access to Information, Period Reviews, Land Use and Conveyance of Title, and Agreement Not to Refer Sections of these Orders.

XXVI. WAIVER AND AGREEMENT

68. In order to resolve disputed claims, without admission of fact, violation or liability, Respondent consents to the issuance of these Orders, and agrees to perform all actions required by these Orders.

69. Respondent hereby waives the right to appeal the issuance, terms and conditions, and service of these Orders and hereby waives any and all rights that it may have to seek administrative or judicial review of the issuance, terms and conditions, and service of these Orders either in law or equity.

70. Notwithstanding the limitations herein on Respondent's right to appeal or seek judicial review, Ohio EPA and Respondent agree that in the event that these Orders are appealed by any other party to the Environmental Review Appeals Commission, or any court, Respondent retains the right to intervene and participate in such appeal. In such event, Respondent shall continue to comply with these Orders notwithstanding such appeal and intervention unless these Orders are stayed, vacated or modified

Director's Final Findings and Orders
Meritor Heavy Vehicle Systems, LLC
Heath, Licking County, Ohio

XXVII. EFFECTIVE DATE

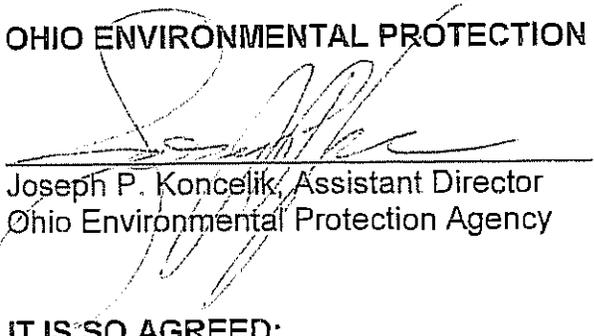
71. The effective date of these Orders shall be the date these Orders are entered in the Journal of the Director of Ohio EPA.

XXVIII. SIGNATORY AUTHORITY

72. Each undersigned representative of a Party to these Orders certifies that he or she is fully authorized to enter into these Orders and to legally bind such Party to these Orders.

IT IS SO ORDERED AND AGREED:

OHIO ENVIRONMENTAL PROTECTION AGENCY



Joseph P. Koncelik, Assistant Director
Ohio Environmental Protection Agency

Date

12/29/02

IT IS SO AGREED:

Meritor Heavy Vehicle Systems, LLC,
Successor In Interest to Rockwell International Corporation,
Respondent

BY:



Name

Date

12/17/03

Assistant General Counsel
Title

Director's Final Findings and Orders
Meritor Heavy Vehicle Systems, LLC
Heath, Licking County, Ohio

APPENDIX A - DECISION DOCUMENT

OHIO E.P.A.
MAR - 4 2003
ENTERED DIRECTOR'S JOURNAL

DECISION DOCUMENT

FOR THE

REMEDICATION OF

Rockwell International Corporation, On-Highway Products

Licking County, Ohio

prepared by

THE OHIO ENVIRONMENTAL PROTECTION AGENCY

November, 2002

*"I certify this to be a true and correct copy of the
official document as filed in the records of the Ohio
Environmental Protection Agency."*

Roma A. Clements Mar 4, 03

DECLARATION

SITE NAME AND LOCATION

Rockwell International Corporation, On-Highway Products
Heath, Ohio

STATEMENT OF BASIS AND PURPOSE

This Decision Document presents the selected remedial action for the Rockwell International Corporation, On-Highway Products Site (Rockwell) in Heath, Ohio, chosen in accordance with the policies of the Ohio Environmental Protection Agency, statutes and regulations of the State of Ohio, and the National Contingency Plan, 40 CFR Part 300.

ASSESSMENT OF THE SITE

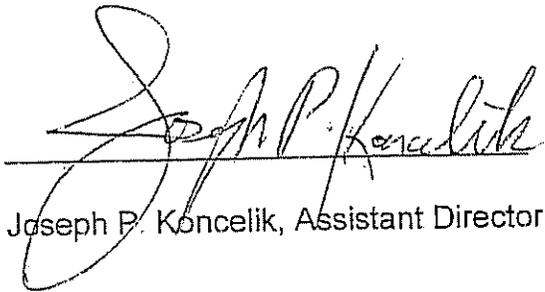
Actual and threatened releases of vinyl chloride, cis 1,2 dichloroethene, and polychlorinated biphenyls (PCBs) due to past disposal practices at the Rockwell site, if not addressed by implementing the remedial action selected in the Decision Document, constitute a substantial threat to public health or safety and are causing or contributing to air or water pollution or soil contamination.

DESCRIPTION OF THE SELECTED REMEDY

- Enhanced In-situ Anaerobic Reductive Dechlorination to reduce the concentration of vinyl chloride and cis 1,2 dichloroethene in ground water;
- Soil Cover to provide a minimum of two feet of separation between the industrial fill and the land surface;
- Light Non-Aqueous Phase Liquid removal to reduce the mass and volume of PCB-laced hydrocarbon oil in the ground water;
- Monitoring to document the effectiveness of Enhanced In-Situ Anaerobic Reductive Dechlorination and the fate and transport of vinyl chloride and cis 1,2 dichloroethene in soil and ground water; and,
- Institutional/Engineering Controls to prevent contact with contaminated media during the remedial action.

STATUTORY DETERMINATIONS

The selected remedial action is protective of human health and the environment, complies with legally applicable state and federal requirements, is acceptable to the local community and is cost-effective. The remedy utilizes permanent solutions and treatment technologies to the maximum extent practicable to reduce the toxicity, mobility and volume of hazardous substances produced at the Rockwell Site. The effectiveness of the remedy will be reviewed regularly.


Joseph P. Koncelik, Assistant Director

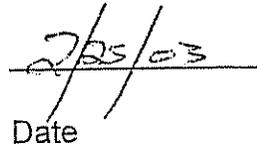

Date

TABLE OF CONTENTS

		Page Number
1.0	SITE BACKGROUND	
1.1	Site Location, History, and Characteristics	6
1.2	Summary of the Remedial Investigation	9
	1.2.1 Soil Contamination	9
	1.2.2 Ground Water Contamination	10
	1.2.3 Surface Water Contamination	11
1.3	Interim or Removal Actions Taken to Date	11
2.0	SUMMARY OF SITE RISKS	12
2.1	Risks to Human Health	12
2.2	Risks to Ecological Receptors	13
3.0	FEASIBILITY STUDY	14
4.0	REMEDIAL ACTION OBJECTIVES	15
5.0	SUMMARY OF REMEDIAL ALTERNATIVES	17
5.1	No Action Alternative	17
5.2	Enhanced In-Situ Anaerobic Reductive Dechlorination, Soil Cover, LNAPL Removal, Monitoring, Institutional/ Engineering Controls	17
5.3	Ground Water Extraction and Treatment, Soil Cover, LNAPL Removal, Monitoring, Institutional/ Engineering Controls	18
5.4	Zero Valent Iron Reactive Wall, Soil Cover, LNAPL Removal, Monitoring, Institutional/Engineering Controls	18
6.0	COMPARISON AND EVALUATION OF ALTERNATIVES	19
6.1	Evaluation Criteria	19
6.2	Analyses of Evaluation Criteria	20
	6.2.1 Overall Protection of Human Health and the Environment	20
	6.2.2 Compliance with Applicable Regulations	21
	6.2.3 Long-Term Effectiveness and Permanence	21
	6.2.4 Reduction of Toxicity, Mobility or Volume Through Treatment	22
	6.2.5 Short-Term Effectiveness	23
	6.2.6 Implementability	23
	6.2.7 Cost	24

6.2.8	Community Involvement and Acceptance	24
7.0	SELECTED REMEDIAL ALTERNATIVE	25
7.1	Enhanced In-Situ Anaerobic Reductive Dechlorination	25
7.1.1	Performance Standards	26
7.2	Soil Cover	26
7.2.1	Performance Standards	27
7.3	LNAPL Removal	27
7.3.1	Performance Standards	28
7.4	Monitoring	28
7.4.1	Performance Standards	29
7.5	Institutional/Engineering Controls	29
7.5.1	Performance Standards	29
8.0	Contingent Remedy Process	31
9.0	Glossary	32

Attachment

Letter from Meritor Heavy Vehicle Systems, dated October 25, 2002.

Figures

- 1, Site Location
- 2, Operable Units
- 3, Extent of Ground Water Contamination
- 4, Interim Action LNAPL Recovery Wells

Tables

- 1-1 Summary of Soil Analytical Results
- 1-2 Summary of Ground Water Analytical Results
- 6-1 Anticipated Residual Risk for Each Remedial Alternative
- 6-2 Costs of Remedial Alternatives Evaluated

DECISION DOCUMENT

Rockwell International Corporation, On Highway Products
Licking County, Ohio

1.0 SITE BACKGROUND

1.1 Site Location, History and Characteristics

The Rockwell International Corporation, On-Highway Products site (Rockwell) is located at 444 Hebron Road (State Route 79) in Heath, Licking County, Ohio (Figure 1). The current owner and operator of the facility is Meritor Heavy Vehicle Systems, LLC (Meritor). The area of the site owned by Meritor is approximately 77 acres, which includes 60 acres around the main plant and a 17 acre parcel east of the plant. A residential neighborhood is located immediately north of the site, commercial properties are located to the south, and mixed agricultural, residential, and commercial properties are located to the east. The Moundbuilders State Memorial Park, an archaeological and historical site, is located west of the site, across Hebron Road. An abandoned railroad spur borders the northeastern side of the property line. The nearest significant waterway is the South Fork of the Licking River, which is located 2000 feet east of the site. A small pond, Gayth Avenue Pond, is located 600 feet east of the northern property line.

The facility was built in 1951 to manufacture heavy-duty truck axles for military vehicles. It was originally named Timken-Detroit Axle Company, Ohio Axle and Gear Division. In 1953, the facility was named Rockwell Spring and Axle Company. In 1954, the facility expanded to include the manufacture of commercial truck axles. No other major expansions have taken place since. In 1958, the facility was named Rockwell-Standard Corporation, Transmission and Axle Division. In 1967, the facility was named North American Rockwell Corporation, and in 1973 it was named Rockwell International Corporation. In 1997, the facility separated from Rockwell International Corporation and became known as Meritor Automotive, Inc., Meritor Heavy Vehicle Systems, LLC, and ArvinMeritor, Inc. The current owner and operator is Meritor Heavy Vehicle Systems, LLC, which continues to manufacture and assemble heavy-duty truck axles and axle components for military and commercial use.

The manufacturing process consists of metal operations, including heat treatment, metal working, and metal finishing. The process generates an oily wastewater, which is a by-product of quenching, machining, and lubricating processes. In the past, the wastewater contained cutting oil, solvents, paints, paint thinners, and metals. From 1951-1985, wastewater was discharged to a series of four unlined surface

impoundments or lagoons (Lagoons 1, 2, 3, and 4) (see Figure 2). The lagoons acted as an oil water separator and primary disposal method for the wastewater through infiltration to ground water. The wastewater was pumped to Lagoon 1, where primary oil separation took place, and then flowed to Lagoon 2 through an underflow system. Additional oil separation occurred in Lagoon 2 before the wastewater flowed north to Lagoon 3 and Lagoon 4. The individual lagoon capacities ranged from 1.7 to 2.7 million gallons.

The facility placed industrial wastes and demolition material on the property. The waste was placed adjacent to the railroad spur and in the vicinity of the lagoons, mainly between Lagoons 3 and 4. The fill consists of oily metal grindings and fillings, machinery pieces, crushed drums, wire, construction debris, ash, slag, and fabrics. The total area of the fill is approximately five acres and has an average thickness of approximately 13 feet.

In 1981, Rockwell performed an internal environmental audit, which included the installation and sampling of five ground water monitoring wells installed in the lagoon area. The sampling results indicated the presence of various chemical contaminants in ground water.

In May 1984, Rockwell obtained a Permit to Install (PTI) for a wastewater pre-treatment system that would eliminate the lagoons as the primary wastewater treatment method. In 1985, Rockwell obtained the PTI, built the pre-treatment system, and began discharging the treated wastewater to the Newark Wastewater Treatment Plant.

In 1984, after Rockwell received the PTI for the wastewater pre-treatment system, they began plans to close the lagoons. The remaining wastewater in the lagoons and a thick layer of sludge that had formed at the bottom of the lagoons needed to be removed. Ohio EPA and US EPA initially classified the bottom sludge as F006 electroplating waste. This classification required Rockwell to close the lagoons in accordance with Resource Conservation and Recovery Act (RCRA) requirements. Rockwell appealed the F006 electroplating classification to US EPA. In 1986, US EPA advised Rockwell that the electroplating definition had been revised and the lagoon sludge was not a listed F006 electroplating waste. Ohio EPA also removed the hazardous classification of the lagoon sludge. However, by the time of the 1986 revision, Rockwell had already submitted a RCRA closure plan to US EPA and Ohio EPA. The regulatory agencies encouraged Rockwell to close the lagoons in accordance with the closure plan but did not require it.

In 1986, Rockwell began closure of the wastewater lagoons. Rockwell pumped out approximately 11 million gallons of water, treated it, and then discharged it to the Newark Wastewater Treatment Plant. Rockwell then initiated the removal of the bottom sludge. Sampling results of the bottom sludge indicate that it contained oil and grease, phenolics, vinyl chloride, methylene chloride, trans 1,2 dichloroethene, 1,2 dichloroethane, toluene, chlorobenzene, ethylbenzene, xylenes, cyanide, and several

metals. Rockwell solidified the sludge with kiln dust and disposed of it at Bedford ECOL 2, a solid waste landfill in Gahanna, Ohio. Ohio EPA approved the disposal of the solidified sludge as solid waste in October 1987. The lagoons were backfilled with clean fill and graded, and the closure was completed in 1988.

In March 1986, Rockwell signed Ohio EPA Director's Findings and Orders to complete a hydrogeologic assessment of the lagoon area. The Findings and Orders were issued to satisfy RCRA requirements related to the lagoon closure. Rockwell completed the assessment in August 1986 and provided the final report to Ohio EPA in November 1986. The investigation consisted of the installation of eight new monitoring wells; the sampling of all 13 on-site monitoring wells; the completion of a geophysical survey; and the evaluation of all geologic, hydrogeologic, and geophysical data. The results of the investigation indicated the ground water was contaminated with several volatile organic compounds, heavy hydrocarbon oil, and metals; and large amounts of debris between Lagoons 3 and 4.

In January 1989, Rockwell began voluntary quarterly sampling of the 13 on-site monitoring wells at the request of Ohio EPA. On April 20, 1989, Ohio EPA completed a preliminary assessment and recommended no further federal action and gave the site a medium priority for state action. In June 1989, Ohio EPA received the first quarter ground water sampling results, and, in July 1989, Ohio EPA received the second quarter results. The first two quarterly reports indicated persistent ground water contamination of cis 1,2 dichloroethene, trans 1,2 dichloroethene, and vinyl chloride. The quarterly reports also indicated the heavy hydrocarbon oil in the ground water contained polychlorinated biphenyls (PCBs). The piezometric surface of ground water indicated an easterly flow of contaminants toward the South Fork Licking River and residential areas.

In August 1989, Ohio EPA and Rockwell began discussions to address the ground water contamination. In April 1990, Ohio EPA sent Rockwell an invitation to negotiate an administrative order on consent (AOC) to complete a remedial investigation and feasibility study (RI/FS). In June 1990, Rockwell informed Ohio EPA that Rockwell had installed and sampled monitoring wells east of their property and discovered that the contamination had migrated in ground water several hundred feet east of its property line. On November 28, 1990, Rockwell signed the AOC with Ohio EPA to complete an RI/FS. The AOC divided the site into two operable units: (1) The Closed Lagoon Operable Unit (CLOU) and (2) the Demolition Debris Operable Unit (DDOU) (see Figure 2). The AOC defines the CLOU as the four lagoons, the industrial fill between the lagoons, and any contamination migrating from the CLOU. The DDOU is defined as the fill area adjacent to the east side of the main manufacturing building and any contamination migrating from the DDOU.

1.2 Summary of the Remedial Investigation

The RI, performed by Rockwell with Ohio EPA oversight, included a number of tasks to identify the nature and extent of site-related chemical contaminants. The tasks included sampling soil, surface water, industrial fill, and ground water. The data obtained from the RI were used to conduct a baseline risk assessment and to determine the need to evaluate remedial alternatives. The RI field activities began in 1991 and were completed in 1993. Ohio EPA approved the final RI Report on February 10, 1998.

This Decision Document contains a brief summary of the findings of the RI. Please refer to the RI for additional information on contaminant concentrations.

The nature and extent of contamination at the Rockwell site in each environmental medium and the contaminants attributable to the site are described in the following sections.

1.2.1 Soil Contamination

Soil samples were collected from surface soil (0-2 feet below the ground surface) and subsurface soil (2-12 feet below the ground surface). The samples were analyzed for volatile organic compounds, semi-volatile organic compounds, PCBs, pesticides, and inorganics (metals and cyanide). Table 1-1 summarizes the analytical results for soil.

Table 1-1 Summary of Soil Analytical Results

Soil Media	Organic Chemicals	Elevated Inorganics
Surface Soil (0-2 Feet)	tetrachloroethene, PCBs	arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, sodium, cyanide, barium, silver, vanadium, zinc
Subsurface Soil (2-12 Feet)	BTEX, acetone, methylene chloride, 2-butanone, trichloroethene, cis 1,2 dichloroethene, vinyl chloride, phenanthrene and di-n-butylphthalate, PCBs	cadmium, chromium, copper, lead, zinc, cyanide

Inorganics were considered elevated if concentrations exceeded a statistical critical value as compared to background (see RI Report). In general, the highest concentrations of chemicals occur in the subsurface soil and in the industrial fill. Contaminated soil was not detected off of Rockwell's property.

In addition to the soil samples, waste fill samples were also collected from 10 trenches that were dug in the DDOU and the CLOU fill areas. Organic chemicals detected in the

waste fill include BTEX (benzene, toluene, ethylbenzene, xylenes), trichloroethene, tetrachloroethene, methylene chloride, 2-butanone, acetone, and PCBs. Elevated inorganics detected include chromium, cobalt, copper, iron, manganese, nickel, arsenic, lead, sodium, zinc, barium, aluminum, cadmium, beryllium, vanadium, and cyanide.

1.2.2 Ground Water Contamination

The RI characterized the nature and extent of ground water contamination. The contaminated ground water is confined to the upper aquifer, which begins 5-10 feet below the land surface and is approximately 60 feet thick. The upper aquifer is a heterogeneous mix of glacial sand and gravel outwash deposits and clay lenses. The upper aquifer yields between 100-150 gallons per minute. At the base of the upper aquifer is a clay-till, 45-65 feet thick, that separates the upper aquifer from the lower aquifer. The clay-till is a barrier to vertical migration of the plume. The upper aquifer is contaminated with several chemical compounds. Table 1-2 summarizes the analytical results for ground water.

Table 1-2 Summary of Ground Water Analytical Results

Organic Chemicals	Elevated Inorganics
vinyl chloride, cis 1,2 dichloroethene, 4-methyl 2-pentanone, trans 1,2 dichloroethene, trichloroethene, tetrachloroethene, 1,2 dichloroethane, BTEX, and PCBs	aluminum, arsenic, barium, copper, lead, manganese, chromium, cobalt, nickel, vanadium, and zinc.

The RI defined a vinyl chloride plume and a cis 1,2 dichloroethene plume that extends east of the CLOU. The highest concentrations of vinyl chloride and cis 1,2 dichloroethene are in the ground water beneath Lagoons 1 and 2. The lateral extent of the vinyl chloride plume is approximately 1000 feet east of the property line, and the lateral extent of the cis 1,2 dichloroethene plume is approximately 1800 feet east of the property line (see Figure 3). The vertically extent of the plume is to the base of the upper aquifer (approximately 50 feet below the top of the ground water table). The total surface area of both plumes together is approximately 34 acres. The closure of the lagoons has eliminated the primary source of contaminants; therefore, the migration of the contaminant plume has probably stagnated. The other contaminants detected in ground water are either contained on the facility's property or were detected sporadically in monitoring wells off of the property.

The RI defined the nature and extent of a hydrocarbon oil plume at the top of the ground water table (see Figure 4). The oil is a light non-aqueous phase liquid (LNAPL). The apparent thickness of the LNAPL in the well casings is 0.4-4.7 feet. The thickest LNAPL occurs in the Lagoons 1 and 2 area. The LNAPL contains PCBs, toluene, ethylbenzene, and xylenes. Analytical interferences prevented the detection of other constituents. The LNAPL has migrated southeast of Lagoon 2 and seeped out onto the

land surface. The seepage is not continuous and is related to the height of the ground water table. Estimated aerial extent of LNAPL is 25,000 square feet.

1.2.3 Surface Water Contamination

The RI characterized the nature and extent of surface water and sediment contamination at the Gayth Avenue Pond and South Fork Licking River. Site-related contaminants detected in surface water include vinyl chloride (Gayth Avenue Pond) and cis 1,2 dichloroethene (South Fork Licking River). The concentrations of these contaminants are below the water quality standards (WQS) for surface water (see Ohio Administrative Code (OAC) 3745-1-34, effective February 22, 2002).

1.3 Interim or Removal Actions Taken to Date

In April 1991, Ohio EPA discovered LNAPL seepage immediately east of the railroad tracks in an adjacent farm field. Ohio EPA sampled the soil and found that it contained PCBs at a concentration of 149 mg/kg. Rockwell fenced off the area and placed booms and straw bales to prevent surface water run-off. This work was completed as an interim action under the AOC.

In May 1991, Rockwell completed an interim environmental investigation in the residential areas at Gayth Avenue and Licking View Drive. The investigation was conducted as an interim action under the AOC with Ohio EPA oversight. The objective of the investigation was to determine the need for immediate action. Rockwell sampled ground water, indoor air, basement sump water, and Gayth Avenue Pond surface water. Ground water was found to contain vinyl chloride and cis 1,2 dichloroethene in the vicinity of Gayth Avenue. Site-related contaminants were not detected in the indoor air samples or basement sump water samples. Vinyl chloride was detected in the Gayth Avenue Pond. Ohio EPA concluded that immediate actions were not required to protect the health of the residents.

In October 1993, Rockwell initiated LNAPL recovery operations on their property as an interim action under the AOC. Rockwell installed three recovery wells that were placed at locations where thick LNAPL was identified during the RI in the Lagoon 1 and 2 area (Figure 4). The wells were drilled 22-28 feet below the ground surface and were constructed with 8-inch diameter v-slot wire wrap screens and steel casings. The well screens straddle the top of the water table. LNAPL is recovered using gravity skimmers and pumped to a recovery drum located in an equipment building. The recovery operation is ongoing and has recovered approximately 7,000 gallons of LNAPL.

2.0 SUMMARY OF SITE RISKS

A baseline risk assessment was conducted by Rockwell to evaluate current and future risk to human health associated with contaminants present at the site. The results demonstrated that the existing concentration of contaminants in environmental media pose risks to human receptors at a level sufficient to trigger the need for remedial actions.

2.1 Risks to Human Health

The objective of the baseline risk assessment is to evaluate current and potential future risks to human health associated with contaminants present at a site. There are two hazards to human health that are calculated in baseline risk assessments: (1) carcinogenic (cancer) risk and (2) hazard risks. Carcinogenic risks are the probability of an individual developing cancer over a lifetime from exposures to chemical compounds that are considered cancer causing. Hazard risks are measured as an hazard index (HI), which is a measure that describes the potential for non-cancer health damage to occur in an individual from exposure to all toxic substances. The risk assessment requires that exposure pathways for exposure be identified and the risks and hazards of each pathway be numerically estimated. Ohio EPA has established criteria to manage risks in accordance with the National Oil and Hazardous Substances Contingency Plan, 40 CFR Part 300 (NCP). The criteria are an excess cancer risk range of 1 in 1,000,000 to 1 in 10,000 and an HI score of greater than 1.

The potential human receptors and calculated human health risks that exceed Ohio EPA's established criteria are summarized below.

- Current Employees. The exceedences are an HI score of 2.3 and an excess cancer risk of 4.2 in 100,000. The HI is mainly due to dermal contact with arsenic, chromium, nickel, manganese, and thallium in soil. The cancer risk is due to dermal contact with arsenic in soil.
- Future Industrial Workers at CLOU. The exceedences are an HI score of 2.4 and an excess cancer risk of 7.0 in 1,000,000. The HI is mainly due to dermal contact with arsenic, nickel, manganese, and thallium in soil. The cancer risk is due mainly to inhalation of vinyl chloride.
- Future Industrial Workers at DDOU. The exceedences are an HI score of 3.0 and an excess cancer risk of 5.3 in 100,000. The HI is due to dermal contact with arsenic, manganese, and nickel in soil. The excess cancer risk is due to inhalation of benzene.
- Future Construction and Remediation Workers at CLOU. The exceedences are an HI of 110 and an excess cancer risk of 1.8 in 100,000. The HI is due mainly

to dermal contact with cadmium, manganese, PCBs, and vinyl chloride in soil and manganese, PCBs, and vinyl chloride in ground water. The excess cancer risk is due mainly to dermal contact with vinyl chloride, PCBs, and manganese in ground water.

- Future Construction and Remediation Worker at DDOU. The exceedences are an HI of 36 and an excess cancer risk of 3.2 in 100,000. The HI is due mainly to dermal contact with PCBs and vinyl chloride in ground water. The excess cancer risk is mainly due to dermal contact with beryllium in soil and PCBs, vinyl chloride, and 1,2 dichloroethane in ground water.
- Current Residents within Ground Water Plume. The exceedences are an HI of 3,900 and an excess cancer risk of 2.3 in 100. The HI is due mainly to ingestion of vinyl chloride and cis 1,2 dichloroethene in ground water. The excess cancer risk is due mainly to ingestion of vinyl chloride in ground water, if ground water were used as a source of potable water.
- Current Residents North of the Facility. The exceedence is an HI of 7.6. The HI is due mainly to the theoretical inhalation of benzene and total xylene vapors as predicted by a mathematical model of the vaporization and inhalation process.
- Future Residents at CLOU. The exceedences are an HI of 1,400 and an excess cancer risk of 9.2 in 1000. The HI is due mainly to dermal contact and ingestion of contaminants in soil and ground water. The excess cancer risk is due mainly to dermal contact and ingestion of several contaminants in soil and ground water.
- Future Residents at DDOU. The exceedences are an HI of 830 and an excess cancer risk of 1.1 in 100. The HI is due mainly to dermal contact and ingestion of contaminants in ground water. The excess cancer risk is due mainly to dermal contact and ingestion of contaminants in ground water.

2.2 Risks to Ecological Receptors

A Phase I screening ecological assessment was completed during the RI to evaluate the impacts to nearby ecosystems. Four ecosystems were identified as areas of interest: (1) LNAPL seep area; (2) Gayth Avenue Pond; (3) South Fork Licking River; and (4) eastern third of Rockwell's property (see Figures 1 and 2). Based on a qualitative analysis of the contaminants effects on these ecosystems, they are not being adversely affected. A more extensive Phase II ecological assessment was not conducted for this reason.

3.0 FEASIBILITY STUDY

A Feasibility Study (FS) was conducted by Rockwell, with oversight by Ohio EPA, to define and analyze appropriate remediation alternatives. Ohio EPA approved the final FS on March 8, 2002. The FS identified remedial action objectives, general remedial actions for those objectives, and evaluated potential remediation technologies. The FS included the results of a treatability study of in-situ anaerobic reductive dechlorination, a potential ground water remediation technology. The treatability study began in 1995 and ended in 2000. The RI and FS were the basis for the selection of Ohio EPA's preferred alternative.

4.0 REMEDIAL ACTION OBJECTIVES

As part of the RI/FS process, remedial action objectives (RAOs) were developed in accordance with the NCP, 40 CFR Part 300, which was promulgated under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended, and U.S. EPA guidance. The intent of the RAOs is to set goals that a remedy should achieve in order to ensure the protection of human health and the environment. The goals are designed specifically to mitigate the potential adverse effects of site-related contaminants present in environmental media. For environmental media, remediation levels were developed for a range of potential residual carcinogenic risk levels (i.e., 1 in 100,000, 1 in 1,000,000 etc.) and using an HI of 1.0 and a range of potential exposed receptors, i.e. ingestion of ground water, inhalation of vapors, and skin contact with soil and ground water.

Carcinogenic risks are estimated as the unitless probability of an individual developing cancer over a lifetime as the result of exposure to the potential carcinogens related to the site. Note that for any individual in the exposed population, this risk is in excess of the risk imparted to that individual by factors not related to the site (see Section 8.0 of the RI report for further discussion of site-specific risks).

The RAOs were developed to ensure that remedial actions reduce the projected risk to humans to acceptable levels. The USEPA, through the NCP, defines acceptable RAOs for known or suspected carcinogens to be concentration levels that represent an upper bound excess lifetime cancer risk, above that of the background, to an individual between 1 in 10,000 and 1 in 1,000,000 using information on the relationship between dose and response with the 1 in 1,000,000 risk level as the point of departure.

Likewise, noncarcinogenic risks are also to be reduced to an acceptable level (HI less than 1). The HI is the sum of the Hazard Quotient (HQ) scores, which is the risk from a single contaminant. In a similar manner, important ecological resources (e.g. waters of the state or endangered species) will also be protected. Exposure pathways that will be addressed at the site are potential human exposure to contaminated ground water, contaminated soil, and industrial fill.

Based on the results of the RI and information provided in the FS, Ohio EPA prepared the *Preferred Plan for the Remediation of the Rockwell International Corporation Site* (Preferred Plan) in August 2002. In the Preferred Plan, Ohio EPA established RAOs for this site, which are listed below.

1. Prevent exposure to soil, waste, and ground water so that current and future worker exposures to 95% of the upper confidence limit on the mean concentrations of contaminants are within the cumulative target risk range of 1 in 1,000,000 to 1 in 10,000 for individual carcinogens and an HQ of less than 1.0 for individual non-carcinogens.

2. Prevent exposure to contaminated ground water, soil and waste so that current and potential future resident exposures to 95% of the upper confidence limit on the mean concentrations of contaminants are within the cumulative target risk range of 1 in 1,000,000 to 1 in 10,000 for individual carcinogens and an HQ of less than 1.0 for individual non-carcinogens.
3. Ensure that the leaching of contaminants from the DDOU, CLOU, soil, or any other sources and source areas, do not exceed maximum contamination levels (MCLs) in ground water.
4. Remove LNAPL to the extent practicable and ensure that it is not an unacceptable source of contaminants to ground water.
5. Restore the ground water to the MCLs listed in OAC 3745-81-12.
7. Prevent the use of contaminated ground water and ensure protection of human health from exposures to contaminants in ground water until MCLs are met.
8. Ensure that contaminants in ground water do not migrate to unaffected areas in detectable concentrations.

5.0 SUMMARY OF REMEDIAL ALTERNATIVES

Ohio EPA formulated and considered a total of four alternatives in the Preferred Plan. A brief description of the major features of each of the alternatives follows. More detailed information about these alternatives can be found in the Preferred Plan and the FS.

5.1 No Action Alternative

The no action alternative is a baseline against which the other alternatives are compared. This alternative assumes that no active remediation will be implemented to achieve the RAOs. It relies on undocumented natural attenuation processes and existing controls and restrictions to reduce the risk. Access to the CLOU and DDOU is currently controlled by a perimeter fence and 24-hour security. This alternative assumes that these measures would not continue in the foreseeable future. There are no reliable existing controls to prevent future residential development on the property or to prevent the use of contaminated ground water.

5.2 In-situ Anaerobic Reductive Dechlorination, Soil Cover, LNAPL Removal, Monitoring, and Institutional/Engineering Controls

Enhanced in-situ anaerobic reductive dechlorination is an active bioremediation process that utilizes naturally occurring anaerobic bacteria to actively degrade chlorinated chemical compounds in the ground water to ethene/ethane, which are non-toxic. The enhancement of anaerobic reductive dechlorination is accomplished by creating favorable conditions for the proliferation of anaerobic bacteria that exist in the ground water.

LNAPL would be removed through the use of a skimming device that will be placed in recovery wells. The LNAPL would drain by gravity into a storage reservoir, and a pneumatic pump would pump it to a storage tank at the surface. When the storage tank is full, the LNAPL would be disposed of in accordance with applicable regulations.

Clean soil would be placed over the DDOU and CLOU fill to provide at least two feet of separation between the contaminated media and the land surface.

The monitoring plan would document the effectiveness of enhanced in-situ reductive dechlorination and the fate and transport of contaminants in soil and ground water. This would be accomplished by gathering historical data, hydrogeologic data, geochemical data, and microbiological data.

Institutional and engineering controls may consist of land-use restrictions, fences, security, and personal protective equipment to protect human health during

remediation.

5.3 Ground Water Extraction/Treatment, Soil Cover, LNAPL Removal Monitoring, and Institutional/Engineering Controls

Ground water extraction and treatment relies on the mechanical extraction of contaminated ground water and the physical removal of volatile organic compounds. The volatile organic compounds in the ground water would be "stripped" out of the water and discharged to the air. The treated ground water would then be discharged to the South Fork Licking River. The other components of this alternative are the same as described in Section 5.2.

5.4 Zero-Valent Iron Reactive Wall, Soil Cover, LNAPL Removal, Monitoring, and Institutional/Engineering Controls

The zero valent iron reactive wall relies on the transport of the chlorinated hydrocarbons in ground water through a wall that contains granulated zero valent iron (Fe^0). The wall would be placed as a continuous trench perpendicular to the plume and immediately east of the CLOU on the east side of the railroad tracks. Chlorinated hydrocarbons chemically react with the Fe^0 as they pass through the wall and are reduced (dechlorinated) to form ethene, which is not hazardous.

6.0 COMPARISON AND EVALUATION OF ALTERNATIVES

6.1 Evaluation Criteria

In selecting the remedy for this Site, Ohio EPA considered the following eight criteria as outlined in the NCP:

1. Overall protection of human health and the environment - Alternatives shall be assessed to determine whether they can adequately protect human health and the environment, in both the short- and long-term, from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site by eliminating, reducing, or controlling exposures to levels established during development of remediation goals
2. Compliance with all State, Federal and Local laws and regulations - Addresses whether or not a remedy will meet all of the applicable State, Federal and Local environmental requirements;
3. Long-term effectiveness and permanence - Refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once pollution has been abated and clean-up goals have been met. This includes assessment of the residual risks remaining from untreated wastes, and the adequacy and reliability of controls such as containment systems and institutional controls;
4. Reduction of toxicity, mobility, or volume through treatment - The degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume shall be assessed, including how treatment is used to address the principal threats posed by the site;
5. Short-term effectiveness - The short-term impacts of alternatives shall be assessed considering the following: (1) Short-term risks that might be posed to the community during implementation of an alternative; (2) Potential impacts on workers during remedial action and the effectiveness and reliability of protective measures; (3) Potential environmental impacts of the remedial action and the effectiveness and reliability of mitigative measures during implementation; and (4) Time until protection is achieved;
6. Implementability - The ease or difficulty of implementing the alternatives shall be assessed by considering the following factors as appropriate: (1) Technical feasibility, including technical difficulties and unknowns associated with the construction and operation of a technology, the reliability of the technology, ease of undertaking additional remedial actions, and the ability to monitor the effectiveness of the remedy; (2) Administrative feasibility, including activities needed to coordinate with other offices and agencies and the ability and time required to obtain any necessary approvals and permits from other agencies (for

off-site actions); (3) Availability of services and materials, including the availability of adequate off-site treatment, storage capacity, and disposal capacity and services; the availability of necessary equipment and specialists, and provisions to ensure any necessary additional resources; the availability of services and materials; and the availability of prospective technologies;

7. Cost - The types of costs that shall be assessed include the following: (1) Capital costs, including both direct and indirect costs; (2) Annual operation and maintenance (O&M) costs; and (3) Net present value of capital and O&M costs; and,
8. Community acceptance - This assessment includes determining which components of the remedial alternatives that interested persons in the community support, have reservations about, or oppose. The comment period on the Preferred Plan ended October 25, 2002. See Section 6.2.8.

The first two are threshold criteria required for acceptance of an alternative as both accomplishing the goal of health and environmental protection and complying with the law. The next five are the balancing criteria that were used to select the alternative identified in the Preferred Plan. The cost estimates were based on information provided by the FS. Those estimates include only the direct costs of implementing the selected remedy at the site and do not include other costs, such as damage to the environment or human health associated with any alternative. Community acceptance was determined, in part, by written responses received during the public comment period and statements offered at the public meeting.

6.2 Analyses of Evaluation Criteria

This section examines how each of the evaluation criteria is applied to each of the remedial alternatives found in Section 5.0 and compares how the alternatives achieve the criteria.

6.2.1 Overall Protection of Human Health and the Environment

The assessment of cancer risks and non-cancer hazards to human receptors requires that exposure pathways be identified and the risks and hazards of each pathway be numerically estimated. Seven chemical exposure routes have been identified: vapors, soil particulates, dermal contact with soil, dermal contact with surface water, soil ingestion, ground water ingestion, and dermal contact with ground water. The normal criteria for acceptability of risk represent an upperbound excess lifetime cancer risk to an individual between 1 in 10,000 and 1 in 1,000,000 and the total noncarcinogenic adverse health effects are estimated using an HI score of less than 1.0. The residual risks that are anticipated to remain after the completion of each of the remedial alternatives are summarized in Table 6-1.

Table 6-1 Anticipated Residual Risks

Alternative	Description	Residual Risk	
		Cancer	HI
Alternative 1	No Action	No Change	No Change
Alternative 2	Enhanced In-Situ Reductive Dechlorination, Soil Cover, LNAPL Removal, Monitoring, Institutional/Engineering Controls	3.5 in 100,000	0.7
Alternative 3	Ground Water Extraction/Treatment, Soil Cover, LNAPL Removal, Monitoring, Institutional/Engineering Controls	7.4 in 1,000	3
Alternative 4	Zero-Valent Iron Reactive Wall, Soil Cover, LNAPL Removal, Monitoring, Institutional/Engineering Controls	Unknown	Unknown
<p>Assumptions and Notes: No Change means the residual risk will be approximately the same as the current risk for the next 20 years. Alternative 2: assumes the achievement of MCL for vinyl chloride/1,2 DCE in ground water within 20 years Alternative 3: assumes 50% reduction of vinyl chloride/1,2 DCE in ground water within 20 years Alternative 4: relies on undocumented natural attenuation processes for contaminated ground water downgradient from wall Alternatives 2,3,4: assumes the common components will be effective in reducing risk to acceptable levels.</p>			

Based on Ohio EPA's assessment of the information in the FS, only Alternative 2 is anticipated to reduce the human health risk to acceptable levels within 20 years. Alternative 3 has the potential to reduce the risk to acceptable levels within 50 years. Alternative 4 may require several hundred years to reduce the concentration of vinyl chloride to acceptable levels (based on general fate and transport properties of vinyl chloride in subsurface environments).

6.2.2 Compliance with Applicable Requirements

Alternative 1, No Action, does not comply with applicable requirements pertaining to the release of pollutants, hazardous wastes, and hazardous substances into the environment. Alternative 1 does not comply with Ohio Revised Code (ORC) Section 6111.04; and, does not comply with OAC Chapters 3745-81 and 3745-82.

Alternatives 2, 3, and 4 all comply with applicable requirements. Alternative 2 would require an underground injection control (UIC) permit or waiver. The requirements are set forth in OAC 3745-34-06 through 3745-34-09 (Ohio UIC rules). The waiver would allow the injection of nutrients and electron donor substances, which would facilitate the reductive dechlorination process.

6.2.3 Long-Term Effectiveness and Permanence

Alternative 1: This alternative is not considered effective in the long-term. The sources of ground water contamination will remain and no attempts will be made to monitor or reduce concentrations of the contaminants. The potential risk due to exposure to

contaminants in ground water will not be reduced and will remain indefinitely. Existing controls and alternative water supply are not a reliable means to ensure effectiveness in the long-term.

Alternative 2: This alternative has the potential to permanently reduce the concentration of contaminants in the ground water to MCLs. Treatability study data indicates this alternative reduced the concentration of vinyl chloride by 90% in the treated area. The predicted time-frame to remediate the ground water is 10 years with periodic re-application as required to maintain MCLs.

Alternative 3: This alternative would reduce the concentrations of contaminants and prevent downgradient migration, but it is unlikely that this alternative could achieve MCLs in ground water in a reasonable time-frame. This is due to the heterogeneous characteristics of the upper aquifer and the general inability of this technology to mechanically remove contaminants from aquifer pore spaces. To ensure long-term effectiveness modifications may be needed during implementation to reduce vinyl chloride and cis 1,2 dichloroethene to MCLs.

Alternative 4: This alternative would have a high degree of long-term effectiveness as a barrier to continued downgradient migration of contaminants. The overall long-term effectiveness of this alternative is uncertain because it relies on unproven natural attenuation processes to achieve RAOs away from the wall. Therefore, this alternative is not expected to be able to reduce the concentration of vinyl chloride and cis 1,2 dichloroethene to MCLs in a reasonable time frame.

6.2.4 Reduction of Toxicity, Mobility or Volume Through Treatment

Alternative 1: This alternative would not reduce the toxicity, mobility, or volume through treatment. No active treatment process would be implemented.

Alternative 2: This alternative would reduce the toxicity and volume through treatment. In-situ anaerobic dechlorination would reduce the toxicity of contaminants in the ground water. LNAPL recovery would reduce the volume. The soil cover and institutional/engineering controls will not reduce toxicity, mobility, or volume of contaminants through treatment.

Alternative 3: This alternative would reduce the mobility and volume of contaminants in ground water through treatment. Ground water extraction and treatment would reduce the mobility and volume of contaminants. The contaminants would be transferred to the air in the treatment system. The common components are the same as described for Alternative 2.

Alternative 4: This alternative would reduce toxicity and mobility of contaminants in ground water through treatment. The wall would act as a barrier to downgradient migration of contaminants. The common components are the same as described for Alternative 2.

6.2.5 Short-Term Effectiveness

Alternative 1: This alternative would not add any additional risk to community and workers. This alternative would result in continued migration of the ground water plume.

Alternative 2: This alternative would add temporary risk to workers during construction of the anaerobic dechlorination system, LNAPL recovery system, monitoring wells, and soil cover. Construction in residential areas could potentially add risk to the community. Alternative 2 would be implemented in phases and is anticipated to take at least 10 years to complete. Personal protective equipment, institutional/engineering controls, and health and safety protocols would reduce the risk during remediation.

Alternative 3: This alternative would require the placement of extraction wells and an air stripper in residential areas. This could potentially add some risk to the community. Contaminants would be stripped from ground water and released into the air, so continuous air monitoring may be necessary. The construction of the ground water extraction/treatment system would add some risk to workers. The system may take one year to construct and test and would be in operation for 20 years or more. Personal protective equipment, institutional/engineering controls, and health and safety protocols would reduce the risk during construction and remediation.

Alternative 4: This alternative would add some risk to remediation workers during construction of the reactive wall. Remediation workers would need personal protective equipment and health and safety monitoring. Construction would take one year to complete. Maintenance and monitoring would continue for several years.

6.2.6 Implementability

Alternative 1: No approvals would be necessary and nothing would be required to implement this alternative.

Alternative 2: Technically, this alternative should be feasible to construct, but the anaerobic reductive dechlorination system would require continuous maintenance and monitoring. The ability to implement this alternative site-wide is uncertain. Administratively, the re-injection of contaminated ground water would require a UIC permit or waiver (OAC 3745-34-06 through 3745-34-09). A waiver was granted for the pilot-scale study, which may be continued for the full-scale system.

Alternative 3: This alternative should be feasible to construct and maintain. Iron fouling of the air stripper and extraction wells over the long-term may be problematic. This is a high maintenance technology. Administratively, this alternative requires coordination between Ohio EPA's Division of Air Pollution Control and Division of Surface Water. Services and materials are readily available.

Alternative 4: This alternative should be feasible to construct. The principal difficulty

would be the construction of the iron reactive wall, which would need to extend about 30 feet below the ground water table. Dewatering the trench would be necessary, and the water would need to be treated before disposal. Additional hydrogeologic and geochemical studies would be required to evaluate reaction rates and determine thickness. There would be little or no maintenance. Administratively, there are no coordination issues. Services and materials are readily available.

6.2.7 Cost

The capital costs, operation and maintenance costs, net present worth costs, and net present value costs of each alternative are summarized in the table below.

Table 6-2 Costs of Remedial Alternatives Evaluated

Alternative	Cost			
	Capital	O&M	Net Present Worth	Net Present Value
Alternative 1	0	0	0	0
Alternative 2	1,611,911	258,600	1,615,244	3,227,166
Alternative 3	2,658,605	506,280	5,704,973	8,363,588
Alternative 4	6,934,905	181,560	1,472,459	8,593,160

6.2.8 Community Involvement and Acceptance

The local community has been kept informed of the activities at the Rockwell site during the RI/FS process. Ohio EPA formally met with local residents and government officials on April 23, 1991 and on August 14, 1991. Ohio EPA has made the administrative record available for public review at the Newark Public Library and at Ohio EPA's Central District Office. An up-to-date site summary was available on Ohio EPA's world wide web page at:

<http://www.epa.state.oh.us/dist/cdo/sitepagesummaries/rockwell.htm>

The final evaluation criteria is community acceptance of the Preferred Plan. Ohio EPA offered the Preferred Plan to the public for comment on September 25, 2002 and held a public meeting and hearing at the Heath Municipal Building on October 2, 2002. The public comment period ended on October 25, 2002. Ohio EPA received comments from Meritor HVS (Attachment A). No other comments were received. Based on the community response, Ohio EPA determined that the Preferred Plan is acceptable to the local community.

7.0 SELECTED REMEDIAL ALTERNATIVE

The selected remedial alternative is Alternative 2, In-situ Anaerobic Reductive Dechlorination, Soil Cover, LNAPL Removal, Monitoring, and Institutional/Engineering Controls. This alternative best satisfies the selection criteria because it offers the greatest degree of protection of human health and the environment; it is the most effective in the long-term; has the greatest potential to reduce the contaminant concentrations in the ground water to meet the RAOs in the shortest time-frame; and, is the most cost-effective alternative. In-situ anaerobic reductive dechlorination will be implemented in phases. The other components will be implemented concurrently with the construction of the first phase of the enhanced in-situ reductive dechlorination system.

In order to ensure the selected alternative is properly implemented and maintained, Ohio EPA identified performance standards for each component of the selected alternative. Performance standards are applicable standards and criteria for the remedial design, remedial action, and operation and maintenance of the selected remedy. The performance standards specifically address the remedial actions or circumstances for each component of the selected remedy. The selected remedy is expected to achieve these standards; if it does not, then Ohio EPA will consider the implementation of additional work, remedy modifications, or contingent remedies. The following sections describe each component of the selected remedy and list the performance standards.

7.1 Enhanced In-Situ Anaerobic Reductive Dechlorination

Enhanced in-situ anaerobic reductive dechlorination will be implemented to reduce the concentrations of cis 1,2 dichloroethene, vinyl chloride, and other chlorinated contaminants in the ground water. The technology accomplishes this by creating favorable conditions for the proliferation of anaerobic bacteria that exist in the ground water. Some of these anaerobic bacteria have the ability to "dechlorinate" chlorinated ethenes and ultimately convert them to ethene, which is not toxic. The bacteria accomplish this by utilizing the chlorinated ethenes as secondary terminal electron acceptors in their energy transformation process.

The technology consists of injecting excess electron donor and nutrients to the ground water. The electron donor is a carbon source and can be a variety of substances. The specific electron donor will be determined during the remedial design. The excess electron donor expedites the exhaustion of naturally occurring electron acceptors. Once the natural electron acceptors are depleted, the bacteria discharge electrons to other available electron acceptors, which include chlorinated ethenes. When the chlorinated ethenes are used as electron acceptors, they lose chlorine atoms and gain hydrogen atoms. The common industrial solvents, tetrachloroethene and trichloroethene, can degrade in this manner to cis dichloroethenes and vinyl chloride. The accumulation of vinyl chloride and cis 1,2 dichloroethene in the ground water at the Rockwell site is an indication that this process has occurred naturally in the former lagoons and ground

water. The implementation of enhanced in-situ anaerobic reductive dechlorination is intended to speed up the natural degradation process.

The FS states that the enhanced in-situ anaerobic dechlorination system will be implemented in phases. The system will initially consist of a series of injection wells placed at the western boundary of the ground water plume. Ground water will be amended with an electron donor and other nutrients through the injection wells. Monitoring wells will be placed downgradient of the injection wells to monitor electron donor distribution and the effectiveness of biodegradation. The first phase will be the treatment of the Lagoon 1 and 2 area. When adequate treatment is provided in that area, then the second phase will be the treatment of the Lagoon 3 area. Additional phases will be implemented until the applicable RAOs are met.

7.1.1 Performance Standards for Enhanced In-Situ Anaerobic Reductive Dechlorination

The objective of the enhanced in-situ anaerobic reductive dechlorination system is to reduce the chlorinated contaminants in ground water to their respective MCLs (RAO Number 5). Ohio EPA identified the following performance standards for in-situ anaerobic reductive dechlorination:

- After all phases of treatment are completed, the chlorinated contaminants in ground water must meet MCLs for at least five consecutive years of bi-annual monitoring. Achievement of MCLs will result in acceptable risks from water use.
- The operation of the system and its effectiveness will be monitored to ensure compliance with remediation time-frames and to ensure that the biodegradation of the contaminants is occurring at an acceptable rate.
- System components will be properly installed, inspected and maintained.
- Ground water samples will be properly collected and analyzed for indicator parameters and contaminants.

The construction of each phase of the reductive dechlorination system will be monitored to ensure compliance with the approved design.

7.2 Soil Cover

The objective of the soil cover is to provide adequate separation between the industrial waste fill and the land surface. The soil cover will therefore be placed over the fill at the DDOU and CLOU fill area.

7.2.1 Performance Standards for the Soil Cover

The cover is intended to provide separation between the contaminated media and the ground surface. This will prevent incidental exposures to contaminants, reduce vapor emissions, and reduce water infiltration (RAO Numbers 1, 2, and 3). These RAOs require worker and resident exposures to be within the acceptable risk range and require the prevention of contaminants leaching to ground water from the soil and waste. The cover will meet the following specifications:

- The soil used for the cover will be classified as "clay" under the USDA textural classification chart.
- The soil used as cover will have a maximum field permeability of 1×10^{-5} centimeter per second.
- The soil cover will be a minimum of 2 feet thick.
- The soil cover will have sufficient slope to prevent ponding.
- A six-inch top soil layer will be placed over the soil cover to support vegetation.
- Vegetation will consist of grass and be sufficiently lush to minimize erosion.
- The soil cover will be required to pass a post-construction Ohio EPA inspection and annual inspections thereafter.
- Restrict property use to prevent destruction of the soil cover.

7.3 LNAPL Removal

LNAPL will be removed from the upper aquifer through the expansion of the existing LNAPL recovery system. The recovery wells will be at least 2 inches in diameter and screened across the top of the water table. A skimming device will be placed in each well. The exact number and locations of the additional recovery wells and the type of skimmer and pump that will be used will be determined during the remedial design. The skimming device, which contains a storage reservoir, will be placed in the recovery well at the interface between ground water and LNAPL. The LNAPL will drain by gravity into the storage reservoir. A pneumatic pump will be used to pump LNAPL from the storage reservoir to a storage tank at the surface. The LNAPL will then be disposed of in accordance with applicable regulations. Multiple wells may be combined into a single recovery system with common controls and storage tanks.

The LNAPL recovery system will proceed in two phases. The first phase is the installation of the recovery wells. The conceptual layout in the FS predicts that 11 new wells will be installed for a total of 14 recovery wells. The skimmer and pump systems will be pilot tested, and the ability of each well to recover oil will be evaluated during the

first phase. The second phase includes the installation of the recovery equipment, piping, and control equipment.

7.3.1 Performance Standards for LNAPL Removal

The objective for LNAPL removal is to remove all recoverable LNAPL to the extent practicable (RAO Number 4). Ohio EPA identified the following performance standards for the removal of LNAPL.

- The LNAPL will be considered removed upon a demonstration that it is no longer causing ground water to exceed MCL's off of the property and thus meeting risk goals.
- Documentation will be required that indicates all recoverable LNAPL has been removed.
- System components will be properly installed, inspected and maintained
- The operation of the system and its effectiveness will be monitored.

7.4 Monitoring

A comprehensive monitoring plan, which includes a fate and transport study, will be developed and implemented. The monitoring plan will document the effectiveness of enhanced in-situ reductive dechlorination as well as the fate and transport of contaminants in soil and ground water. This will be accomplished by gathering historical data, hydrogeologic data, geochemical data, and microbiological data. Specifically, the monitoring program will establish the following:

- the rate of contaminant reduction in the ground water and remediation time-frame;
- whether the ground water plume is expanding, contracting, or in a steady state;
- the percolation rate of contaminants to ground water from source areas;
- the degradation rate of contaminants in soil, waste, and in the vadose zone;
- fate and transport mechanisms; and,
- attainment of RAOs.

7.4.1 Performance Standards for Monitoring

The objective of the monitoring program is to ensure compliance with RAO Numbers 3, 5, and 8. The monitoring program will ensure that soil and waste are not continuing sources of contaminants to ground water; that the enhanced anaerobic reductive dechlorination is effective in reducing contaminant concentrations in ground water; and that the contaminants are not migrating to unaffected areas. Ohio EPA identified the following performance standards for the monitoring program:

- The components of the monitoring program will be implemented in accordance with the Ohio EPA approved remedial design.
- Soil and ground water samples will be properly collected and analyzed by an approved laboratory.
- Field measurements will be made in accordance with established protocols and the approved remedial design.
- Performance monitoring will continue for five consecutive years after RAOs have been achieved.

7.5 Institutional and Engineering Controls

Institutional and engineering controls consist of land-use restrictions, fences, security, and personal protective equipment as required. Land-use restrictions may include deed restrictions, local ordinances, and building permit restrictions as required.

7.5.1 Performance Standards for Institutional/Engineering Controls

The objective of the institutional and engineering controls is to prevent exposure to soil, waste, and ground water during remediation (RAO Numbers 1, 2, and 7). Ohio EPA has identified the following performance standards for institutional/engineering controls:

- All controls must remain in place until all RAOs are met.
- The controls must restrict the use of ground water in all affected areas of the Meritor HVS property through appropriate deed restrictions recorded with the Licking County Recorder. Meritor HVS will endeavor to obtain voluntary use restrictions and/or an ordinance restricting ground water use in affected off-property areas.
- Meritor HVS must restrict excavations or digging at the CLOU and DDOU through appropriate deed restrictions recorded with the Licking County Recorder.
- Meritor HVS must provide proper personal protective equipment and follow proper

health and safety protocols if workers excavate or dig at the CLOU and DDOU through a plan to be approved by Ohio EPA.

- Meritor HVS must maintain the integrity of the soil cover by complying with an operation and maintenance plan to be approved by Ohio EPA.
- Institutional and engineering controls must be monitored by Meritor HVS to ensure protection of public health and safety and the environment until RAOs are achieved.

8.0 Contingent Remedy Process

Contingent remedies may be employed if the selected remedy cannot be implemented as designed, fails to perform as anticipated, or, there is a change in the conditions at the site. A contingent remedy may specify a different technology or may be a modification of the preferred remedy. The general process by which the selected remedy may be modified or changed is as follows:

- evaluate which condition triggered the performance standard;
- evaluate the need for and/or extent to which the selected remedy may be modified or changed to address the triggering condition, and the time frame for an appropriate response action;
- implement the selected remedy modification or change; and
- document the modifications or changes that were made to the selected remedy.

Potential contingent technologies will be identified and screened according to implementability, effectiveness, and cost. Ohio EPA will compare the technologies and select the most cost effective technology that will achieve the required performance standards. Ohio EPA may review and change the performance standards if it is determined that the standards are not technically feasible.

9.0 GLOSSARY

AOC	Administrative Order on Consent: legal agreement for the RI/FS.
Aquifer	An underground geological formation capable of holding and yielding water.
Baseline Risk Assessment	An evaluation of the risks to humans and the environment posed by a site.
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes. These chemicals are associated with petroleum hydrocarbons.
Carcinogen	A chemical that causes cancer.
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act. A federal law that governs cleanup of hazardous materials sites under the Superfund Program.
Cis 1,2 Dichloroethene	A general solvent. At the Rockwell site, cis 1,2 DCE is a break-down product of the chlorinated solvents trichloroethene and tetrachloroethene
CLOU	Closed Lagoon Operable Unit
DDOU	Demolition Debris Operable Unit
Decision Document	A statement issued by the Ohio Environmental Protection Agency identifying the Director's selected remedy for a site and the reasons for its selection.
Ecological Receptor	Animals or plant life exposed to chemicals released at a site.
Exposure Pathway	Route by which a chemical is transported from the site to a human or ecological receptor.
FS	Feasibility Study. A study conducted by Rockwell to ensure that appropriate remedial alternatives are developed and evaluated, such that relevant information concerning the remedial action options can be presented to a decision-maker and an appropriate remedy selected.
Hazardous Substance	A chemical that may cause harm to humans or the environment.
Hazardous Waste	A waste product, listed or defined by the RCRA, which may cause harm to humans or the environment.
HI	Hazard Index: sum of hazard quotients (HQs).
HQ	Hazard Quotient: measure of toxicity risk due to a single chemical.
Human Receptor	A person exposed to chemicals released at a site.
LNAPL	Light Non-Aqueous Phase Liquid: liquid lighter than water that does not readily dissolve in water.
MCLs	Maximum Contaminant Level: drinking water criteria established under the Safe Drinking Water Act and Ohio Administrative Code (OAC) 3745-81-

12.

NCP	National Contingency Plan. A framework for investigation and remediation of hazardous substance contamination at sites as specified in CERCLA.
O&M	Operation and Maintenance. Those long-term measures taken at a site, after the initial remedial actions, to assure that a remedy remains protective of human health and the environment.
PCBs	Polychlorinated biphenyls. A class of chemicals. PCBs are an oily substance that were used in cutting oil at the Rockwell site. PCB production was discontinued in 1976 due to their persistence and toxicity.
Preferred Plan	The plan chosen by the Ohio EPA to remediate the site in a manner that best satisfies the evaluation criteria.
RCRA	Resource Conservation and Recovery Act. A federal law that regulates the handling of hazardous wastes.
RAOs	Remedial Action Objectives. Specific goals of the remedy for reducing risks posed by the site.
RI	Remedial Investigation. A study conducted to collect information necessary to adequately characterize the site for the purpose of developing and evaluating effective remedial alternatives.
Responsiveness Summary	A summary of all comments received concerning the Preferred Plan and Ohio EPA's response to all issues raised in those comments.
Tetrachloroethene	A common industrial solvent and cleaner.
Trichloroethene	A common industrial solvent and cleaner.
Vinyl Chloride	A common chemical used in making plastics. At the Rockwell site, vinyl chloride is a break-down product of trichloroethene and tetrachloroethene.
Water Quality Criteria	Chemical and thermal standards that define whether a body of surface water is unacceptably contaminated. These standards are intended to ensure that a body of water is safe for fishing, swimming and as a drinking water source.
Water Quality Standards	Water Quality Standards: surface water criteria defined in Ohio Administrative Code Chapter 3745-1, effective February 22, 2002.

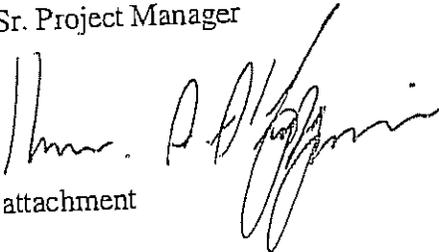
ATTACHMENT A

3. Meritor HVS plans to utilize the "Enhanced In-Situ Reductive Dechlorination" technology until the MCL's are met at the site boundary and in areas off of the Meritor HVS property. Groundwater monitoring at the property boundary and in areas off of the Meritor HVS property will insure that the risks to the public have been remediated and are controlled in the future.
4. Execution of the elements of the Preferred Plan will occur as soon as practical. The time frame for completing each of the remedial actions will be negotiated and specified in the future modifications to the Amended Final Findings and Order.

As discussed above, Meritor HVS agrees with Ohio EPA's selected remedies for this Site. Meritor HVS has provided the above general comments to help ensure that the Preferred Plan parallels the presentations provided in the approved HHRA and FS. Thank you for your consideration of these comments. Meritor HVS would be glad to discuss these comments at a meeting with the Agency as appropriate.

Respectfully,
METCALF & EDDY OF OHIO, INC.

Ihsan Al-Fayyomi
Sr. Project Manager



attachment

cc: Linda Furlough
James Haff
David Nash

ATTACHMENT

Table 4-2A Summary of Current Human Health Risks

Population	Hazard Index	Cancer Risk
Current Employee	2.33	4.2 in 100,000
CLOU Construction Worker	110	1.8 in 100,000
DDOU Construction Worker	36	3.2 in 100,000
North Side Residents	7.6	3 in 10,000,000

Table 4-2B Summary of Future Hypothetical Human Health Risks

Population	Hazard Index	Cancer Risk
CLOU Industrial Worker	2.4	7 in 1,000,000
DDOU Industrial Worker	3	5.3 in 100,000
Eastside Resident Groundwater Use	3900	2.3 in 100
DDOU Residential	830	1.1 in 100
CLOU Residential	1400	9.2 in 1000

FIGURES

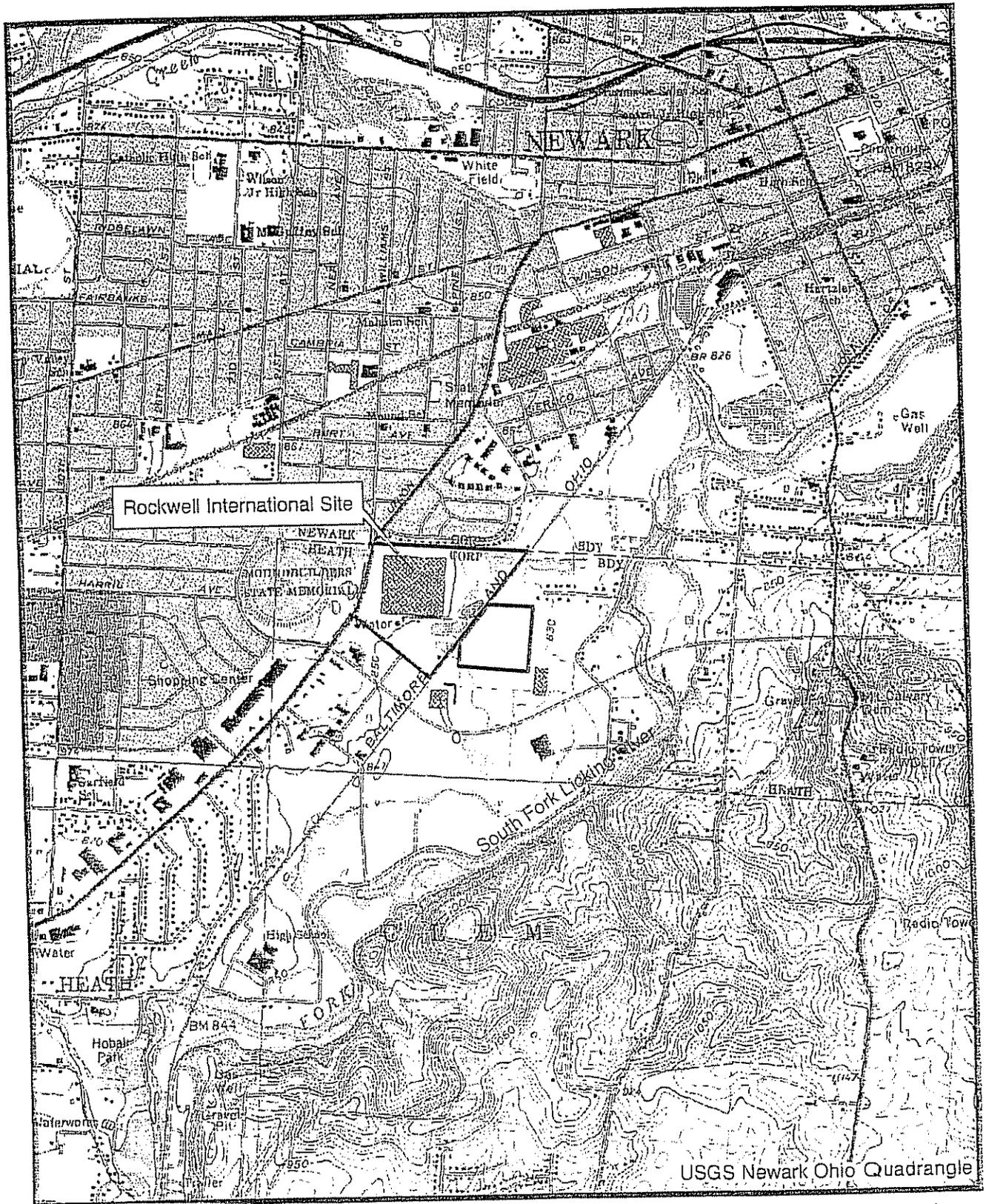
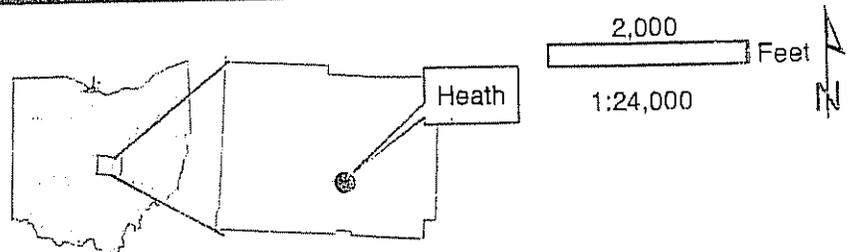


Figure 1
 Site Location
 Rockwell International Site
 Heath, Ohio
 Licking County



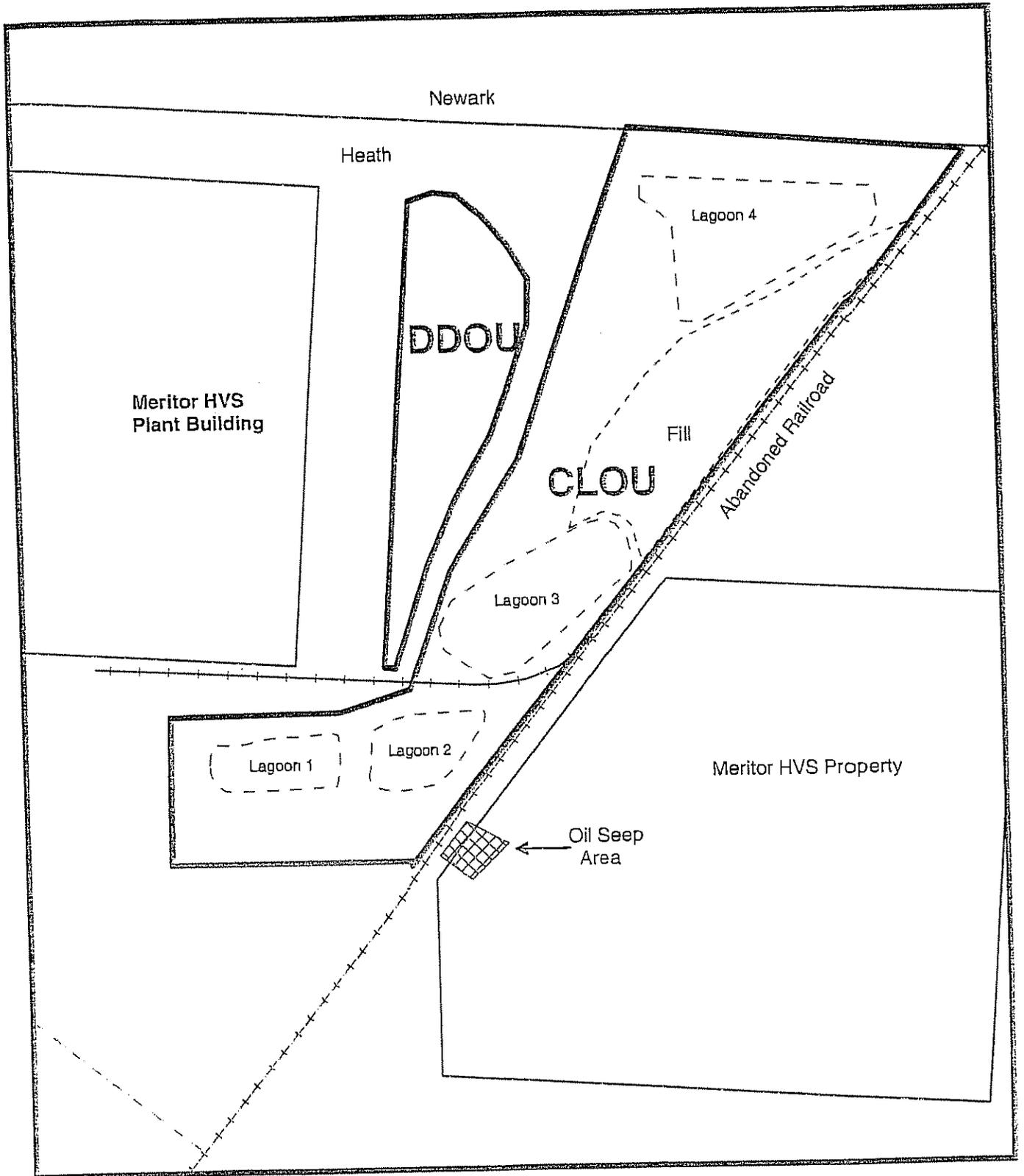


Figure 2
 Closed Lagoon Operable Unit (CLOU)
 Demolition Debris Operable Unit (DDOU)
 Rockwell International Site
 Heath, Ohio

200 Feet



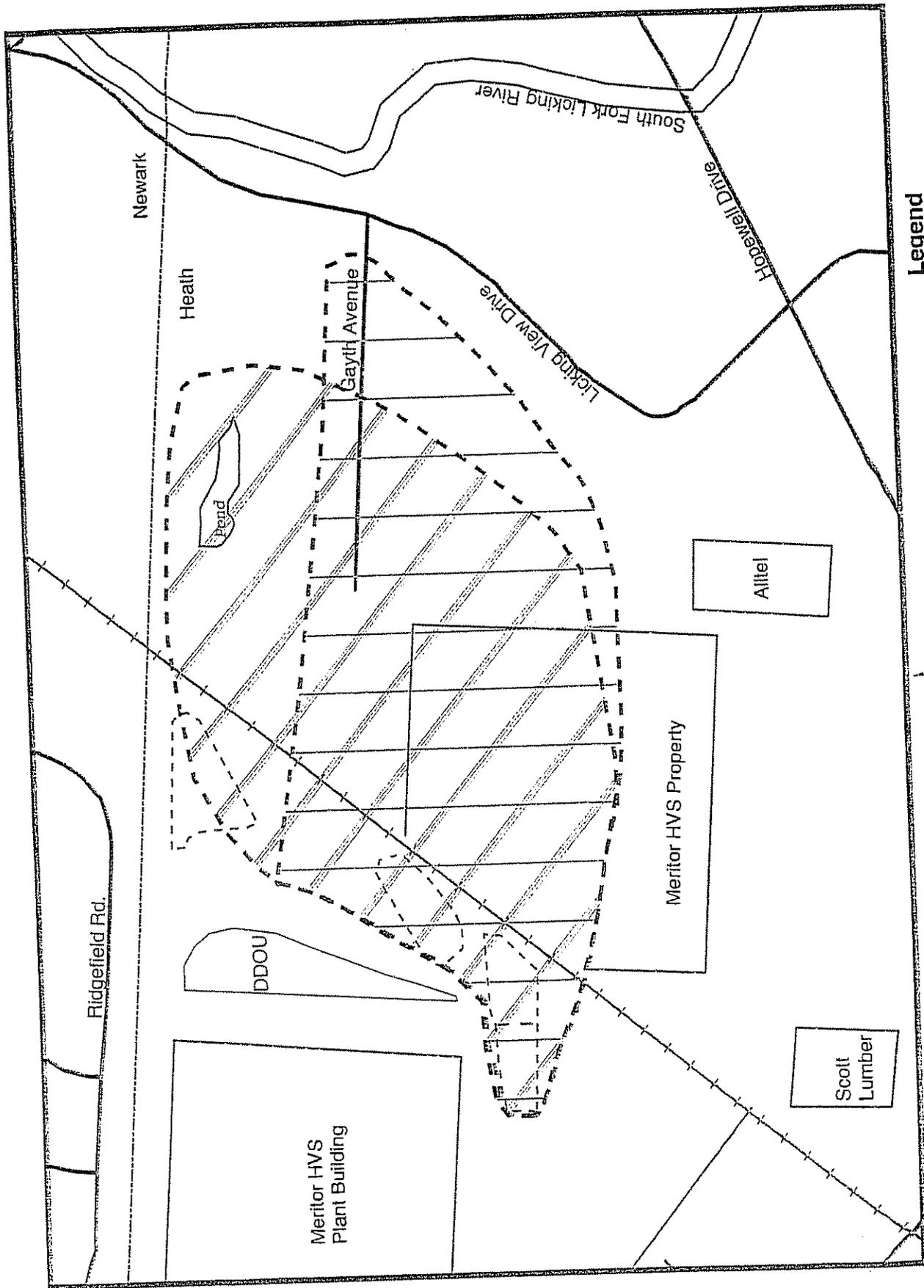


Figure 3
 Extent of Ground Water Contamination
 Rockwell International Site
 Heath, Ohio

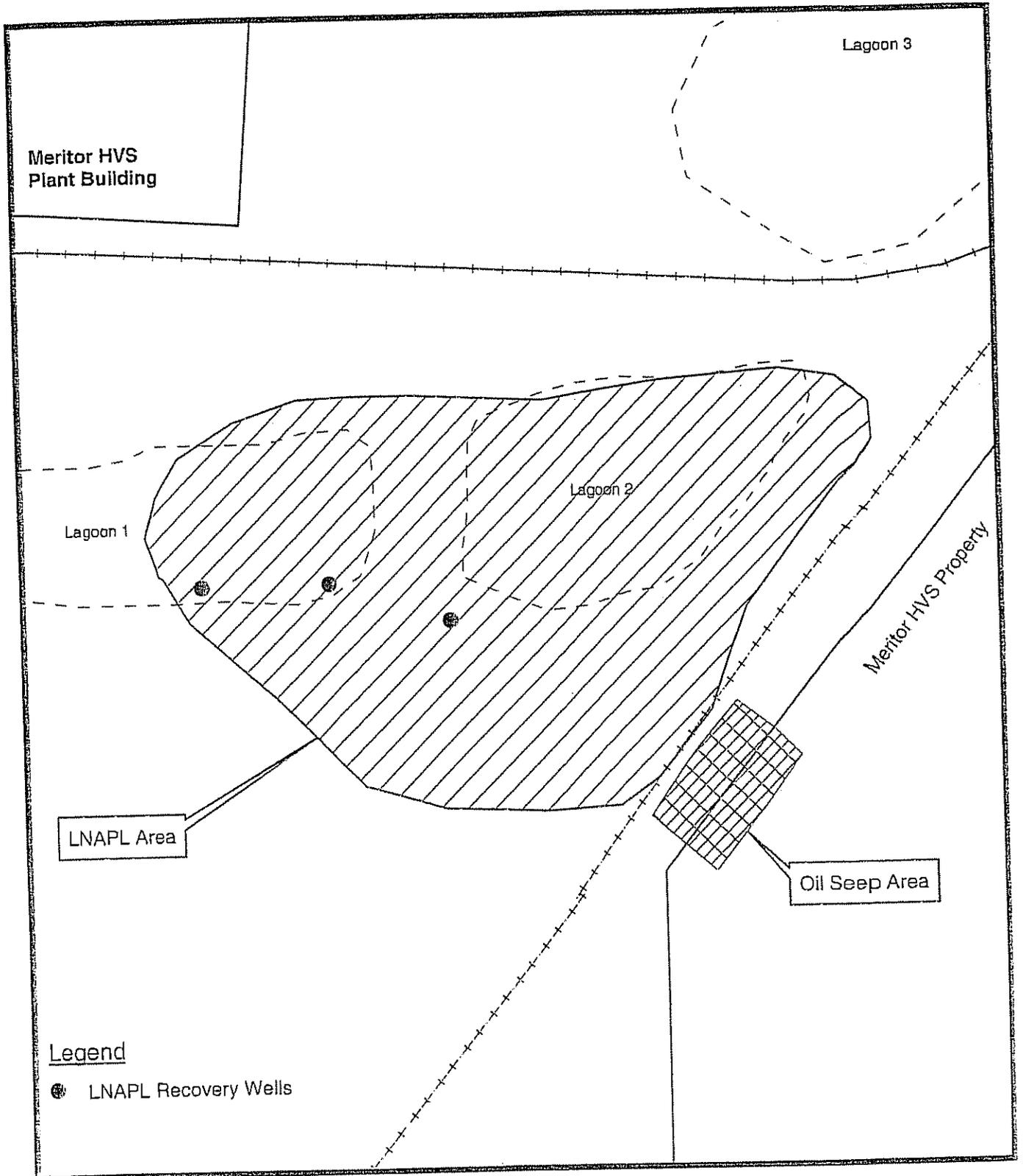


Figure 4
 LNAPL Area
 Rockwell International Site
 Heath, Ohio

100 Feet



PUBLIC NOTICE

Ohio EPA Finalizes Decision Document for Rockwell International Corporation, On-Highway Products, Heath, Ohio

On [date], Ohio EPA finalized a Decision Document identifying the selected alternative to remediate contamination at the Rockwell International, On-Highway Products site (Meritor Heavy Vehicle Systems, LLC), located at 444 Hebron Road in Heath, Licking County, Ohio.

The site is an operating facility that manufactures heavy duty truck axles. The soil and ground water are contaminated with vinyl chloride, cis 1,2 dichloroethene, and PCB-laced oil. The selected alternative includes: (1) enhanced in-situ anaerobic reductive dechlorination; (2) soil cover; (3) oil recovery; (4) monitoring; and, (5) institutional and engineering controls.

On September 25, 2002, Ohio EPA issued a Preferred Plan that outlined Ohio EPA's preferred alternative to remediate contamination at the Site. A public meeting was held on October 2, 2002 during which public comments on the Preferred Plan were accepted. In addition, written comments on the Preferred Plan were accepted through October 25, 2002. The comments received by the Agency during the comment period are addressed in the Responsiveness Summary attached to the Decision Document.

The Decision Document is available for review at the Newark Public Library, located at 101 West Main Street in Newark. The Decision Document and related materials are also available for review at Ohio EPA's Central District Office, located at 3232 Alum Creek Drive in Columbus by calling (614) 728-3778 to set up an appointment.

The effective date of this final action is [date]. This action of the Director of the Ohio EPA is final and may be appealed to the Environmental Review Appeals Commission (ERAC) pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. The appeal must be filed with the ERAC within thirty (30) days after notice of the Director's action. A copy of the appeal must be served upon the Director of the Ohio EPA within three (3) days of filing at the ERAC. The ERAC is located at 236 East Town Street, Room 300, Columbus, Ohio, 43215.

Director's Final Findings and Orders
Meritor Heavy Vehicle Systems, LLC
Heath, Licking County, Ohio

APPENDIX B - STATEMENT OF WORK

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

**Rockwell International, On-Highway Products
Heath, Ohio**

1.0 PURPOSE

The purpose of this Remedial Design/Remedial Action Statement of Work (RD/RA SOW) is to define the procedures the Respondent(s) shall follow in designing and implementing the selected remedy for the Rockwell International 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) documented the selection of a remedy for the site in a Decision Document journalized March 4, 2003. 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.

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

2.0 DESCRIPTION OF THE REMEDIAL ACTION/ PERFORMANCE STANDARDS

Performance standards and specifications of the major components of the remedial action to be designed and implemented by the Respondent(s) 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.

See Appendix A, Decision Document, for description of the remedial action components and associated performance standards.

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 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 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

Rockwell has previously completed extensive studies to evaluate anaerobic reductive dechlorination, eliminating the need for any additional pre-design studies.

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(s) 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 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 natural resource 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 III: REMEDIAL DESIGN

The Respondent(s) shall prepare and submit to 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 the Site as defined in the Purpose and Description of the Remedial Action sections of this SOW, the Decision Document, and/or the Orders.

3.2.1 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.

3.2.2 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.

3.2.2.1 Preliminary Design

A Preliminary Design, which reflects the design effort at approximately 30% completion, shall be submitted to 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 siting/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 Respondent(s) 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 Ohio EPA shall be incorporated into the subsequent design phase.

3.2.2.2 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 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 Ohio EPA shall reflect the same degree of completion. The Respondent(s) shall ensure that any required revisions or amendments resulting from 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 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, if it has not already been submitted. Revisions or amendments to the Intermediate Design required by Ohio EPA shall be incorporated into the Prefinal Design.

3.2.2.3 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 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; the 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 on operational procedures once startup has been successfully accomplished.

Ohio EPA will provide written comments to the Respondent(s) 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 Respondent(s) 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.

3.2.2.4 Final Design

Following incorporation of any required modifications resulting from Ohio EPA's review of the Prefinal Design submittal, the Respondent(s) shall submit to 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 Ohio EPA may have provided by way of comments on previous design submittals shall be returned to 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 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.

3.2.3 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 Ohio EPA during Final Design review, and reflect current prices for labor, material and equipment.

The refined cost estimate shall be submitted by the Respondent(s) with the Prefinal Design and the final cost estimate shall be included with the Final Design submittal.

3.2.4 Remedial Action Implementation Plan

The Respondent(s) shall develop a Remedial Action Implementation Plan (RAIP) 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 Ohio EPA. The final plan and RA project schedule shall be submitted with the Final Design for review and approval.

3.2.5 Community Relations Support

A community relations program will be implemented by Ohio EPA. The Respondent(s) shall cooperate with 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 Ohio EPA concerning the Site.

3.4 TASK IV: REMEDIAL ACTION CONSTRUCTION

Following approval of the Final Design submittal by Ohio EPA, the Respondent(s) shall implement the designed remedial action(s) at the 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 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 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 meeting minutes shall be transmitted 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 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's written approval prior to implementation include:

- Changes 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);
- Changes that result in a less effective treatment for wastes associated with the site;
- Any changes that may result in an increase in 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;
- Changes 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 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 Respondent(s), the Site Coordinator for Ohio EPA, all contractors involved with construction of the remedial action(s) and the remedial design agent (person(s) who 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 meeting minutes shall be transmitted by the Respondent(s) to all parties in attendance.

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 Ohio EPA with assistance from the party with primary responsibility for the construction inspection, if requested.

The prefinal inspection will consist of a walk-through inspection of the entire site. "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 being achieved reliably. 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 when no additional deficiencies are identified. The "shakedown" may take several months. Determination of remedy effectiveness for other types of remedial actions will be based on the Performance Standard Verification Plan (PSVP).

If the 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 Ohio EPA and schedule a final inspection. A final inspection will be conducted by Ohio EPA with assistance from the party having primary responsibility for the 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 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 Ohio EPA. If Ohio EPA's review indicates that corrections or amendments to the report are necessary, Ohio EPA will provide comments to the Respondent(s). The Respondent(s) shall submit a revised construction completion report, based on Ohio EPA comments, to Ohio EPA within 30 days of receipt of such comments. Upon determination by 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 Respondent(s) 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 Review Reports 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 9355.7-03B-P, Comprehensive Five-Year Review Guidance, June 2001.

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 Ohio EPA prior to initiation of field activities or proceeding with the five-year review.

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

3.6 TASK VI: OPERATION AND MAINTENANCE/PERFORMANCE MONITORING

The Respondent(s) shall implement performance monitoring and operation and maintenance procedures as required by the approved Performance Standard Verification Plan and approved Operation and Monitoring (O&M) 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 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 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) A synopsis of the remedial action and certification of the design and construction;
- 2) A listing of the cleanup and performance standards as established in the Decision Document and the Orders, including any amendments to those standards with an explanation for adopting the amendments;
- 3) A summary and explanation of any changes to the approved plans and

- specifications. An explanation of why the changes were necessary should be included in the summary, and where necessary, Ohio EPA's approval of the changes should be documented;
- 4) A summary of the treatment system operations and monitoring data, documenting that the remedial action met or exceeded the performance standards or cleanup criteria;
 - 5) An 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 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 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 an 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 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 (HSP)
 - Regulatory Compliance Plan
- **Final RD/RA Work Plan**
 - HSP
 - Regulatory Compliance Plan
- **Draft Pre-Design Studies Plan**
 - Quality Assurance Project Plan (QAPP)
 - Field Sampling Plan (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 Construction Quality Assurance Plan (CQAP)
 - Draft Performance Standard Verification Plan (PSVP)
 - Draft O & M Plan
 - Health and Safety Plan
- **Prefinal Design Documents**
 - CQAP
 - PSVP
 - O & M Plan
 - Draft Remedial Action Implementation Plan (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 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 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 Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part A), Interim Final, EPA/540/1-89/002, December 1989);
 - 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 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 Ohio EPA. Subsequent drafts shall be submitted with the Preliminary and Final Design submittals that incorporate comments made by 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 (PSVP) 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 Ohio EPA. The final PSVP, which fully addresses comments made by 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 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 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 Ohio EPA.

Director's Final Findings and Orders
Meritor Heavy Vehicle Systems, LLC
Heath, Licking County, Ohio

APPENDIX C - GUIDANCE DOCUMENTS

Appendix C

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. Best Available Treatment Technologies (BATT) for Remedial Response Program Sites, Ohio EPA Policy No. DERR-00-RR-016, Final, October 23, 1992
2. 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
3. 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
4. Technical Guidance Manual for Hydrogeologic Investigations and Ground Water Monitoring Programs, Ohio EPA, Division of Drinking and Ground Waters, Final, February 1995
5. 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:

- 6a. 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
- 6b. 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
- 6c. 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
- 6d. 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
- 6e. 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

- 7. CERCLA Compliance with Other Laws Manual - Part I, OSWER Directive 9234.1-01, EPA/540/G-89/006, August 1988, interim final
- 8. Use of monitored Natural Attenuation at Superfund, RCRA, Corrective Action, and Underground Storage Tank Sites, OSWER 9200.4-17, Interim Final, November 1997
- 9. Technical Guidance Document: Construction Quality Assurance and Quality Control for Waste Containment Facilities, EPA/600/R-93/182, September 1993
- 10. CERCLA Compliance with Other Laws Manual - Part II, OSWER 9234.1-01, EPA/540/G-89/006, August 1988, interim final
- 11. 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, EPA/540-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, September 26, 1994
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/600/8-91-003, 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. Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action and Underground Storage Tank Sites, OSWER Directive 9200.4-17P, 1999
- 54.* Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments, EPA/530-SW-89-047, July 1989
- 55.* Technical Guidance Document: Inspection Techniques for the Fabrication of Geomembrane Field Seams, EPA/530/SW-91/051, May 1991
56. Technical Guidance for Corrective Measures - Subsurface Gas, EPA/530-SW-88-023, March 1985
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
61. Wildlife Exposure Factors Handbook, Volume I of II, EPA/600/R-93/187a, December 1993
62. Wildlife Exposure Factors Handbook, Appendix: Literature Review Database, Volume II of II, EPA/600/R-93/187b, December 1993
63. Comprehensive Five-Year Review Guidance, OSWER 9355.7-03B-P, June 2001

INNOVATIVE TECHNOLOGY AND REGULATORY COOPERATION PROTOCOLS

1. Multi-State Evaluation of Expedited Site Characterization Technology, Site Characterization and Analysis Penetrometer System-Induced Fluorescence (SCAPS-LIF)-Final-May 1996
2. Multi-State Evaluation of Expedited Site Characterization Technology, Site Characterization and Analysis Penetrometer System-Volatile Organic Compounds (SCAPS-VOC) Sensing Technologies-Final-December 1997
3. Technology Review of SCAPS Thermal Desorption VOC Sampler-Final-
4. ISB Protocol Binder and Resource Document for Hydrocarbons-Final-June 1996
5. Natural Attenuation of Chlorinated Solvents in Groundwater-Principles and Practices-Draft Version 3.0-August 1997
6. Closure Criteria Focus Group-Final-March 1998
7. Cost & Performance reporting for In-Situ Bioremediation Technologies-Final-December 1997
8. Technical and Regulatory Guidelines for Soil Washing-Final-December 1997
9. Regulatory Guidance for Permeable Barriers Designed to Remediate Chlorinated Solvents-Final-December 1997
10. Design Guidance for Application of Permeable Barriers to Remediate Dissolved Chlorinated Solvents-Final-February 1997
11. Regulatory Guidance for Permeable Barriers to Remediate Inorganics and radionuclides-Draft-October 1998
12. Technical Requirements for On-site Low Temperature Thermal Treatment of Non-Hazardous Soils Contaminated with Petroleum/Coal Tar/ Gas Plant Wastes-Final-1996
13. Technical Requirements for On-Site Thermal Desorption of Solid Media Contaminated with Hazardous Chlorinated Solvents-Final-September 1997
14. Technical Requirements for On-Site Thermal Desorption of Solid Media Contaminated and Low Level Mixed Waste Contaminated with Mercury and/or Hazardous Chlorinated

Organics-Final-September 1997

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.
- 3) The ITRC documents can be downloaded from the itrc web site, www.sso.org/ecos/itrc.