UNITED STATES DISTRICT COURT
DISTRICT OF NEW JERSEY

- x

UNITED STATES OF AMERICA

Plaintiff,

Civil Action No.

v.

WYETH HOLDINGS LLC

Defendant.

- x

CONSENT DECREE

TABLE OF CONTENTS

I. BACKGROUND

A. The United States of America ("United States"), on behalf of the United States Environmental Protection Agency ("EPA"), filed a complaint in this matter pursuant to Sections 106 and 107 of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. §§ 9606, 9607.

B. The United States in its complaint seeks, *inter alia*: (1) reimbursement of costs incurred by EPA and the Department of Justice ("DOJ") for response actions at the American Cyanamid Superfund Site in Bridgewater Township, Somerset County, New Jersey (the "Site"), together with accrued interest; and (2) performance by the defendant of the Remedial Action consistent with the National Contingency Plan ("NCP"), 40 C.F.R. Part 300.

C. In accordance with the NCP and Section 121(f)(1)(F) of CERCLA, 42 U.S.C. § 9621(f)(1)(F), EPA notified the State of New Jersey (the "State") on September 25, 2012, of negotiations with a potentially responsible party ("PRP") regarding the implementation of the remedial design and remedial action for the Site, and EPA has provided the State with an opportunity to participate in such negotiations and be a party to this Consent Decree.

D. In accordance with Section 122(j)(1) of CERCLA, 42 U.S.C. § 9622(j)(1), EPA notified the United States Department of the Interior and the National Oceanic and Atmospheric Administration Office on September 27, 2012, (collectively, the "Natural Resource Trustees") of negotiations with a PRP regarding the release of hazardous substances that may have resulted in injury to the natural resources under federal trusteeship and encouraged the Natural Resource Trustees to participate in the negotiation of this Consent Decree.

E. Defendant Wyeth Holdings LLC ("Settling Defendant") does not admit any liability to Plaintiff arising out of the transactions or occurrences alleged in the complaint, nor does it acknowledge that the release or threatened release of hazardous substances at or from the Site constitutes an imminent and substantial endangerment to the public health or welfare or the environment.

F. Pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, EPA placed the Site on the National Priorities List ("NPL"), set forth at 40 C.F.R. Part 300, Appendix B, by publication in the Federal Register on September 8, 1983, 48 Fed. Reg. 40658.

G. In response to a release or a substantial threat of a release of a hazardous substance(s) at or from the Site, American Cyanamid Company (now known as Wyeth Holdings LLC) entered into Administrative Consent Orders ("ACOs") with the State of New Jersey in 1982 and 1988 (later amended in 1994) to investigate and remediate the Site. American Home Products Corporation acquired the American Cyanamid Company in 1994. In or about 2004, American Cyanamid Company changed its name to Wyeth Holdings Corporation, which subsequently changed its name to Wyeth Holdings LLC.

H. In 2004, Settling Defendant recommended, and the State and EPA agreed, that a Comprehensive Site-wide Feasibility Study ("FS") should be initiated. This FS was completed in February 2012.

I. Pursuant to Section 117 of CERCLA, 42 U.S.C. § 9617, EPA published notice of the completion of the FS and of the proposed plan for remedial action on February 16, 2012, in a major local newspaper of general circulation. EPA provided an opportunity for written and oral comments from the public on the proposed plan for remedial action. A copy of the transcript of the public meeting is available to the public as part of the administrative record upon which the Director of the Emergency and Remedial Response Division, EPA Region 2, based the selection of the response action.

J. The decision by EPA on the remedial action to be implemented at the Site is embodied in a final Record of Decision ("ROD"), executed on September 27, 2012, on which the State has had a reasonable opportunity to review and comment and on which the State has given its concurrence. The ROD includes a responsiveness summary to the public comments. Notice of the final plan was published in accordance with Section 117(b) of CERCLA, 42 U.S.C. § 9617(b).

K. The ROD sets forth the remedy for Operable Unit ("OU") 4, which combines all active OUs at the Site, except for OU 8 (Impoundments 1 and 2) and Impoundments 15 and 16. The OU4 ROD addresses Impoundments 3, 4, 5, 13, 17 and 24, as well as Site-wide soils and groundwater. Impoundments 15 and 16 shall also be remediated under this Consent Decree pursuant to the November 1998 OU 2 Explanation of Significant Differences (the "OU 2 ESD"), the 1996 OU 2 ROD (the "OU 2 ROD"), and the 1999 Remedial Action Plan for the Closure of Impoundments 15 and 16 (the "1999 RAP"). This Consent Decree does not require remediation of OU 8 because a record of decision for OU 8 has not yet been issued.

L. A Removal Action being conducted at the Site by Settling Defendant pursuant to the Settlement Agreement and Order on Consent, as amended, (Docket No. CERCLA-02-2011-2015) issued by EPA for this Site on July 19, 2011 is now incorporated into the Remedial Action and is governed by this Consent Decree. Thus, this Consent Decree, upon entry, shall supersede the July 19, 2011 Settlement Agreement and Order on Consent.

M. Settling Defendant and EPA also entered into an Administrative Settlement Agreement and Order on Consent for Remedial Design, Operable Unit 4 and Focused Feasibility Study, Operable Unit 8 (U.S. EPA Docket No. CERCLA-02-2012-2031), dated March 18, 2013 (the "OU 4 RD/OU 8 FFS Order"). This Administrative Settlement Agreement and Order shall remain in effect and is not superseded by this Consent Decree. To the extent that any inconsistencies may arise between the OU4 RD/OU8 FFS Order and this Consent Decree, the parties will work cooperatively to resolve those inconsistencies.

N. Based on the information presently available to EPA and the State, EPA and the State believe that the Work will be properly and promptly conducted by Settling Defendant if conducted in accordance with the requirements of this Consent Decree and its appendices.

O. Solely for the purposes of Section 113(j) of CERCLA, 42 U.S.C. § 9613(j), the Remedial Action and the Work to be performed by Settling Defendant shall constitute a response action taken or ordered by the President for which judicial review shall be limited to the administrative record.

P. The Parties recognize, and the Court by entering this Consent Decree finds, that this Consent Decree has been negotiated by the Parties in good faith and implementation of this Consent Decree will expedite the cleanup of the Site and will avoid prolonged and complicated litigation between the Parties, and that this Consent Decree is fair, reasonable, and in the public interest.

NOW, THEREFORE, it is hereby Ordered, Adjudged and Decreed:

II. JURISDICTION

1. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331, and 1345, and 42 U.S.C. §§ 9606, 9607, and 9613(b). This Court also has personal jurisdiction over Settling Defendant. Solely for the purposes of this Consent Decree and the underlying complaints, Settling Defendant waives all objections and defenses that it may have to jurisdiction of the Court or to venue in this District. Settling Defendant shall not challenge the terms of this Consent Decree or this Court's jurisdiction to enter and enforce this Consent Decree.

III. PARTIES BOUND

2. This Consent Decree applies to and is binding upon the United States and upon Settling Defendant and its successors and assigns. Any change in ownership or corporate status of the Settling Defendant including, but not limited to, any transfer of assets or real or personal property, shall in no way alter such Settling Defendant's responsibilities under this Consent Decree.

3. Settling Defendant shall provide a copy of this Consent Decree to each contractor hired to perform the Work required by this Consent Decree and to each person representing the Settling Defendant with respect to the Site or the Work, and shall condition all contracts entered into hereunder upon performance of the Work in conformity with the terms of this Consent Decree. Settling Defendant or its contractor(s) shall provide written notice of the Consent Decree to all subcontractors hired to perform any portion of the Work required by this Consent Decree. Settling Defendant shall nonetheless be responsible for ensuring that its contractors and subcontractors perform the Work in accordance with the terms of this Consent Decree. With regard to the activities undertaken pursuant to this Consent Decree, each contractor and subcontractor shall be deemed to be in a contractual relationship with Settling Defendant within the meaning of Section 107(b)(3) of CERCLA, 42 U.S.C. § 9607(b)(3).

IV. DEFINITIONS

4. Unless otherwise expressly provided in this Consent Decree, terms used in this Consent Decree that are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in CERCLA or in such regulations. Whenever terms listed below are used in this Consent Decree or its appendices, the following definitions shall apply solely for purposes of this Consent Decree:

"American Cyanamid Superfund Site Special Account" shall mean the special account, within the EPA Hazardous Substance Superfund, established for the Site by EPA pursuant to Section 122(b)(3) of CERCLA, 42 U.S.C. § 9622(b)(3).

"CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9601-9675.

"Consent Decree" shall mean this Consent Decree and all appendices attached hereto (listed in Section XXVIII). In the event of conflict between this Consent Decree and any appendix, this Consent Decree shall control.

"Day" or "day" shall mean a calendar day unless expressly stated to be a working day. The term "working day" shall mean a day other than a Saturday, Sunday, or federal or state holiday. In computing any period of time under this Consent Decree, where the last day would fall on a Saturday, Sunday, or federal or state holiday, the period shall run until the close of business of the next working day.

"DOJ" shall mean the United States Department of Justice and its successor departments, agencies, or instrumentalities.

"Effective Date" shall mean the date upon which this Consent Decree is entered by the Court as recorded on the Court docket, or, if the Court instead issues an order approving the Consent Decree, the date such order is recorded on the Court docket.

"EPA" shall mean the United States Environmental Protection Agency and its successor departments, agencies, or instrumentalities.

"EPA Hazardous Substance Superfund" shall mean the Hazardous Substance Superfund established by the Internal Revenue Code, 26 U.S.C. § 9507.

"Future Response Costs" shall mean all costs, including, but not limited to, direct and indirect costs, that the United States incurs in reviewing or developing plans, reports, and other deliverables submitted pursuant to this Consent Decree, in overseeing implementation of the Work, or otherwise implementing, overseeing, or enforcing this Consent Decree, including, but not limited to, payroll costs, contractor costs, travel costs, laboratory costs, the costs incurred pursuant to Paragraph 9 (Notice to Successors-in-Title and Transfers of Real Property), Sections VII (Remedy Review), IX (Access and Institutional Controls) (including, but not limited to, the cost of attorney time and any monies paid to secure access and/or to secure, implement, monitor,

maintain, or enforce Institutional Controls including, but not limited to, the amount of just compensation), XV (Emergency Response), Paragraph 47 (Funding for Work Takeover), and Section XXIX (Community Involvement); except Future Response Costs shall not include costs incurred by the United States pursuant to the OU 4 RD/OU 8 FFS Order. Future Response Costs shall also include all Interim Response Costs, and all Interest on those Past Response Costs Settling Defendant has agreed to pay under this Consent Decree that has accrued pursuant to 42 U.S.C. § 9607(a) during the period from April 30, 2013 to the Effective Date.

"Institutional Controls" or "ICs" shall mean Proprietary Controls and state or local laws, regulations, ordinances, zoning restrictions, or other governmental controls or notices that: (a) limit land, water, and/or resource use to minimize the potential for human exposure to Waste Material at or in connection with the Site; (b) limit land, water, and/or resource use to implement, ensure non-interference with, or ensure the protectiveness of the Remedial Action; and/or (c) provide information intended to modify or guide human behavior at or in connection with the Site.

"Institutional Control Implementation and Assurance Plan" or "ICIAP" shall mean the plan for implementing, maintaining, monitoring and reporting the Institutional Controls as developed pursuant to the OU 4 RD/OU 8 FFS Order.

"Interest" shall mean interest at the rate specified for interest on investments of the EPA Hazardous Substance Superfund established by 26 U.S.C. § 9507, compounded annually on October 1 of each year, in accordance with 42 U.S.C. § 9607(a). The applicable rate of interest shall be the rate in effect at the time the interest accrues. The rate of interest is subject to change on October 1 of each year.

"Interim Response Costs" shall mean all unreimbursed costs, including, but not limited to, direct and indirect costs, (a) paid by the United States in connection with the Site between April 30, 2013 and the Effective Date, or (b) incurred prior to the Effective Date but paid after that date. Interim Response Costs shall also include those costs incurred by EPA pursuant to the Removal Order.

"NCP" shall mean the National Oil and Hazardous Substances Pollution Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, codified at 40 C.F.R. Part 300, and any amendments thereto.

"Operation and Maintenance" or "O&M" shall mean all activities required to maintain the effectiveness of the Remedial Action as required under the Operation and Maintenance Plan approved or developed by EPA pursuant to Section VI (Performance of the Work by Settling Defendant) and the SOW, and maintenance, monitoring, and enforcement of ICIAP.

"Operable Unit 4" or "OU 4" shall mean all of the Operable Units, previously identified at the Site as OU 1 (Impoundments 13 and 24), OU 2 (Impoundment 17), OU 3 (Impoundments 3, 4 and 5), OU 4 (Site Soils, including, for the avoidance of doubt, the soils underlying Impoundments 15 and 16), OU 5 (Site Groundwater), and OU 7 (Site-related Wetlands), but excluding OU 8 (Impoundments 1 and 2) and Impoundments 15 and 16.

"OU 4 RD/OU 8 FFS Order" shall mean the Administrative Settlement Agreement and Order on Consent for Remedial Design, Operable Unit 4 and Focused Feasibility Study, Operable Unit 8 (U.S. EPA Docket No. CERCLA-02-2012-2031), dated March 18, 2013, as amended.

"Paragraph" shall mean a portion of this Consent Decree identified by an Arabic numeral or an upper or lower case letter.

"Parties" shall mean the United States and Settling Defendant.

"Past Response Costs" shall mean all unreimbursed costs, including, but not limited to, direct and indirect costs, that the United States paid at or in connection with the Site through April 30, 2013.

"Performance Standards" shall mean the cleanup standards and other measures of achievement of the goals of the Remedial Action, set forth in the RODs and the SOW and any modified standards established pursuant to this Consent Decree.

"Plaintiff" shall mean the United States.

"Proprietary Controls" shall mean easements or covenants running with the land that (a) limit land, water, or resource use and/or provide access rights and (b) are created pursuant to common law or statutory law by an instrument that is recorded by the owner in the appropriate land records office.

"RCRA" shall mean the Solid Waste Disposal Act, 42 U.S.C. §§ 6901-6992 (also known as the Resource Conservation and Recovery Act).

"Record of Decision" or "ROD" shall mean the EPA Record of Decision relating to Operable Unit 4 at the Site signed on September 27, 2012, by the Director of the Emergency and Remedial Response Division, EPA Region 2, and all attachments thereto. The ROD is attached as Appendix A.

"Remedial Action" shall mean all Work Settling Defendant is required to perform under this Consent Decree to: (i) implement the OU 4 ROD; (ii) complete the remediation of Impoundments 15 and 16 pursuant to the OU 2 ESD, OU 2 ROD, and 1999 RAP; and (iii) incorporate the Removal Action, each in accordance with the SOW, the final approved remedial design submission, the approved Remedial Action Work Plan, and other plans approved by EPA, including implementation of Institutional Controls, until the Performance Standards are met. Remedial Action excludes performance of the Remedial Design, O&M, and the activities required under Section XXV (Retention of Records).

"Remedial Action Work Plan(s)" shall mean the document(s) developed pursuant to Paragraph 11 (Remedial Action) and approved by EPA, and any modifications thereto.

"Removal Action" shall mean that work performed by Settling Defendant pursuant to the Removal Order.

"Removal Order" shall mean the Settlement Agreement and Order on Consent for Removal Action (Docket No. CERCLA-02-2011-2015), dated July 19, 2011, as amended.

"Remedial Design" shall mean that work performed by Wyeth related to OU 4 pursuant to the OU 4 RD/OU 8 FFS Order.

"Scope of the Remedial Action" shall mean: (i) with respect to OU 4, the remedy set forth in the OU 4 ROD; (ii) with respect to the remediation of Impoundments 15 and 16, the remedy set forth in the OU 2 ROD, as modified by the OU 2 ESD; and (iii) with respect to the Removal Action, the work set forth in Section VIII of the Removal Order.

"Section" shall mean a portion of this Consent Decree identified by a Roman numeral.

"Settling Defendant" shall mean Wyeth Holdings LLC.

"Site" shall mean the American Cyanamid Superfund Site, encompassing approximately 435 acres, located primarily in Bridgewater Township with a portion of the Site in Bound Brook, Somerset County, New Jersey, and depicted generally on a map attached in Appendix C.

"State" shall mean the State of New Jersey.

"SOW" shall mean the statement of work for implementation of the Remedial Action, and Operation and Maintenance ("O&M") at the Site, as set forth in Appendix B to this Consent Decree and any modifications made in accordance with this Consent Decree.

"Supervising Contractor" shall mean the principal contractors retained by Settling Defendant to supervise and direct the implementation of the Work under this Consent Decree.

"Transfer" shall mean to sell, assign, convey, lease, mortgage, or grant a security interest in, or where used as a noun, a sale, assignment, conveyance, or other disposition of any interest by operation of law or otherwise.

"United States" shall mean the United States of America and each department, agency, and instrumentality of the United States, including EPA.

"Waste Material" shall mean (1) any "hazardous substance" under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14); (2) any pollutant or contaminant under Section 101(33) of CERCLA, 42 U.S.C. § 9601(33); and (3) any "solid waste" under Section 1004(27) of RCRA, 42 U.S.C.§ 6903(27).

"Work" shall mean all activities and obligations Settling Defendant is required to perform under this Consent Decree, except the activities required under Section XXV (Retention of Records).

V. GENERAL PROVISIONS

5. Objectives of the Parties. The objectives of the Parties in entering into this Consent Decree are to protect public health or welfare or the environment by the implementation of response actions at the Site by Settling Defendant, to pay response costs of the Plaintiff, and to resolve the claims of Plaintiff against Settling Defendant as provided in this Consent Decree.

6. Commitments by Settling Defendant. Settling Defendant shall finance and perform the Work in accordance with this Consent Decree, the ROD, the SOW, and all work plans and other plans, standards, specifications, and schedules set forth in this Consent Decree or developed by Settling Defendant and approved by EPA pursuant to this Consent Decree. Settling Defendant shall pay the United States for Past Response Costs and Future Response Costs as provided in this Consent Decree.

7. Compliance With Applicable Law. All activities undertaken by Settling Defendant pursuant to this Consent Decree shall be performed in accordance with the requirements of all applicable federal and state laws and regulations. Settling Defendant must also comply with all applicable or relevant and appropriate requirements of all federal and state environmental laws as set forth in the OU 4 ROD, OU 2 ROD (as amended by the OU 2 ESD) and the SOW. The activities conducted pursuant to this Consent Decree, if approved by EPA, shall be deemed to be consistent with the NCP.

8. Permits.

a. As provided in Section 121(e) of CERCLA, 42 U.S.C. § 9621(e), and Section 300.400(e) of the NCP, no permit shall be required for any portion of the Work conducted entirely on-site (i.e., within the areal extent of contamination or in very close proximity to the contamination and necessary for implementation of the Work). Where any portion of the Work that is not on-site requires a federal or state permit or approval, Settling Defendant shall submit timely and complete applications and take all other actions necessary to obtain all such permits or approvals.

b. Settling Defendant may seek relief under the provisions of Section XVIII (Force Majeure) for any delay in the performance of the Work resulting from a failure to obtain, or a delay in obtaining, any permit or approval referenced in Paragraph 8.a and required for the Work, provided that it has submitted timely and complete applications and taken all other actions necessary to obtain all such permits or approvals.

c. This Consent Decree is not, and shall not be construed to be, a permit issued pursuant to any federal or state statute or regulation.

9. Notice to Successors-in-Title and Transfers of Real Property.

a. Settling Defendant shall, prior to entering into a contract to Transfer any real property located at the Site, or 60 days prior to Settling Defendant Transferring any real property located at the Site, whichever is earlier:

(1) Notify the proposed transferee that EPA has selected a remedy regarding the Site, that Settling Defendant has entered into a Consent Decree requiring implementation of such remedy, and that the United States District Court has entered the Consent Decree (identifying the name and civil action number of this case and the date the CD was entered by the Court); and

(2) Notify EPA of the name and address of the proposed transferee and provide EPA with a copy of the notice that it provided to the proposed transferee. In the event of any Transfer of real property located at the Site, unless the United States otherwise consents in writing, Settling Defendant shall continue to comply with its obligations under the Consent Decree, including, but not limited to, its obligation to provide and/or secure access, to implement, maintain, monitor, and report on Institutional Controls, and to abide by such Institutional Controls.

VI. PERFORMANCE OF THE WORK BY SETTLING DEFENDANT

10. Selection of Supervising Contractors for Remedial Action.

a. All aspects of the Work to be performed by Settling Defendant pursuant to Sections VI (Performance of the Work by Settling Defendant), VIII (Quality Assurance, Sampling, and Data Analysis), IX (Access and Institutional Controls), and XV (Emergency Response) shall be under the direction and supervision of at least one Supervising Contractor, as designated by Settling Defendant. Settling Defendant has selected and EPA has issued an authorization to proceed regarding hiring of the following persons as Supervising Contractors: Golder Associates Inc., Woodard & Curran, Inc., and Brown & Caldwell, Inc. If at any time hereafter, Settling Defendant proposes to change these Supervising Contractor(s), Settling Defendant shall give such notice to EPA and must obtain an authorization to proceed from EPA before the new Supervising Contractor(s) performs, directs, or supervises any Work under this Consent Decree. Unless EPA determines that it is unnecessary, Settling Defendant shall demonstrate that the proposed replacement contractor has a quality assurance system that complies with ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs" (American National Standard, January 5, 1995), by submitting a copy of the proposed contractor's Quality Management Plan ("QMP"). The QMP should be prepared in accordance with "EPA Requirements for Quality Management Plans (QA/R-2)" (EPA/240/B-01/002, March 2001, reissued May 2006) or equivalent documentation as determined by EPA.

b. If EPA disapproves a replacement Supervising Contractor, EPA will notify Settling Defendant in writing. Settling Defendant shall submit to EPA a list of contractors, including the qualifications of each contractor, that would be acceptable to them within 30 days after receipt of EPA's disapproval of the contractor previously proposed. EPA will provide written notice of the names of any contractor(s) that it disapproves and an authorization to proceed with respect to any of the other contractors. Settling Defendant may select any contractor from that list that is not disapproved and shall notify EPA of the name of the contractor selected within 21 days after EPA's authorization to proceed.

c. If EPA fails to provide written notice of its authorization to proceed or disapproval as provided in this Paragraph and this failure prevents Settling Defendant from meeting one or more deadlines in a plan approved by EPA pursuant to this Consent Decree, Settling Defendant may seek relief under Section XVIII (Force Majeure).

11. Remedial Action.

a. As set forth in the EPA-approved Remedial Design Report(s), Settling Defendant shall submit to EPA, and the State if requested, work plan(s) for the performance of the Remedial Action at the Site ("Remedial Action Work Plan(s)"). The Remedial Action Work Plan(s) may be submitted as separate work plans for each component of the Remedial Action, as approved by EPA and as provided in the SOW (e.g., separate work plans for the impoundment contents and site-wide soil component and for the groundwater component). The Remedial Action Work Plan(s) shall provide for construction and implementation of the remedy set forth in the ROD and achievement of the Performance Standards, in accordance with this Consent Decree, the ROD, the SOW, and the design plans and specifications developed by Settling Defendant pursuant to the Settlement Agreement and Administrative Order on Consent, (U.S. EPA Docket No. CERCLA-02-2012-2031) dated, March 18, 2013, as amended, and approved by EPA. Upon its approval by EPA, the Remedial Action Work Plan(s) shall be incorporated into and become enforceable under this Consent Decree. At the same time as it submits the Remedial Action Work Plan(s), Settling Defendant shall submit to EPA, and the State if requested, a Health and Safety Plan for field activities required by the Remedial Action Work Plan(s) that conforms to the applicable Occupational Safety and Health Administration and EPA requirements including, but not limited to, 29 C.F.R. § 1910.120.

b. The Remedial Action Work Plan(s) shall include the following, as appropriate: (1) schedule for completion of the Remedial Action; (2) schedule for developing and submitting other required Remedial Action plans; (3) groundwater monitoring plan, (4) maintenance and monitoring plan for engineered capping systems; (5) methods for satisfying permitting requirements; (6) methodology for implementing the Operation and Maintenance Plan; (7) Construction Quality Assurance Plan ("CQAP"); and (8) procedures and plans for the decontamination of equipment and disposal of contaminated materials. The Remedial Action Work Plan also shall include the methodology for implementing the CQAP and a schedule for implementing all Remedial Action tasks identified in the final design submission(s).

c. Upon approval of the Remedial Action Work Plan(s) by EPA, after a reasonable opportunity for review and comment by the State if requested, Settling Defendant shall implement the activities required under the applicable Remedial Action Work Plan(s). Settling Defendant shall submit to EPA, and the State if requested, all reports and other deliverables required under the approved Remedial Action Work Plan(s) in accordance with the approved schedule for review and approval pursuant to Section XI (EPA Approval of Plans, Reports, and Other Deliverables). Unless otherwise directed by EPA, Settling Defendant shall not commence physical Remedial Action activities at the Site prior to approval of the applicable Remedial Action Work Plan(s).

12. Settling Defendant shall continue to implement the Remedial Action until the Performance Standards are achieved. Settling Defendant may petition for a waiver of Performance Standards pursuant to applicable law and EPA policy and guidance at the time of such petition. Settling Defendant shall implement O&M for so long thereafter as is required by this Consent Decree.

13. Modification of SOW or Related Work Plans.

a. If EPA determines that it is necessary to modify the work specified in the SOW and/or in work plans developed pursuant to the SOW to achieve and maintain the Performance Standards or to carry out and maintain the effectiveness of the remedy set forth in the ROD, and such modification is consistent with the Scope of the Remedial Action, then EPA may issue such modification in writing and shall notify Settling Defendant of such modification. The Removal Action being conducted at the Site by Settling Defendant and the remediation of Impoundments 15 and 16 (i.e., iron oxide for recycling) pursuant to the OU 2 ESD, OU 2 ROD and 1999 RAP are now incorporated into the Remedial Action and are governed by this Consent Decree. If Settling Defendant objects to a modification to the work specified in the SOW and/or in work plans developed pursuant to the SOW that EPA determines to be necessary after entry of this Consent Decree, Settling Defendant may, within 30 days after EPA's notification, seek dispute resolution under Paragraph 68 (Record Review).

b. The SOW and/or related work plans shall be modified: (1) in accordance with the modification issued by EPA; or (2) if Settling Defendant invokes dispute resolution, in accordance with the final resolution of the dispute. The modification shall be incorporated into and enforceable under this Consent Decree, and Settling Defendant shall implement all work required by such modification. Settling Defendant shall incorporate the modification into the Remedial Action Work Plan(s) under Paragraph 11 (Remedial Action), as appropriate.

c. Nothing in this Paragraph shall be construed to limit EPA's authority to require performance of further response actions as otherwise provided in this Consent Decree.

14. Nothing in this Consent Decree, the SOW, or the Remedial Action Work Plan(s) constitutes a warranty or representation of any kind by Plaintiff that compliance with the work requirements set forth in the SOW and the Work Plans will achieve the Performance Standards.

15. Off-Site Shipment of Waste Material.

a. Settling Defendant may ship Waste Material related to the Remedial Action from the Site to an off-Site facility for disposal or treatment only if it verifies, prior to any shipment, that the off-Site facility is operating in compliance with the requirements of Section 121(d)(3) of CERCLA, 42 U.S.C. § 9621(d)(3), and 40 C.F.R. § 300.440, by obtaining a determination from EPA that the proposed receiving facility is operating in compliance with 42 U.S.C. § 9621(d)(3) and 40 C.F.R. § 300.440.

b. Settling Defendant may ship Waste Material related to the Remedial Action from the Site to an out-of-state waste management facility for disposal or treatment only if, prior to any shipment, it provides written notice to the appropriate state environmental official in the receiving facility's state and to the EPA Project Coordinator. This notice requirement shall not apply to any off-Site shipments when the total quantity of all such shipments will not exceed ten cubic yards. The written notice shall include the following information, if available: (1) the name and location of the receiving facility; (2) the type and quantity of Waste Material to be shipped; (3) the schedule for the shipment; and (4) the method of transportation. Settling Defendant also shall notify the state environmental official referenced above and the EPA Project Coordinator of any major changes in the shipment plan, such as a decision to ship the Waste Material to a different out-of-state facility. Settling Defendant shall provide the written notice after the award of the contract for Remedial Action construction and before the Waste Material is shipped.

VII. REMEDY REVIEW

16. Periodic Review. Settling Defendant shall conduct any studies and investigations to support EPA's reviews of whether the Remedial Action is protective of human health and the environment at least every five years as required by Section 121(c) of CERCLA, 42 U.S.C. § 9621(c), and any applicable regulations.

17. EPA Selection of Further Response Actions. If EPA determines, at any time, that the Remedial Action is not protective of human health and the environment, EPA may select further response actions for the Site in accordance with the requirements of CERCLA and the NCP.

18. Opportunity To Comment. Settling Defendant and, if required by Sections 113(k)(2) or 117 of CERCLA, 42 U.S.C. § 9613(k)(2) or 9617, the public, will be provided with an opportunity to comment on any further response actions proposed by EPA as a result of the review conducted pursuant to Section 121(c) of CERCLA and to submit written comments for the record during the comment period.

19. Settling Defendant's Obligation To Perform Further Response Actions. If EPA selects further response actions relating to the Remedial Action, EPA may require Settling Defendant to perform such further response actions, but only to the extent that the reopener conditions in Paragraph 84 or Paragraph 85 (United States' Pre and Post- Certification

Reservations) are satisfied. Settling Defendant may invoke the procedures set forth in Section XIX (Dispute Resolution) to dispute (a) EPA's determination that the reopener conditions of Paragraph 84 or Paragraph 85 are satisfied, (b) EPA's determination that the Remedial Action is not protective of human health and the environment, or (c) EPA's selection of further response actions. Disputes pertaining to whether the Remedial Action is protective or to EPA's selection of further response actions shall be resolved pursuant to Paragraph 68 (Record Review).

20. Submission of Plans. If Settling Defendant is required to perform further response actions pursuant to Paragraph 19, it shall submit a plan for such response action to EPA for approval in accordance with the procedures of Section VI (Performance of the Work by Settling Defendant). Settling Defendant shall implement the approved plan in accordance with this Consent Decree.

VIII. QUALITY ASSURANCE, SAMPLING, AND DATA ANALYSIS

21. Quality Assurance.

a. Settling Defendant shall use quality assurance, quality control, and chain of custody procedures for all treatability, compliance, and monitoring samples in accordance with "EPA Requirements for Quality Assurance Project Plans (QA/R5)" (EPA/240/B-01/003, March 2001, reissued May 2006), "Guidance for Quality Assurance Project Plans (QA/G-5)" (EPA/240/R-02/009, December 2002), and subsequent amendments to such guidelines upon notification by EPA to Settling Defendant of such amendment. Amended guidelines shall apply only to procedures conducted after such notification.

b. Prior to the commencement of any monitoring project under this Consent Decree, Settling Defendant shall submit to EPA for approval, after a reasonable opportunity for review and comment by the State if requested, a Quality Assurance Project Plan ("QAPP") that is consistent with the SOW, the NCP, and applicable guidance documents. If relevant to the proceeding, the Parties agree that validated sampling data generated in accordance with the QAPP(s) and reviewed and approved by EPA shall be admissible as evidence, without objection, in any proceeding under this Consent Decree. Settling Defendant shall ensure that EPA and State personnel and their authorized representatives are allowed access at reasonable times to all laboratories utilized by Settling Defendant in implementing this Consent Decree. In addition, Settling Defendant shall ensure that such laboratories shall analyze all samples submitted by EPA pursuant to the QAPP for quality assurance monitoring. Settling Defendant shall ensure that the laboratories it utilizes for the analysis of samples taken pursuant to this Consent Decree perform all analyses according to accepted EPA methods, as specified in the EPA-approved QAPP. Settling Defendant shall ensure that all laboratories it uses for analysis of samples taken pursuant to this Consent Decree participate in an EPA or EPA-equivalent quality assurance/quality control ("QA/QC") program. Settling Defendant shall use only laboratories that have a documented Quality System that complies with ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs" (American National Standard, January 5, 1995), and "EPA Requirements for Quality Management Plans (QA/R-2)" (EPA/240/B-01/002, March

2001, reissued May 2006) or equivalent documentation as determined by EPA. EPA may consider laboratories accredited under the National Environmental Laboratory Accreditation Program ("NELAP") or the American Association for Laboratory Accreditation ("A2LA") as meeting the Quality System requirements. Settling Defendant shall ensure that all field methodologies utilized in collecting samples for subsequent analysis pursuant to this Consent Decree are conducted in accordance with the procedures set forth in the QAPP approved by EPA.

22. Upon request, Settling Defendant shall allow split or duplicate samples to be taken by EPA or its authorized representatives. Settling Defendant shall notify EPA not less than 21 days in advance of any sample collection activity unless shorter notice is agreed to by EPA. In addition, EPA shall have the right to take any additional samples that EPA deems necessary. Upon request, EPA shall allow Settling Defendant to take split or duplicate samples of any samples they take as part of Plaintiff's oversight of Settling Defendant's implementation of the Work.

23. Unless EPA agrees otherwise, Settling Defendant shall submit to EPA one electronic copy, and if requested, one hard copy, of the results of all validated sampling and/or tests or other validated data, unless validation will not be performed for such data, obtained or generated by or on behalf of Settling Defendant with respect to the Remedial Action and/or the implementation of this Consent Decree.

24. Notwithstanding any provision of this Consent Decree, the United States retains all of its information gathering and inspection authorities and rights, including enforcement actions related thereto, under CERCLA, RCRA, and any other applicable statutes or regulations.

IX. ACCESS AND INSTITUTIONAL CONTROLS

25. If the Site, or any other real property where access or land/water use restrictions are needed, is owned or controlled by Settling Defendant:

a. Settling Defendant shall, commencing on the date of lodging of the Consent Decree, provide the United States and its representatives, contractors, and subcontractors, with access at all reasonable times to the Site, or such other real property, to conduct any activity regarding the Consent Decree including, but not limited to, the following activities:

(1) Monitoring the Work;

(2) Verifying any data or information submitted to the United States;

(3) Conducting investigations regarding contamination at or near the Site;

(4) Obtaining samples;

(5) Assessing the need for, planning, or implementing additional response actions at or near the Site;

(6) Assessing implementation of quality assurance and quality control practices as defined in the approved CQAP;

(7) Implementing the Work pursuant to the conditions set forth in Paragraph 88 (Work Takeover);

(8) Planning, investigating, implementing, coordinating, and overseeing natural resource damage restoration actions;

(9) Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by Settling Defendant or its agents, consistent with Section XXIV (Access to Information);

(10) Assessing Settling Defendant's compliance with the Consent Decree;

(11) Determining whether the Site or other real property is being used in a manner that is prohibited or restricted, or that may need to be prohibited or restricted, under the Consent Decree; and

(12) Implementing, monitoring, maintaining, reporting on, and enforcing any Institutional Controls.

b. commencing on the date of lodging of the Consent Decree, Settling Defendant shall not use the Site, or such other real property, in any manner that EPA determines will pose an unacceptable risk to human health or to the environment due to exposure to Waste Material at or from the Site or interfere with or adversely affect the implementation, integrity, or protectiveness of the Remedial Action. The restrictions shall include, but not be limited to those listed in the ICIAP developed pursuant to the OU 4 RD/OU 8 FFS Order, and

c. Settling Defendant shall:

(1) execute and record in the appropriate land records office Proprietary Controls that: (i) grant a right of access to conduct any activity regarding the Consent Decree including, but not limited to, those activities listed in Paragraph 25.a; and (ii) grant the right to enforce the land/water use restrictions set forth in the ICIAP in Paragraph 25.b, including, but not limited to, the specific restrictions listed therein and any land/water use restrictions, as further specified in this Paragraph 25.c. The Proprietary Controls shall be granted to one or more of the following persons, as determined by EPA: (i) the United States, on behalf of EPA, and its representatives; (ii) the State and its representatives; and/or (iii) other appropriate grantees.

(2) in accordance with the schedule set forth in the ICIAP, submit to EPA for review and approval regarding such real property: (i) draft Proprietary Controls that are enforceable under state law; and (ii) a current title insurance commitment, or other evidence of title acceptable to EPA, that shows title to the land affected by the Proprietary Controls to be free and clear of all prior liens and encumbrances (except when EPA waives the release or subordination of such prior liens or encumbrances or when, despite best efforts, Settling Defendant is unable to obtain release or subordination of such prior liens or encumbrances).

(3) in accordance with the schedule set forth in the ICIAP, after EPA's approval and acceptance of the Proprietary Controls and the title evidence, update the title search and, if it is determined that nothing has occurred since the effective date of the commitment, or other title evidence, to affect the title adversely, record the Propriety Controls with the appropriate land records office. Within 30 days after recording the Proprietary Controls, Settling Defendant shall provide EPA with a final title insurance policy, or other final evidence of title acceptable to EPA, and a certified copy of the original recorded Proprietary Controls showing the clerk's recording stamps. If the Proprietary Controls are to be conveyed to the United States, the Proprietary Controls and title evidence (including final title evidence) shall be prepared in accordance with the U.S. Department of Justice Title Standards 2001, and approval of the sufficiency of title shall be obtained as required by 40 U.S.C. § 3111.

26. If the Site, or any other real property where access and/or land/water use restrictions are needed to implement the Work, is owned or controlled by persons other than Settling Defendant:

a. Settling Defendant shall, if requested by EPA, use best efforts to secure from such persons:

(1) an agreement to provide access thereto for the United States, and its representatives, contractors, and subcontractors, to conduct any activity regarding the Consent Decree including, but not limited to, the activities listed in Paragraph 25.a;

(2) an agreement, enforceable by Settling Defendant and the United States, to refrain from using the Site, or such other real property, in any manner that EPA determines will pose an unacceptable risk to human health or to the environment due to exposure to Waste Material at or from the Site or interfere with or adversely affect the implementation, integrity, or protectiveness of the Remedial Action. The agreement shall include, but not be limited to, the land/water use restrictions listed in Paragraph 25.b; and

(3) the execution and recordation in the appropriate land records office of Proprietary Controls, that (i) grant a right of access to conduct any activity regarding the Consent Decree including, but not limited to, those activities listed in Paragraph 25.a, and (ii) grant the right to enforce the land/water use restrictions set forth

in Paragraph 25.b, including, but not limited to, the specific restrictions listed therein and any land/water use restrictions listed in the ICIAP. The Proprietary Controls shall be granted to one or more of the following persons, as determined by EPA: (i) the United States, on behalf of EPA, and its representatives, (ii) the State and its representatives, and/or (iii) other appropriate grantees. The Proprietary Controls, other than those granted to the United States, shall include a designation that EPA (and/or the State as appropriate) is a third party beneficiary, allowing EPA (and/or the State as appropriate) to maintain the right to enforce the Proprietary Controls without acquiring an interest in real property. If any Proprietary Controls are granted to Settling Defendant pursuant to this Paragraph 26.a(3), then Settling Defendant shall monitor, maintain, report on, and enforce such Proprietary Controls.

b. The notice requirements in this subparagraph pertain to any real property that meets the following criteria: the real property is owned or controlled by persons other than the Settling Defendant; access and/or land/water use restrictions are needed to implement the Remedial Action and/or ICIAP; and Settling Defendant has become aware that such access and/or land/water use restrictions might not be granted by such other persons. For real property that meets each of these criteria, Settling Defendant shall promptly notify EPA of the following information: i) contact information for such persons; ii) explanation of how access and/or land/water use restrictions may be impacted; and, iii) any other relevant information requested by EPA.

c. In accordance with the schedule set forth in the ICIAP, Settling Defendant shall submit to EPA for review and approval regarding such property: draft Proprietary Controls that are enforceable under state law.

d. In accordance with the schedule set forth in the ICIAP, Settling Defendant shall record the Proprietary Controls with the appropriate land records office. If the Settling Defendant is not the owner of the property and the owner of the property must be the party making the recording, Settling Defendant shall use best efforts as defined in Paragraph 27 to ensure that the owner of the property records Proprietary Controls. Within 30 days after the recording of the Proprietary Controls, Settling Defendant shall provide EPA a certified copy of the original recorded Proprietary Controls showing the clerk's recording stamps. If the Proprietary Controls are to be conveyed to the United States, the Proprietary Controls and title evidence (including final title evidence) shall be prepared in accordance with the U.S. Department of Justice Title Standards 2001, and approval of the sufficiency of title shall be obtained as required by 40 U.S.C. § 3111.

27. For purposes of Paragraphs 25.c(2) and 26.a, "best efforts" includes the payment of reasonable sums of money to obtain access, an agreement to restrict land/water use, Proprietary Controls, and/or an agreement to release or subordinate a prior lien or encumbrance. If, pursuant to the schedule set forth in the ICIAP, Settling Defendant has not obtained agreements to provide access, restrict land/water use, or record Proprietary Controls, as required by Paragraph 26.a(1), 26.a(2), or 26.a(3), Settling Defendant shall promptly notify the United States in writing, and shall include in that notification a summary of the steps that Settling

Defendant has taken to attempt to comply with Paragraph 25 or 26. The United States may, as it deems appropriate, assist Settling Defendant in obtaining access, agreements to restrict land/water use, Proprietary Controls, or the release or subordination of a prior lien or encumbrance. Settling Defendant shall reimburse the United States under Section XVI (Payments for Response Costs) for all costs incurred, direct or indirect, by the United States in obtaining such access, agreements to restrict land/water use, Proprietary Controls, and/or the release/subordination of prior liens or encumbrances including, but not limited to, the cost of attorney time and the amount of monetary consideration paid or just compensation.

28. If EPA determines that Institutional Controls in the form of state or local laws, regulations, ordinances, zoning restrictions, or other governmental controls are needed at or in connection with the Site, Settling Defendant shall cooperate with EPA's efforts to secure and ensure compliance with such governmental controls.

29. Notwithstanding any provision of the Consent Decree, the United States retains all of its access authorities and rights, as well as all of its rights to require Institutional Controls, including enforcement authorities related thereto, under CERCLA, RCRA, and any other applicable statute or regulations.

X. REPORTING REQUIREMENTS

30. In addition to any other requirement of this Consent Decree, Settling Defendant shall submit to EPA one electronic copy (and, if requested by EPA, one hard copy) of written monthly, or at a longer frequency as EPA may approve, progress reports that: satisfy the requirements set forth in the accompanying SOW. Settling Defendant shall submit these progress reports to EPA by the fifteenth day of every month following the lodging of this Consent Decree until EPA notifies Settling Defendant pursuant to Paragraph 50.b of Section XIV (Certification of Completion). If requested by EPA, Settling Defendant shall also provide briefings for EPA to discuss the progress of the Work. Settling Defendant may request that the monthly progress reports under this Consent Decree be combined with those required under the OU 4 RD/OU 8 FFS Order.

31. Settling Defendant shall notify EPA of any change in the schedule described in the monthly progress report for the performance of any activity, including, but not limited to, data collection and implementation of work plans, no later than five days prior to the performance of the activity; however, if Settling Defendant does not know of the circumstances necessitating a change five days prior to the scheduled activity, then it shall provide EPA notice of the change promptly upon becoming aware of such circumstances.

32. If any event occurs regarding the Work that Settling Defendant is required to report under Section 103 of CERCLA, 42 U.S.C. § 9603, or Section 304 of the Emergency Planning and Community Right-to-know Act (EPCRA), 42 U.S.C. § 11004, Settling Defendant shall within 24 hours of the onset of such event orally notify the EPA Project Coordinator or the Alternate EPA Project Coordinator (in the event of the unavailability of the EPA Project Coordinator), or, in the event that neither the EPA Project Coordinator nor Alternate EPA Project

Coordinator is available, the Chief of the Mega Projects Section of the Emergency and Remedial Response Division of EPA Region 2 at 212-637-4310. These reporting requirements are in addition to the reporting required by CERCLA Section 103 or EPCRA Section 304.

33. Within 20 days after the onset of such an event identified in Paragraph 32, Settling Defendant shall furnish to EPA a written report, signed by Settling Defendant's Project Coordinator, setting forth the events that occurred and the measures taken, and to be taken, in response thereto. Within 30 days after the conclusion of such an event, Settling Defendant shall submit a report setting forth all actions taken in response thereto.

34. Settling Defendant shall submit two copies (one hard copy and one electronic copy) of all final plans, reports, data, and other deliverables required by the SOW, the Remedial Action Work Plan, or any other approved plans to EPA in accordance with the schedules set forth in such plans. Draft versions of such documents may be submitted electronically without hard copies, unless hard copies are requested by EPA. Settling Defendant shall submit copies of all such plans, reports, data, and other deliverables to the State, if requested by the State. Upon request by EPA, Settling Defendant shall submit in electronic form all or any portion of any deliverables Settling Defendant is required to submit pursuant to the provisions of this Consent Decree.

35. All deliverables submitted by Settling Defendant to EPA that purport to document Settling Defendant's compliance with the terms of this Consent Decree shall be signed by an authorized representative of Settling Defendant.

XI. EPA APPROVAL OF PLANS, REPORTS, AND OTHER DELIVERABLES

36. Initial Submissions.

a. After review of any plan, report, or other deliverable that is required to be submitted for approval pursuant to this Consent Decree, EPA shall: (1) approve, in whole or in part, the submission; (2) approve the submission upon specified conditions; (3) disapprove, in whole or in part, the submission; or (4) any combination of the foregoing.

b. EPA also may modify the initial submission to cure deficiencies in the submission if: (1) EPA determines that disapproving the submission and awaiting a resubmission would cause substantial disruption to the Work; or (2) previous submission(s) have been disapproved due to material defects and the deficiencies in the initial submission under consideration indicate a bad faith lack of effort to submit an acceptable plan, report, or deliverable.

37. Resubmissions. Upon receipt of a notice of disapproval under Paragraph 36.a(3) or (4), or if required by a notice of approval upon specified conditions under Paragraph 36.a(2), Settling Defendant shall, within 14 days or such longer time as specified by EPA in such notice, correct the deficiencies and resubmit the plan, report, or other deliverable for approval. After review of the resubmitted plan, report, or other deliverable, EPA may: (a) approve, in whole or in

part, the resubmission; (b) approve the resubmission upon specified conditions; (c) modify the resubmission; (d) disapprove, in whole or in part, the resubmission, requiring Settling Defendant to correct the deficiencies; or (e) any combination of the foregoing.

38. Material Defects. If an initially submitted or resubmitted plan, report, or other deliverable contains a material defect, and the plan, report, or other deliverable is disapproved or modified by EPA under Paragraph 36.b(2) or 37 due to such material defect, then the material defect shall constitute a lack of compliance for purposes of Paragraph 71. The provisions of Section XIX (Dispute Resolution) and Section XX (Stipulated Penalties) shall govern the accrual and payment of any stipulated penalties regarding Settling Defendant's submissions under this Section.

39. Implementation. Upon approval, approval upon conditions, or modification by EPA under Paragraph 36 (Initial Submissions) or Paragraph 37 (Resubmissions), of any plan, report, or other deliverable, or any portion thereof: (a) such plan, report, or other deliverable, or portion thereof, shall be incorporated into and enforceable under this Consent Decree; and (b) Settling Defendant shall take any action required by such plan, report, or other deliverable, or portion thereof, subject only to its right to invoke the Dispute Resolution procedures set forth in Section XIX (Dispute Resolution) with respect to the modifications or conditions made by EPA. The implementation of any non-deficient portion of a plan, report, or other deliverable submitted or resubmitted under Paragraph 36 or 37 shall not relieve Settling Defendant of any liability for stipulated penalties under Section XX (Stipulated Penalties).

XII. PROJECT COORDINATORS

40. Within 20 days after lodging this Consent Decree, Settling Defendant and EPA will notify each other, in writing, of the name, address, telephone number, and email address of their respective designated Project Coordinators and Alternate Project Coordinators. If a Project Coordinator or Alternate Project Coordinator initially designated is changed, the identity of the successor will be given to the other Party at least five working days before the change occurs, unless impracticable, but in no event later than the actual day the change is made. Settling Defendant's Project Coordinator and Alternate Project Coordinator shall be subject to disapproval by EPA and shall have the technical expertise sufficient to adequately oversee all aspects of the Work. Settling Defendant's Project Coordinator and Alternate Project Coordinator shall not be an attorney for Settling Defendant in this matter. He or she may assign other representatives, including other contractors, to serve as a Site representative for oversight of performance of daily operations during remedial activities.

41. Plaintiff may designate other representatives, including, but not limited to, EPA employees and federal contractors and consultants, to observe and monitor the progress of any activity undertaken pursuant to this Consent Decree. EPA's Project Coordinator and Alternate Project Coordinator shall have the authority lawfully vested in a Remedial Project Manager ("RPM") and an On-Scene Coordinator ("OSC") by the NCP, 40 C.F.R. Part 300. EPA's Project Coordinator or Alternate Project Coordinator shall have authority as provided in the NCP, to halt any Work required by this Consent Decree and to take any necessary response action when he or

she determines that conditions at the Site constitute an emergency situation or may present an immediate threat to public health or welfare or the environment due to release or threatened release of Waste Material.

42. EPA's Project Coordinator and Settling Defendant's Project Coordinator will meet as necessary to implement the work or as provided in the SOW unless otherwise determined by EPA.

XIII. PERFORMANCE GUARANTEE

43. In order to ensure the full and final completion of the Work, Settling Defendant shall establish and maintain a performance guarantee, initially in the amount of $193.5 million, for the benefit of EPA (hereinafter "Estimated Cost of the Work"). The performance guarantee, which must be satisfactory in form and substance to EPA, shall be in the form of one or more of the following mechanisms (provided that, if Settling Defendant intends to use multiple mechanisms, such multiple mechanisms shall be limited to surety bonds guaranteeing payment, letters of credit, trust funds, and insurance policies):

a. A surety bond unconditionally guaranteeing payment and/or performance of the Work that is issued by a surety company among those listed as acceptable sureties on federal bonds as set forth in Circular 570 of the U.S. Department of the Treasury;

b. One or more irrevocable letters of credit, payable to or at the direction of EPA, that is issued by one or more financial institution(s) (1) that has the authority to issue letters of credit and (2) whose letter-of-credit operations are regulated and examined by a federal or state agency;

c. A trust fund established for the benefit of EPA that is administered by a trustee (1) that has the authority to act as a trustee and (2) whose trust operations are regulated and examined by a federal or state agency;

d. A policy of insurance that (1) provides EPA with acceptable rights as a beneficiary thereof; and (2) is issued by an insurance carrier (i) that has the authority to issue insurance policies in the applicable jurisdiction(s) and (ii) whose insurance operations are regulated and examined by a federal or state agency;

e. A demonstration by Settling Defendant that it meets the financial test criteria of 40 C.F.R. § 264.143(f) with respect to the Estimated Cost of the Work (plus the amount(s) of any other federal or any state environmental obligations financially assured through the use of a financial test or guarantee), provided that all other requirements of 40 C.F.R. § 264.143(f) are met to EPA's satisfaction; or

f. A written guarantee to fund or perform the Work executed in favor of EPA by one or more of the following: (1) a direct or indirect parent company of Settling Defendant, or (2) a company that has a "substantial business relationship" (as defined in 40 C.F.R. § 264.141(h)) with Settling Defendant; provided, however, that any company providing such a

guarantee must demonstrate to the satisfaction of EPA that it satisfies the financial test and reporting requirements for owners and operators set forth in subparagraphs (1) through (8) of 40 C.F.R. § 264.143(f) with respect to the Estimated Cost of the Work (plus the amount(s) of any other federal or any state environmental obligations financially assured through the use of a financial test or guarantee) that it proposes to guarantee hereunder.

44. Settling Defendant has selected, and EPA has found satisfactory, as an initial performance guarantee letter of credit pursuant to Paragraph 43.b, in the form attached hereto as Appendix D. Within ten days after the Effective Date, Settling Defendant shall execute or otherwise finalize all instruments or other documents required in order to make the selected performance guarantee(s) legally binding in a form substantially identical to the documents attached hereto as Appendix D, and such performance guarantee(s) shall thereupon be fully effective. Within 30 days after the Effective Date, Settling Defendant shall submit copies of all executed and/or otherwise finalized instruments or other documents required in order to make the selected performance guarantee(s) legally binding to the United States and EPA as specified in Section XXVI.

45. If, at any time after the Effective Date and before issuance of the Certification of Completion of the Work pursuant to Paragraph 50, Settling Defendant provides a performance guarantee for completion of the Work by means of a demonstration or guarantee pursuant to Paragraph 43.e or 43.f, Settling Defendant shall also comply with the other relevant requirements of 40 C.F.R. § 264.143(f) relating to these mechanisms unless otherwise provided in this Consent Decree, including but not limited to: (a) the initial submission of required financial reports and statements from the relevant entity's chief financial officer ("CFO") and independent certified public accountant ("CPA"), in the form prescribed by EPA in its financial test sample CFO letters and CPA reports available at: http://www.epa.gov/compliance/resources/policies/cleanup/superfund/fa-test-samples.pdf; (b) the annual resubmission of such reports and statements within 90 days after the close of the entity's fiscal year; and (c) the prompt notification of EPA after the entity determines that it no longer satisfies the financial test requirements set forth at 40 C.F.R. § 264.143(f)(1) and in any event within 90 days after the close of any fiscal year in which the entity no longer satisfies such financial test requirements. For purposes of the performance guarantee mechanisms specified in this Section XIII, references in 40 C.F.R. Part 264, Subpart H, to "closure," "post-closure," and "plugging and abandonment" shall be deemed to include the Work; the terms "current closure cost estimate," "current post-closure cost estimate," and "current plugging and abandonment cost estimate" shall be deemed to include the Estimated Cost of the Work; the terms "owner" and "operator" shall be deemed to refer to the Settling Defendant in making a demonstration under Paragraph 43.e; and the terms "facility" and "hazardous waste facility" shall be deemed to include the Site.

46. In the event that EPA determines at any time that a performance guarantee provided by Settling Defendant pursuant to this Section is inadequate or otherwise no longer satisfies the requirements set forth in this Section, whether due to an increase in the estimated cost of completing the Work or for any other reason, or in the event that Settling Defendant becomes aware of information indicating that a performance guarantee provided pursuant to this Section is inadequate or otherwise no longer satisfies the requirements set forth in this Section,

whether due to an increase in the estimated cost of completing the Work or for any other reason, Settling Defendant, within 30 days after receipt of notice of EPA's determination or, as the case may be, within 30 days after Settling Defendant becomes aware of such information, shall obtain and present to EPA for approval a proposal for a revised or alternative form of performance guarantee listed in Paragraph 43 that satisfies all requirements set forth in this Section XIII; provided, however, that if Settling Defendant cannot obtain such revised or alternative form of performance guarantee within such 30-day period, and provided further that Settling Defendant shall have commenced to obtain such revised or alternative form of performance guarantee within such 30-day period, and thereafter diligently proceeds to obtain the same, EPA shall extend such period for such time as is reasonably necessary for Settling Defendant in the exercise of due diligence to obtain such revised or alternative form of performance guarantee, such additional period not to exceed 60 days. On day 30, Settling Defendant shall provide to EPA a status report on its efforts to obtain the revised or alternative form of guarantee. In seeking approval for a revised or alternative form of performance guarantee, Settling Defendant shall follow the procedures set forth in Paragraph 48.b(2). Settling Defendant's inability to post a performance guarantee for completion of the Work shall in no way excuse performance of any other requirements of this Consent Decree, including, without limitation, the obligation of Settling Defendant to complete the Work in strict accordance with the terms of this Consent Decree.

47. Funding for Work Takeover. The commencement of any Work Takeover pursuant to Paragraph 88 shall trigger EPA's right to receive the benefit of any performance guarantee(s) provided pursuant to Paragraphs 43.a, 43.b, 43.c, 43.d, or 43.f, and at such time EPA shall have immediate access to resources guaranteed under any such performance guarantee(s), whether in cash or in kind, as needed to continue and complete the Work assumed by EPA under the Work Takeover. Upon the commencement of any Work Takeover, if (a) for any reason EPA is unable to promptly secure the resources guaranteed under any such performance guarantee(s), whether in cash or in kind, necessary to continue and complete the Work assumed by EPA under the Work Takeover, or (b) in the event that the performance guarantee involves a demonstration of satisfaction of the financial test criteria pursuant to Paragraph 43.e or Paragraph 43.f(2), Settling Defendant (or in the case of Paragraph 43.f(2), the guarantor) shall immediately upon written demand from EPA deposit into a special account within the EPA Hazardous Substance Superfund or such other account as EPA may specify, in immediately available funds and without setoff, counterclaim, or condition of any kind, a cash amount up to but not exceeding the estimated cost of completing the Work as of such date, as determined by EPA. In addition, if at any time EPA is notified by the issuer of a performance guarantee that such issuer intends to cancel the performance guarantee mechanism it has issued, then, unless Settling Defendant provides a substitute performance guarantee mechanism in accordance with this Section XIII no later than 30 days prior to the impending cancellation date, EPA shall be entitled (as of and after the date that is 30 days prior to the impending cancellation) to draw fully on the funds guaranteed under the then-existing performance guarantee. All EPA Work Takeover costs not reimbursed under this Paragraph shall be reimbursed under Section XVI (Payments for Response Costs).

48. Modification of Amount and/or Form of Performance Guarantee.

a. Reduction of Amount of Performance Guarantee. If Settling Defendant believes that the estimated cost of completing the Work has diminished below the amount set forth in Paragraph 43, Settling Defendant may, on any anniversary of the Effective Date, or at any other time agreed to by the Parties, petition EPA in writing to request a reduction in the amount of the performance guarantee provided pursuant to this Section so that the amount of the performance guarantee is equal to the estimated cost of completing the Work. Settling Defendant shall submit a written proposal for such reduction to EPA that shall specify, at a minimum, the estimated cost of completing the Work and the basis upon which such cost was calculated. In seeking approval for a reduction in the amount of the performance guarantee, Settling Defendant shall follow the procedures set forth in Paragraph 48.b(2) for requesting a revised or alternative form of performance guarantee, except as specifically provided in this Paragraph 48. If EPA decides to accept Settling Defendant's proposal for a reduction in the amount of the performance guarantee, either to the amount set forth in Settling Defendant's written proposal or to some other amount as selected by EPA, EPA will notify Settling Defendant of such decision in writing. Upon EPA's acceptance of a reduction in the amount of the performance guarantee, the Estimated Cost of the Work shall be deemed to be the estimated cost of completing the Work set forth in EPA's written decision. After receiving EPA's written decision, Settling Defendant may reduce the amount of the performance guarantee in accordance with and to the extent permitted by such written acceptance and shall submit copies of all executed and/or otherwise finalized instruments or other documents required in order to make the selected performance guarantee(s) legally binding in accordance with Paragraph 48.b(2). In the event of a dispute, Settling Defendant may reduce the amount of the performance guarantee required hereunder only in accordance with a final administrative or judicial decision resolving such dispute pursuant to Section XIX (Dispute Resolution). No change to the form or terms of any performance guarantee provided under this Section, other than a reduction in amount, is authorized except as provided in Paragraphs 46 or 48.b.

b. Change of Form of Performance Guarantee.

(1) If, after the Effective Date, Settling Defendant desires to change the form or terms of any performance guarantee(s) provided pursuant to this Section, Settling Defendant may, on any anniversary of the Effective Date, or at any other time agreed to by the Parties, petition EPA in writing to request a change in the form or terms of the performance guarantee provided hereunder. The submission of such proposed revised or alternative performance guarantee shall be as provided in Paragraph 48.b(2). Any decision made by EPA on a petition submitted under this Paragraph shall be made in EPA's sole and unreviewable discretion, and such decision shall not be subject to challenge by Settling Defendant pursuant to the dispute resolution provisions of this Consent Decree or in any other forum.

(2) Settling Defendant shall submit a written proposal for a revised or alternative performance guarantee to EPA that shall specify, at a minimum, the estimated cost of completing the Work, the basis upon which such cost was calculated,

and the proposed revised performance guarantee, including all proposed instruments or other documents required in order to make the proposed performance guarantee legally binding. The proposed revised or alternative performance guarantee must satisfy all requirements set forth or incorporated by reference in this Section. Settling Defendant shall submit such proposed revised or alternative performance guarantee in accordance with Section XXVI (Notices and Submissions). EPA will notify Settling Defendant in writing of its decision to accept or reject a revised or alternative performance guarantee submitted pursuant to this Paragraph. Within ten days after receiving a written decision approving the proposed revised or alternative performance guarantee, Settling Defendant shall execute and/or otherwise finalize all instruments or other documents required in order to make the selected performance guarantee(s) legally binding in a form substantially identical to the documents submitted to EPA as part of the proposal, and such performance guarantee(s) shall thereupon be fully effective. Settling Defendant shall submit copies of all executed and/or otherwise finalized instruments or other documents required in order to make the selected performance guarantee(s) legally binding within 30 days after receiving a written decision approving the proposed revised or alternative performance guarantee to the United States and EPA as specified in Section XXVI.

c. Release of Performance Guarantee. Settling Defendant shall not release, cancel, or discontinue any performance guarantee provided pursuant to this Section except as provided in this Paragraph. If Settling Defendant receives written notice from EPA in accordance with Paragraph 50 that the Work has been fully and finally completed in accordance with the terms of this Consent Decree, or if EPA otherwise so notifies Settling Defendant in writing, Settling Defendant may thereafter release, cancel, or discontinue the performance guarantee(s) provided pursuant to this Section. In the event of a dispute, Settling Defendant may release, cancel, or discontinue the performance guarantee(s) required hereunder only in accordance with a final administrative or judicial decision resolving such dispute pursuant to Section XIX (Dispute Resolution).

XIV. CERTIFICATION OF COMPLETION

49. Completion of the Remedial Action.

a. Within 90 days after Settling Defendant concludes that the Remedial Action has been fully performed and the Performance Standards have been achieved, Settling Defendant shall schedule and conduct a pre-certification inspection to be attended by EPA. If, after the pre-certification inspection, Settling Defendant still believes that the Remedial Action has been fully performed and the Performance Standards have been achieved, it shall submit a written report requesting certification to EPA for approval, with a copy to the State, pursuant to Section XI (EPA Approval of Plans, Reports, and Other Deliverables) within 30 days after the inspection. In the report, a registered professional engineer and Settling Defendant's Project Coordinator shall state that the Remedial Action has been completed in full satisfaction of the requirements of this Consent Decree. The written report shall include as-built drawings signed and stamped by a professional engineer. The report shall contain the following statement,

signed by a responsible corporate official of the Settling Defendant or Settling Defendant's Project Coordinator:

> I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If, after completion of the pre-certification inspection and receipt and review of the written report, EPA, after reasonable opportunity for review and comment by the State, determines that the Remedial Action or any portion thereof has not been completed in accordance with this Consent Decree or that the Performance Standards have not been achieved, EPA will notify Settling Defendant in writing of the activities that must be undertaken by Settling Defendant pursuant to this Consent Decree to complete the Remedial Action and achieve the Performance Standards, provided, however, that EPA may only require Settling Defendant to perform such activities pursuant to this Paragraph to the extent that such activities are consistent with the Scope of the Remedial Action (as that term is defined in Section IV). EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the SOW or require Settling Defendant to submit a schedule to EPA for approval pursuant to Section XI (EPA Approval of Plans, Reports and Other Deliverables). Settling Defendant shall perform all activities described in the notice in accordance with the specifications and schedules established pursuant to this Paragraph, subject to its right to invoke the dispute resolution procedures set forth in Section XIX (Dispute Resolution).

b. If EPA concludes, based on the initial or any subsequent report requesting Certification of Completion of the Remedial Action and after a reasonable opportunity for review and comment by the State, that the Remedial Action has been performed in accordance with this Consent Decree and that the Performance Standards have been achieved, EPA will so certify in writing to Settling Defendant. This certification shall constitute the Certification of Completion of the Remedial Action for purposes of this Consent Decree, including, but not limited to, Section XXI (Covenants by the United States). Certification of Completion of the Remedial Action shall not affect Settling Defendant's remaining obligations under this Consent Decree.

50. Completion of the Work.

a. Within 90 days after Settling Defendant concludes that all phases of the Work, other than any remaining activities required under Section VII (Remedy Review), have been fully performed, Settling Defendant shall schedule and conduct a pre-certification inspection to be attended by EPA. If, after the pre-certification inspection, Settling Defendant still believes that the Work has been fully performed, Settling Defendant shall submit a written

report by a registered professional engineer stating that the Work has been completed in full satisfaction of the requirements of this Consent Decree. The report shall contain the statement set forth in Paragraph 49.a, signed by a responsible corporate official of the Settling Defendant or Settling Defendant's Project Coordinator. If, after review of the written report, EPA, after reasonable opportunity for review and comment by the State, determines that any portion of the Work has not been completed in accordance with this Consent Decree, EPA will notify Settling Defendant in writing of the activities that must be undertaken by Settling Defendant pursuant to this Consent Decree to complete the Work, provided, however, that EPA may only require Settling Defendant to perform such activities pursuant to this Paragraph to the extent that such activities are consistent with the Scope of the Remedial Action, as that term is defined in Section IV. EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the SOW or require Settling Defendant to submit a schedule to EPA for approval pursuant to Section XI (EPA Approval of Plans, Reports, and Other Deliverables). Settling Defendant shall perform all activities described in the notice in accordance with the specifications and schedules established therein, subject to its right to invoke the dispute resolution procedures set forth in Section XIX (Dispute Resolution).

b. If EPA concludes, based on the initial or any subsequent request for Certification of Completion of the Work by Settling Defendant and after a reasonable opportunity for review and comment by the State, that the Work has been performed in accordance with this Consent Decree, EPA will so notify Settling Defendant in writing.

XV. EMERGENCY RESPONSE

51. If any action or occurrence during the performance of the Work that causes or threatens a release of Waste Material from the Site that constitutes an emergency situation or may present an immediate threat to public health or welfare or the environment, Settling Defendant shall, subject to Paragraph 52, immediately take all appropriate action to prevent, abate, or minimize such release or threat of release, and shall immediately notify the EPA's Project Coordinator, or, if the Project Coordinator is unavailable, EPA's Alternate Project Coordinator. If neither of these persons is available, Settling Defendant shall notify the Chief of the Mega Projects Section of the Emergency and Remedial Response Division of EPA, Region 2 at 212-637-4310. Settling Defendant shall take such actions in consultation with EPA's Project Coordinator or other available authorized EPA officer and in accordance with all applicable provisions of the Health and Safety Plans, the Contingency Plans, and any other applicable plans or documents developed pursuant to the SOW. In the event that Settling Defendant fails to take appropriate response action as required by this Section, and EPA takes such action instead, Settling Defendant shall reimburse EPA all costs of the response action not inconsistent with the NCP under Section XVI (Payments for Response Costs).

52. Subject to Section XXI (Covenants by Plaintiff), nothing in the preceding Paragraph or in this Consent Decree shall be deemed to limit any authority of the United States to (a) take all appropriate action to protect human health and the environment or to prevent, abate, respond to, or minimize an actual or threatened release of Waste Material on, at, or from the Site, or (b) direct or order such action, or seek an order from the Court, to protect human health and

the environment or to prevent, abate, respond to, or minimize an actual or threatened release of Waste Material on, at, or from the Site.

XVI. PAYMENTS FOR RESPONSE COSTS

53. Payment by Settling Defendant for Past Response Costs.

a. Within 30 days after the Effective Date, Settling Defendant shall pay to EPA $1,000,000.00, in payment for Past Response Costs. Payment shall be made in accordance with Paragraph 55.a (Instructions for Past Response Cost Payments).

b. The total amount to be paid by Setting Defendant pursuant to Paragraph 53.a shall be deposited by EPA in the American Cyanamid Superfund Site Special Account to be retained and used to conduct or finance response actions at or in connection with the Site, or to be transferred by EPA to the EPA Hazardous Substance Superfund.

54. Payments by Settling Defendant for Future Response Costs. Settling Defendant shall pay to EPA all Future Response Costs not inconsistent with the NCP.

a. On a periodic basis, EPA will send Settling Defendant a bill requiring payment that includes a Superfund Cost Recovery Package Imaging and On-line system ("SCORPIOS") Report, which includes direct and indirect costs incurred by EPA, its contractors, DOJ and a DOJ case cost summary. Settling Defendant shall make all payments within 30 days after Settling Defendant's receipt of each bill requiring payment, except as otherwise provided in Paragraph 56, in accordance with Paragraphs 56.b (Instructions for Payment to the United States of Future Response Costs and Stipulated Penalties). EPA may extend the time for payment in its unreviewable discretion. If an extension for the payment of response costs is granted by EPA, interest pursuant to Paragraph 57 and stipulated penalties pursuant to Paragraph 72 shall be waived so long as payment is made within the extended time period. If payment is not made by the end of the extended time period, interest shall accrue from the date of the bill pursuant to Paragraph 57, and stipulated penalties shall accrue from the first day of noncompliance pursuant to Paragraph 72.

b. The total amount to be paid by Setting Defendant pursuant to Paragraph.54.a shall be deposited by EPA in the American Cyanamid Superfund Site Special Account to be retained and used to conduct or finance response actions at or in connection with the Site, or to be transferred by EPA to the EPA Hazardous Substance Superfund.

55. Payment Instructions for Settling Defendant.

a. Instructions for Past Response Costs Payments. All Past Response Costs Payments to the United States shall be made at https://www.pay.gov to the U.S. Department of Justice account, in accordance with instructions provided to Settling Defendant by the Financial Litigation Unit ("FLU") of the United States Attorney's Office for the District of New Jersey after the Effective Date. The payment instructions provided by the Financial Litigation Unit shall include a Consolidated Debt Collection System ("CDCS") number, which shall be used to

identify all payments required to be made in accordance with this Consent Decree. The FLU shall provide the payment instructions to:

Wyeth Holdings, LLC
100 Route 206 North
Peapack, NJ
ATTN: Russell Downey, m.s. 4-LLA-401
russell.g.downey@pfizer.com

on behalf of Settling Defendant. Settling Defendant may change the individual to receive payment instructions on its behalf by providing written notice of such change in accordance with Section XXVI (Notices and Submissions). When making payments under this Paragraph 55.a, Settling Defendant shall also comply with Paragraph 55.c.

b. Instructions for Payment of Future Response Costs and Stipulated Penalties. All payments required, elsewhere in this Consent Decree, to be made in accordance with this Paragraph b shall be made by Fedwire EFT to:

Federal Reserve Bank of New York
ABA = 021030004
Account = 68010727
SWIFT address = FRNYUS33
33 Liberty Street
New York NY 10045
Field Tag 4200 of the Fedwire message should read "D 68010727 Environmental Protection Agency"

When making payments under this Paragraph 55.b, Settling Defendant shall also comply with Paragraph 55.c.

c. Instructions for All Payments. All payments made under Paragraphs 55.a (Instructions for Past Response Cost Payments to the United States) or 55.b (Instructions for Payment to the United States of Future Response Costs and Stipulated Penalties) shall reference the CDCS Number, Site/Spill ID Number 022H, and DOJ Case Number 90-11-3-07250/1. At the time of any payment required to be made in accordance with Paragraphs 55.a or 55.b, Settling Defendant shall send notice that payment has been made to the United States and to EPA (for payments related to Past Response Costs, Future Response Costs, and Stipulated Penalties), in accordance with Section XXVI (Notices and Submissions), and to the EPA Cincinnati Finance Office by email at cinwd_acctsreceivable@epa.gov and to kellum.elizabeth@epa.gov and provide reference to the CDCS Number, Site/Spill ID Number, and DOJ Case Number.

56. Settling Defendant may contest any Future Response Costs billed under Paragraph 54 (Payments by Settling Defendant for Future Response Costs) if it determines that EPA has made a mathematical error or included a cost item that is not within the definition of Future Response Costs, or if it believes EPA incurred excess costs as a direct result of an EPA action that was inconsistent with a specific provision or provisions of the NCP. Such objection

shall be made in writing within 30 days after receipt of the bill and must be sent to the United States pursuant to Section XXVI (Notices and Submissions). Any such objection shall specifically identify the contested Future Response Costs and the basis for objection. In the event of an objection, Settling Defendant shall pay all uncontested Future Response Costs to the United States within 30 days after Settling Defendant's receipt of the bill requiring payment. Simultaneously, Settling Defendant shall establish, in a duly chartered bank or trust company, an interest-bearing escrow account that is insured by the Federal Deposit Insurance Corporation ("FDIC"), and remit to that escrow account funds equivalent to the amount of the contested Future Response Costs. Settling Defendant shall send to the United States, as provided in Section XXVI (Notices and Submissions), a copy of the transmittal letter and check paying the uncontested Future Response Costs, and a copy of the correspondence that establishes and funds the escrow account, including, but not limited to, information containing the identity of the bank and bank account under which the escrow account is established as well as a bank statement showing the initial balance of the escrow account. Simultaneously with establishment of the escrow account, Settling Defendant shall initiate the Dispute Resolution procedures in Section XIX (Dispute Resolution). If the United States prevails in the dispute, Settling Defendant shall pay the sums due (with accrued interest) to the United States within ten days after the resolution of the dispute. If Settling Defendant prevails concerning any aspect of the contested costs, Settling Defendant shall pay that portion of the costs (plus associated accrued interest) for which they did not prevail to the United States within five days after the resolution of the dispute. Settling Defendant shall be disbursed any balance of the escrow account. All payments to the United States under this Paragraph shall be made in accordance with Paragraph 55.b (Instructions for Future Response Cost Payments and Stipulated Penalties). The dispute resolution procedures set forth in this Paragraph in conjunction with the procedures set forth in Section XIX (Dispute Resolution) shall be the exclusive mechanisms for resolving disputes regarding Settling Defendant's obligations to reimburse the Future Response Costs.

57. Interest. In the event that any payment for Past Response Costs or Future Response Costs required under this Section is not made by the date required, Settling Defendant shall pay Interest on the unpaid balance. The Interest to be paid on Past Response Costs under this Paragraph shall begin to accrue on the Effective Date. The Interest on Future Response Costs shall begin to accrue on the date of the bill. The Interest shall accrue through the date of Settling Defendant's payment. Payments of Interest made under this Paragraph shall be in addition to such other remedies or sanctions available to Plaintiff by virtue of Settling Defendant's failure to make timely payments under this Section including, but not limited to, payment of stipulated penalties pursuant to Paragraph 72.

XVII. INDEMNIFICATION AND INSURANCE

58. Settling Defendant's Indemnification of the United States.

a. The United States does not assume any liability by entering into this Consent Decree or by virtue of any designation of Settling Defendant as EPA's authorized representative under Section 104(e) of CERCLA, 42 U.S.C. § 9604(e). Settling Defendant shall indemnify, save and hold harmless the United States and its officials, agents, employees,

contractors, subcontractors, and representatives for or from any and all claims or causes of action to the extent these arise from, or on account of, negligent or other wrongful acts or omissions of Settling Defendant, its officers, directors, employees, agents, contractors, subcontractors, and any persons acting on its behalf or under its control, in carrying out activities pursuant to this Consent Decree, including, but not limited to, any claims arising from any designation of Settling Defendant as EPA's authorized representatives under Section 104(e) of CERCLA. Further, Settling Defendant agrees to pay the United States all costs it incurs including, but not limited to, attorneys' fees and other expenses of litigation and settlement to the extent these arise from, or on account of, claims made against the United States based on negligent or other wrongful acts or omissions of Settling Defendant, its officers, directors, employees, agents, contractors, subcontractors, and any persons acting on its behalf or under its control, in carrying out activities pursuant to this Consent Decree. The United States shall not be held out as a party to any contract entered into by or on behalf of Settling Defendant in carrying out activities pursuant to this Consent Decree. Neither Settling Defendant nor any such contractor shall be considered an agent of the United States.

b. The United States shall give Settling Defendant notice of any claim for which the United States plans to seek indemnification pursuant to this Paragraph 58, and shall consult with Settling Defendant prior to settling such claim.

59. Settling Defendant covenants not to sue and agrees not to assert any claims or causes of action against the United States for damages or reimbursement or for set-off of any payments made or to be made to the United States to the extent these arise from or on account of any contract, agreement, or arrangement between Settling Defendant and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays. In addition, Settling Defendant shall indemnify and hold harmless the United States with respect to any and all claims for damages or reimbursement arising from or on account of any contract, agreement, or arrangement between Settling Defendant and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays.

60. No later than 15 days before commencing any on-site Work, Settling Defendant shall secure, and shall maintain until the first anniversary after issuance of EPA's Certification of Completion of the Remedial Action pursuant to Paragraph 49.b of Section XIV (Certification of Completion), commercial general liability insurance with limits of $5 million, for any one occurrence, and automobile liability insurance with limits of $5 million, combined single limit, naming the United States as additional insureds with respect to all liability arising out of the activities performed by or on behalf of Settling Defendant pursuant to this Consent Decree. In addition, for the duration of this Consent Decree, Settling Defendant shall satisfy, or shall ensure that its contractors or subcontractors satisfy, all applicable laws and regulations regarding the provision of worker's compensation insurance for all persons performing the Work on behalf of Settling Defendant in furtherance of this Consent Decree. Prior to commencement of the Work under this Consent Decree, Settling Defendant shall provide to EPA certificates of such insurance and, if requested, a copy of each insurance policy in accordance with Section XXVI (Notices and Submissions). Settling Defendant shall resubmit such certificates and, if requested,

copies of such insurance policies each year on the anniversary of the Effective Date. If Settling Defendant demonstrates by evidence satisfactory to EPA that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance covering the same risks but in a lesser amount, then, with respect to that contractor or subcontractor, Settling Defendant need provide only that portion of the insurance described above that is not maintained by the contractor or subcontractor.

XVIII. FORCE MAJEURE

61. "Force majeure," for purposes of this Consent Decree, is defined as any event arising from causes beyond the control of Settling Defendant, of any entity controlled by Settling Defendant, or of Settling Defendant's contractors that delays or prevents the performance of any obligation under this Consent Decree despite Settling Defendant's best efforts to fulfill the obligation. The requirement that Settling Defendant exercise "best efforts to fulfill the obligation" includes using best efforts to anticipate any potential force majeure and best efforts to address the effects of any potential force majeure (a) as it is occurring and (b) following the potential force majeure such that the delay and any adverse effects of the delay are minimized to the greatest extent possible. Force majeure does not include financial inability to complete the Work or a failure to achieve the Performance Standards.

62. If any event occurs or has occurred that may delay the performance of any obligation under this Consent Decree for which Settling Defendant intends or may intend to assert a claim of force majeure, Settling Defendant shall notify EPA's Project Coordinator orally or, in his or her absence, EPA's Alternate Project Coordinator or, in the event both of EPA's designated representatives are unavailable, the Chief of the Mega Projects Section of the Emergency and Remedial Response Division, EPA Region 2, within seventy-two (72) hours of when Settling Defendant first knew that the event would likely cause a delay. Within five (5) business days thereafter, Settling Defendant shall provide in writing to EPA an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; Settling Defendant's rationale for attributing such delay to a force majeure; and a statement as to whether, in the opinion of Settling Defendant, such event may cause or contribute to an endangerment to public health or welfare, or the environment. Settling Defendant shall include with any notice all available documentation supporting its claim that the delay was attributable to a force majeure. Settling Defendant shall be deemed to know of any circumstance of which Settling Defendant, any entity controlled by Settling Defendant, or Settling Defendant's contractors knew or should have known. Failure to comply with the above requirements regarding an event shall preclude Settling Defendant from asserting any claim of force majeure regarding that event during the period of time of such failure to comply, provided, however, that if EPA, despite the late notice, is able to assess to its satisfaction whether the event is a force majeure under Paragraph 61 and whether Settling Defendant has exercised its best efforts under Paragraph 61, EPA may, in its unreviewable discretion, excuse in writing Settling Defendant's failure to submit timely notices under this Paragraph.

63. If EPA agrees that the delay or anticipated delay is attributable to a force majeure, the time for performance of the obligations under this Consent Decree that are affected by the force majeure will be extended by EPA for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the force majeure shall not, of itself, extend the time for performance of any other obligation. If EPA does not agree that the delay or anticipated delay has been or will be caused by a force majeure, EPA will notify Settling Defendant in writing of its decision. If EPA agrees that the delay is attributable to a force majeure, EPA will notify Settling Defendant in writing of the length of the extension, if any, for performance of the obligations affected by the force majeure.

64. If Settling Defendant elects to invoke the dispute resolution procedures set forth in Section XIX (Dispute Resolution), it shall do so no later than 15 days after receipt of EPA's notice. In any such proceeding, Settling Defendant shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a force majeure, that the duration of the delay or the extension sought was or will be warranted under the circumstances, that best efforts were exercised to avoid and mitigate the effects of the delay, and that Settling Defendant complied with the requirements of Paragraphs 61 and 62. If Settling Defendant carries this burden, the delay at issue shall be deemed not to be a violation by Settling Defendant of the affected obligation of this Consent Decree identified to EPA and the Court.

XIX. DISPUTE RESOLUTION

65. Unless otherwise expressly provided for in this Consent Decree, the dispute resolution procedures of this Section shall be the exclusive mechanism to resolve disputes regarding this Consent Decree. However, the procedures set forth in this Section shall not apply to actions by the United States to enforce obligations of Settling Defendant that has not been disputed in accordance with this Section.

66. Any dispute regarding this Consent Decree shall in the first instance be the subject of informal negotiations between the parties to the dispute. The period for informal negotiations shall not exceed 20 days from the time the dispute arises, unless it is modified by written agreement of the parties to the dispute. The dispute shall be considered to have arisen when one party sends the other parties a written Notice of Dispute.

67. Statements of Position.

a. In the event that the parties cannot resolve a dispute by informal negotiations under the preceding Paragraph, then the position advanced by EPA shall be considered binding unless, within thirty (30) days after the conclusion of the informal negotiation period, Settling Defendant invokes the formal dispute resolution procedures of this Section by serving on the United States a written Statement of Position on the matter in dispute, including, but not limited to, any factual data, analysis, or opinion supporting that position and any supporting documentation relied upon by Settling Defendant. The Statement of Position

shall specify Settling Defendant's position as to whether formal dispute resolution should proceed under Paragraph 68 (Record Review) or 69.

b. Within thirty (30) days after receipt of Settling Defendant's Statement of Position, EPA will serve on Settling Defendant its Statement of Position, including, but not limited to, any factual data, analysis, or opinion supporting that position and all supporting documentation relied upon by EPA. EPA's Statement of Position shall include a statement as to whether formal dispute resolution should proceed under Paragraph 68 (Record Review) or Paragraph 69. Within thirty (30) days after receipt of EPA's Statement of Position, Settling Defendant may submit a Reply.

c. If there is disagreement between EPA and Settling Defendant as to whether dispute resolution should proceed under Paragraph 68 (Record Review) or 69, the parties to the dispute shall follow the procedures set forth in the paragraph determined by EPA to be applicable. However, if Settling Defendant ultimately appeals to the Court to resolve the dispute, the Court shall determine which paragraph is applicable in accordance with the standards of applicability set forth in Paragraphs 68 and 69.

68. Record Review. Formal dispute resolution for disputes pertaining to the selection or adequacy of any response action and all other disputes that are accorded review on the administrative record under applicable principles of administrative law shall be conducted pursuant to the procedures set forth in this Paragraph. For purposes of this Paragraph, the adequacy of any response action includes, without limitation, the adequacy or appropriateness of plans, procedures to implement plans, or any other items requiring approval by EPA under this Consent Decree, and the adequacy of the performance of response actions taken pursuant to this Consent Decree. Nothing in this Consent Decree shall be construed to allow any dispute by Settling Defendant regarding the validity of the provisions of the OU 4 ROD and OU 2 ROD (as amended by the OU 2 ESD).

a. An administrative record of the dispute shall be maintained by EPA and shall contain all statements of position, including supporting documentation, submitted pursuant to this Section. Where appropriate, EPA may allow submission of supplemental statements of position by the parties to the dispute.

b. The Director of the Emergency and Remedial Response Division, EPA Region 2, will issue a final administrative decision resolving the dispute based on the administrative record described in Paragraph 68.a. This decision shall be binding upon Settling Defendant, subject only to the right to seek judicial review pursuant to Paragraphs 68.c and 68.d.

c. Any administrative decision made by EPA pursuant to Paragraph 68.b shall be reviewable by this Court, provided that a motion for judicial review of the decision is filed by Settling Defendant with the Court and served on all Parties within ten working days after receipt of EPA's decision. The motion shall include a description of the matter in dispute, the efforts made by the parties to resolve it, the relief requested, and the schedule, if any, within

which the dispute must be resolved to ensure orderly implementation of this Consent Decree. The United States may file a response to Settling Defendant's motion.

d. In proceedings on any dispute governed by this Paragraph, Settling Defendant shall have the burden of demonstrating that the decision of the Emergency and Remedial Response Division Director is arbitrary and capricious or otherwise not in accordance with law. Judicial review of EPA's decision shall be on the administrative record compiled pursuant to Paragraph 68.a.

69. Formal dispute resolution for disputes that neither pertain to the selection or adequacy of any response action nor are otherwise accorded review on the administrative record under applicable principles of administrative law, shall be governed by this Paragraph.

a. Following receipt of Settling Defendant's Statement of Position submitted pursuant to Paragraph 67, the Director of the Emergency and Remedial Response Division, EPA Region 2, will issue a final decision resolving the dispute. The Emergency and Remedial Response Division Director's decision shall be binding on Settling Defendant unless, within ten working days after receipt of the decision, Settling Defendant files with the Court and serves on the parties a motion for judicial review of the decision setting forth the matter in dispute, the efforts made by the parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of the Consent Decree. The United States may file a response to Settling Defendant's motion.

b. Notwithstanding Paragraph O (CERCLA Section 113(j) Record Review of RODs and Work) of Section I (Background), judicial review of any dispute governed by this Paragraph shall be governed by applicable principles of law.

70. The invocation of formal dispute resolution procedures under this Section shall not extend, postpone, or affect in any way any obligation of Settling Defendant under this Consent Decree, not directly in dispute, unless EPA or the Court agrees otherwise. Stipulated penalties with respect to the disputed matter shall continue to accrue but payment shall be stayed pending resolution of the dispute as provided in Paragraph 78. Notwithstanding the stay of payment, stipulated penalties shall accrue from the first day of noncompliance with any applicable provision of this Consent Decree. In the event that Settling Defendant does not prevail on the disputed issue, stipulated penalties shall be assessed and paid as provided in Section XX (Stipulated Penalties).

XX. STIPULATED PENALTIES

71. Settling Defendant shall be liable for stipulated penalties in the amounts set forth in Paragraphs 72 and 73 to the United States for failure to comply with the requirements of this Consent Decree specified below, unless excused under Section XVIII (Force Majeure). "Compliance" by Settling Defendant shall include completion of all payments and activities required under this Consent Decree, or any plan, report, or other deliverable approved under this Consent Decree, in accordance with all applicable requirements of law, this Consent Decree, the

SOW, and any plans, reports, or other deliverables approved under this Consent Decree and within the specified time schedules established by and approved under this Consent Decree.

72. Stipulated Penalty Amounts - Work and Payment of Past Response Costs (Excluding, Plans, Reports, and Other Deliverables).

a. The following stipulated penalties shall accrue per violation per day for any noncompliance identified in Paragraph 72.b:

Penalty Per Violation Per Day	Period of Noncompliance
$1,000.00	1st through 14th day
$2,000.00	15th through 30th day
$3,500.00	31st day and beyond

b. Compliance Milestones.

(1) Payment of Past Response Costs

(2) Provide notification required under Paragraph 32 of this Consent Decree

73. Stipulated Penalty Amounts – Payment of Future Response Costs, Plans, Reports and other Deliverables.

a. The following stipulated penalties shall accrue per violation per day for failure to submit timely or adequate reports and other plans or deliverables identified in Paragraph 73b:

Penalty Per Violation Per Day	Period of Noncompliance
$300.00	1st through 14th day
$750.00	15th through 30th day
$2,000.00	31st day and beyond

b. Compliance Milestones.

(1) Payment of Future Response Costs

(2) Submission of name of Project Coordinator

(3) Progress Reports

(4) Remedial Action Work Plans

(5) Health & Safety Plans

(6) O&M Plans

(7) Remedial Action Reports

(8) Post-Remediation Monitoring Plans

(9) Establish Performance Guarantees

(10) Provide Certificates of Insurance, if requested

74. In the event that EPA assumes performance of a portion or all of the Work pursuant to Paragraph 88 (Work Takeover), Settling Defendant shall be liable for a stipulated penalty to the United States in the amount of $15 million. Stipulated penalties under this Paragraph are in addition to the remedies available under Paragraphs 47 (Funding for Work Takeover) and 88 (Work Takeover).

75. All penalties shall begin to accrue on the day after the complete performance is due or the day a violation occurs and shall continue to accrue through the final day of the correction of the noncompliance or completion of the activity. However, stipulated penalties shall not accrue: (a) with respect to a deficient submission under Section XI (EPA Approval of Plans, Reports, and Other Deliverables), during the period, if any, beginning on the 31st day after EPA's receipt of such submission until the date that EPA notifies Settling Defendant of any deficiency; (b) with respect to a decision by the Director of the Emergency and Remedial Response Division, EPA Region 2, under Paragraph 68.b or 69.a of Section XIX (Dispute Resolution), during the period, if any, beginning on the 21st day after the date that Settling Defendant's reply to EPA's Statement of Position is received until the date that the Director issues a final decision regarding such dispute; or (c) with respect to judicial review by this Court of any dispute under Section XIX (Dispute Resolution), during the period, if any, beginning on the 31st day after the Court's receipt of the final submission regarding the dispute until the date that the Court issues a final decision regarding such dispute. Nothing in this Consent Decree shall prevent the simultaneous accrual of separate penalties for separate violations of this Consent Decree.

76. Following EPA's determination that Settling Defendant has failed to comply with a requirement of this Consent Decree, EPA may give Settling Defendant written notification of the same and describe the noncompliance. EPA may send Settling Defendant a written demand for the payment of the penalties. However, penalties shall accrue as provided in the preceding Paragraph regardless of whether EPA has notified Settling Defendant of a violation.

77. All penalties accruing under this Section shall be due and payable to the United States within 30 days after Settling Defendant's receipt from EPA of a demand for payment of the penalties, unless Settling Defendant invokes the Dispute Resolution procedures under Section XIX (Dispute Resolution) within the 30-day period. All payments to the United States under this Section shall indicate that the payment is for stipulated penalties and shall be made in accordance with Paragraph 55.b (Instructions for Future Response Cost Payments).

78. Penalties shall continue to accrue as provided in Paragraph 75 during any dispute resolution period, but need not be paid until the following:

a. If the dispute is resolved by agreement of the Parties or by a decision of EPA that is not appealed to this Court, accrued penalties determined to be owed shall be paid to EPA within 21 days after the agreement or the receipt of EPA's decision or order;

b. If the dispute is appealed to this Court and the United States prevails in whole or in part, Settling Defendant shall pay all accrued penalties determined by the Court to be owed to EPA within 60 days after receipt of the Court's decision or order, except as provided in Paragraph 78.c;

c. If the District Court's decision is appealed by any Party, Settling Defendant shall pay all accrued penalties determined by the District Court to be owed to the United States into an interest-bearing escrow account, established at a duly chartered bank or trust company that is insured by the FDIC, within 60 days after receipt of the Court's decision or order. Penalties shall be paid into this account as they continue to accrue, at least every 60 days. Within 15 days after receipt of the final appellate court decision, the escrow agent shall pay the balance of the account to EPA or to Settling Defendant to the extent that they prevail.

79. If Settling Defendant fails to pay stipulated penalties when due, Settling Defendant shall pay Interest on the unpaid stipulated penalties as follows: (a) if Settling Defendant has timely invoked dispute resolution such that the obligation to pay stipulated penalties has been stayed pending the outcome of dispute resolution, Interest shall accrue from the date stipulated penalties are due pursuant to Paragraph 78 until the date of payment; and (b) if Settling Defendant fails to timely invoke dispute resolution, Interest shall accrue from the date of demand under Paragraph 77 until the date of payment. If Settling Defendant fails to pay stipulated penalties and Interest when due, the United States may institute proceedings to collect the penalties and Interest.

80. The payment of penalties and Interest, if any, shall not alter in any way Settling Defendant's obligation to complete the performance of the Work required under this Consent Decree.

81. Nothing in this Consent Decree shall be construed as prohibiting, altering, or in any way limiting the ability of the United States to seek any other remedies or sanctions available by virtue of Settling Defendant's violation of this Consent Decree or of the statutes and regulations upon which it is based, including, but not limited to, penalties pursuant to Section 122(l) of CERCLA, 42 U.S.C. § 9622(*l*), provided, however, that the United States shall not seek civil penalties pursuant to Section 122(*l*) of CERCLA for any violation for which a stipulated penalty is provided in this Consent Decree, except in the case of a willful violation of this Consent Decree.

82. Notwithstanding any other provision of this Section, the United States may, in its unreviewable discretion, waive any portion of stipulated penalties that have accrued pursuant to this Consent Decree.

XXI. COVENANTS BY THE UNITED STATES

83. Covenants for Settling Defendant by United States. In consideration of the actions that have been and will be performed and the payments that will be made by Settling Defendant under this Consent Decree, and except as specifically provided in Paragraph 87 (General Reservations of Rights by the United States) of this Section, the United States covenants not to sue or to take administrative action against Settling Defendant pursuant to Sections 106 and 107(a) of CERCLA for the Work, Past Response Costs, and Future Response Costs. The United States also covenants not to sue for work previously completed on Impoundments 11, 14, 18, 19, 20 and 26. These covenants shall take effect upon the receipt by EPA of the payment required by Paragraph 53.a (Payments for Past Response Costs) and any Interest or stipulated penalties due thereon under Paragraph 57 (Interest) or Section XX (Stipulated Penalties). These covenants are conditioned upon the satisfactory performance by Settling Defendant of its obligations under this Consent Decree. These covenants extend only to Settling Defendant and do not extend to any other person.

84. United States' Pre-Certification Reservations. Notwithstanding any other provision of this Consent Decree, the United States reserves, and this Consent Decree is without prejudice to, the right to institute proceedings in this action or in a new action, and/or to issue an administrative order, seeking to compel Settling Defendant to perform further response actions relating to the Remedial Action and/or to pay the United States for additional costs of response if, (a) prior to the applicable Certification of Completion of the Remedial Action, (1) conditions at the Site, previously unknown to EPA, are discovered, or (2) information, previously unknown to EPA, is received, in whole or in part, and (b) EPA determines that these previously unknown conditions or information together with any other relevant information indicates that the Remedial Action is not protective of human health or the environment.

85. United States' Post-Certification Reservations. Notwithstanding any other provision of this Consent Decree, the United States reserves, and this Consent Decree is without prejudice to, the right to institute proceedings in this action or in a new action, and/or to issue an administrative order, seeking to compel Settling Defendant to perform further response actions relating to the Remedial Action and/or to pay the United States for additional costs of response if, (a) subsequent to the applicable Certification of Completion of the Remedial Action, (1) conditions at the Site, previously unknown to EPA, are discovered, or (2) information, previously unknown to EPA, is received, in whole or in part, and (b) EPA determines that these previously unknown conditions or this information together with other relevant information indicate that the Remedial Action is not protective of human health or the environment.

86. For purposes of Paragraph 84 (United States' Pre-Certification Reservations), the information and the conditions known to EPA will include only that information and those conditions known to EPA as of the date the ROD was signed and set forth in the ROD for the

Site and the administrative record supporting the ROD. For purposes of Paragraph 85 (United States' Post-Certification Reservations), the information and the conditions known to EPA shall include only that information and those conditions known to EPA as of the date of the applicable Certification of Completion of the Remedial Action and set forth in the ROD, the administrative record supporting the ROD, the post-ROD administrative record, or in any information received by EPA pursuant to the requirements of this Consent Decree prior to Certification of Completion of the Remedial Action.

87. General Reservations of Rights by the United States. The United States reserves, and this Consent Decree is without prejudice to, all rights against Settling Defendant with respect to all matters not expressly included within the United States' covenants. Notwithstanding any other provision of this Consent Decree, the United States reserves all rights against Settling Defendant with respect to:

a. liability for failure by Settling Defendant to meet a requirement of this Consent Decree;

b. liability arising from the past, present, or future disposal, release, or threat of release of Waste Material outside of the Site;

c. liability based on the ownership of the Site by Settling Defendant when such ownership commences after signature of this Consent Decree by Settling Defendant;

d. liability based on the operation of the Site by Settling Defendant when such operation commences after signature of this Consent Decree by Setting Defendant and does not arise solely from Settling Defendant's performance of the Work;

e. liability based on Settling Defendant's transportation, treatment, storage, or disposal, or arrangement for transportation, treatment, storage, or disposal of Waste Material at or in connection with the Site, other than as provided in the OU 4 ROD, OU 2 ROD (as amended by the OU 2 ESD), the Work, or otherwise ordered by EPA, after signature of this Consent Decree by Settling Defendant;

f. liability for damages to, destruction of, or loss of natural resources, and for the costs of any natural resource damage assessment;

g. criminal liability;

h. liability for violations of federal or state law that occur during or after implementation of the Work;

i. liability prior to Certification of Completion of the Remedial Action;

j. liability for Operable Unit 8; and

k. liability for costs that the United States will incur regarding the Site but that are not within the definition of Future Response Costs

88. Work Takeover.

a. In the event EPA determines that Settling Defendant (1) has ceased implementation of any portion of the Work, or (2) is seriously or repeatedly deficient or late in its performance of the Work, or (3) is implementing the Work in a manner that may cause an imminent and substantial endangerment to public health or welfare or the environment, EPA may issue a written notice ("Work Takeover Notice") to Settling Defendant. Any Work Takeover Notice issued by EPA will specify the grounds upon which such notice was issued and will provide Settling Defendant a period of ten days (or longer period as EPA may determine in its sole and unreviewable discretion) within which to remedy the circumstances giving rise to EPA's issuance of such notice.

b. If, after expiration of the notice period specified pursuant to Paragraph 88.a, Settling Defendant has not remedied to EPA's satisfaction the circumstances giving rise to EPA's issuance of the relevant Work Takeover Notice, EPA may at any time thereafter assume the performance of all or any portion(s) of the Work as EPA deems necessary ("Work Takeover"). EPA will notify Settling Defendant in writing (which writing may be electronic) if EPA determines that implementation of a Work Takeover is warranted under this Paragraph 88.b. Funding of Work Takeover costs is addressed under Paragraph 47.

c. Settling Defendant may invoke the procedures set forth in Paragraph 68 (Record Review), to dispute EPA's implementation of a Work Takeover under Paragraph 88.b. However, notwithstanding Settling Defendant's invocation of such dispute resolution procedures, and during the pendency of any such dispute, EPA may in its sole discretion commence and continue a Work Takeover under Paragraph 88.b. until the earlier of (1) the date that Settling Defendant remedies, to EPA's satisfaction, the circumstances giving rise to EPA's issuance of the relevant Work Takeover Notice, or (2) the date that a final decision is rendered in accordance with Paragraph 68 (Record Review) requiring EPA to terminate such Work Takeover.

89. Notwithstanding any other provision of this Consent Decree, the United States retains all authority and reserves all rights to take any and all response actions authorized by and in accordance with law.

XXII. COVENANTS BY SETTLING DEFENDANT

90. Covenants by Settling Defendant. Subject to the reservations in Paragraph 92, Settling Defendant covenants not to sue and agrees not to assert any claims or causes of action against the United States with respect to the Work, past response actions regarding the Site, Past Response Costs, Future Response Costs, and this Consent Decree, including, but not limited to:

a. any direct or indirect claim for reimbursement from the EPA Hazardous Substance Superfund through CERCLA Sections 106(b)(2), 107, 111, 112 or 113, or any other provision of law;

b. any claims under CERCLA Sections 107 or 113, RCRA Section 7002(a), 42 U.S.C. § 6972(a), or state law regarding the Work, past response actions regarding the Site, Past Response Costs, Future Response Costs, Settling Defendant's Past Response Costs, Settling Defendant's Future Response Costs, Nature Resource Damages, and this Consent Decree; or

c. any claims arising out of response actions at or in connection with the Site, including any claim under the United States Constitution, the State Constitution, the Tucker Act, 28 U.S.C. §1491, the Equal Access to Justice Act, 28 U.S.C. § 2412, or at common law.

91. Except as provided in Paragraph 98 (Res Judicata and Other Defenses), the covenants in this Section shall not apply if the United States brings a cause of action or issues an order pursuant to any of the reservations in Section XXI (Covenants by Plaintiff), other than in Paragraphs 87.a (claims for failure to meet a requirement of the Consent Decree), 87.g (criminal liability), and 87.h (violations of federal/state law during or after implementation of the Work), but only to the extent that Settling Defendant's claims arise from the same response action, response costs, or damages that the United States is seeking pursuant to the applicable reservation.

92. Settling Defendant reserves, and this Consent Decree is without prejudice to, claims against the United States, subject to the provisions of Chapter 171 of Title 28 of the United States Code, and brought pursuant to any statute other than CERCLA or RCRA and for which the waiver of sovereign immunity is found in a statute other than CERCLA or RCRA, for money damages for injury or loss of property or personal injury or death caused by the negligent or wrongful act or omission of any employee of the United States, as that term is defined in 28 U.S.C. § 2671, while acting within the scope of his or her office or employment under circumstances where the United States, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred. However, the foregoing shall not include any claim based on EPA's selection of response actions, or the oversight or approval of Settling Defendant's plans, reports, other deliverables or activities.

93. Nothing in this Consent Decree shall be deemed to constitute preauthorization of a claim within the meaning of Section 111 of CERCLA, 42 U.S.C. § 9611, or 40 C.F.R. § 300.700(d).

XXIII. EFFECT OF SETTLEMENT; CONTRIBUTION

94. Nothing in this Consent Decree shall be construed to create any rights in, or grant any cause of action to, any person not a Party to this Consent Decree. Each of the Parties expressly reserves any and all rights (including, but not limited to, pursuant to Section 113 of CERCLA, 42 U.S.C. § 9613), defenses, claims, demands, and causes of action that each Party

may have with respect to any matter, transaction, or occurrence relating in any way to the Site against any person not a Party hereto. Nothing in this Consent Decree diminishes the right of the United States, pursuant to Section 113(f)(2) and (3) of CERCLA, 42 U.S.C. § 9613(f)(2)-(3), to pursue any such persons to obtain additional response costs or response action and to enter into settlements that give rise to contribution protection pursuant to Section 113(f)(2).

95. The Parties agree, and by entering this Consent Decree this Court finds, that this Consent Decree constitutes a judicially approved settlement for purposes of Section 113(f)(2) of CERCLA, 42 U.S.C. § 9613(f)(2), and that the Settling Defendant is entitled, as of the Effective Date, to protection from contribution actions or claims as provided by Section 113(f)(2) of CERCLA, or as may be otherwise provided by law, for "matters addressed" in this Consent Decree. The "matters addressed" in this Consent Decree are the Work, Past Response Costs, Future Response Costs and Impoundments 11, 14, 18, 19, 20 and 26, provided, however, that if the United States exercises rights under the reservations in Section XXI (Covenants by Plaintiff), other than in Paragraphs 87.a (claims for failure to meet a requirement of the Consent Decree), 87.g (criminal liability), or 87.h (violations of federal/state law during or after implementation of the Work), the "matters addressed" in this Consent Decree will no longer include those response costs or response actions that are within the scope of the exercised reservation.

96. Settling Defendant shall, with respect to any suit or claim brought by it for matters related to this Consent Decree, notify the United States in writing no later than 60 days prior to the initiation of such suit or claim.

97. Settling Defendant shall, with respect to any suit or claim brought against it for matters related to this Consent Decree, notify in writing the United States within ten days after service of the complaint on Settling Defendant. In addition, Settling Defendant shall notify the United States within ten days after service or receipt of any Motion for Summary Judgment and within ten days after receipt of any order from a court setting a case for trial.

98. Res Judicata and Other Defenses. In any subsequent administrative or judicial proceeding initiated by the United States for injunctive relief, recovery of response costs, or other appropriate relief relating to the Site, Settling Defendant shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim-splitting, or other defenses based upon any contention that the claims raised by the United States in the subsequent proceeding were or should have been brought in the instant case; provided, however, that nothing in this Paragraph affects the enforceability of the covenants not to sue set forth in Section XXI (Covenants by the United States).

XXIV. ACCESS TO INFORMATION

99. Settling Defendant shall provide to EPA, upon request, copies of all records, reports, documents, and other information (including records, reports, documents, and other information in electronic form) (hereinafter referred to as "Records") within its possession or control or that of its contractors or agents relating to activities at the Site or to the implementation of this Consent Decree, including, but not limited to, sampling, analysis, chain of

custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence, or other documents or information regarding the Work. Settling Defendant shall also make available to EPA, for purposes of investigation, information gathering, or testimony, its employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Work.

100. Business Confidential and Privileged Documents.

a. Settling Defendant may assert business confidentiality claims covering part or all of the Records submitted to Plaintiff under this Consent Decree to the extent permitted by and in accordance with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7), and 40 C.F.R. § 2.203(b). Records determined to be confidential by EPA will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no claim of confidentiality accompanies Records when they are submitted to EPA and, or if EPA has notified Settling Defendant that the Records are not confidential under the standards of Section 104(e)(7) of CERCLA or 40 C.F.R. Part 2, Subpart B, the public may be given access to such Records without further notice to Settling Defendant.

b. Settling Defendant may assert that certain Records are privileged under the attorney-client privilege or any other privilege recognized by federal law. If Settling Defendant asserts such a privilege in lieu of providing Records, it shall provide Plaintiff with the following: (1) the title of the Record; (2) the date of the Record; (3) the name, title, affiliation (e.g., company or firm), and address of the author of the Record; (4) the name and title of each addressee and recipient; (5) a description of the contents of the Record; and (6) the privilege asserted by Settling Defendant. If a claim of privilege applies only to a portion of a Record, the Record shall be provided to the United States in redacted form to mask the privileged portion only. Settling Defendant shall retain all Records that they claim to be privileged until the United States has had a reasonable opportunity to dispute the privilege claim and any such dispute has been resolved in Settling Defendant's favor.

c. No Records created or generated that are required to be submitted to EPA pursuant to the requirements of this Consent Decree shall be withheld from the United States on the grounds that they are privileged or confidential.

101. No claim of confidentiality or privilege shall be made with respect to any data, including, but not limited to, all sampling, analytical, monitoring, hydrogeologic, scientific, chemical, or engineering data, or any other documents or information related to such data and evidencing conditions at or around the Site.

XXV. RETENTION OF RECORDS

102. Retention of Records

a. Until ten years after Settling Defendant's receipt of EPA's notification pursuant to Paragraph 50.b (Completion of the Work), Settling Defendant shall preserve and

retain all non-identical copies of Records (including Records in electronic form) now in its possession or control or that come into its possession or control that relate in any manner to its liability under CERCLA with respect to the Site, provided, however, that Settling Defendant who is potentially liable as an owner or operator of the Site must retain, in addition, all Records that relate to the liability of any other person under CERCLA with respect to the Site. Settling Defendant must also retain, and instruct its contractors and agents to preserve, for the same period of time specified above all non-identical copies of the last draft or final version of any Records (including Records in electronic form) now in its possession or control or that come into its possession or control that relate in any manner to the performance of the Work, provided, however, that Settling Defendant (and its contractors and agents) must retain, in addition, copies of all data generated that are required to be submitted to EPA during the performance of the Work and not contained in the aforementioned Records required to be retained. Each of the above record retention requirements shall apply regardless of any corporate retention policy to the contrary.

b. Settling Defendant's obligations with respect to retaining Records do not apply to any electronic backup tapes or files that are created, deleted, or overwritten in compliance with Settling Defendant's standard document retention and disposition practices.

103. At the conclusion of this record retention period, Settling Defendant shall notify the United States at least 90 days prior to the destruction of any such Records, and, upon request by the United States, Settling Defendant shall deliver any such Records to EPA. Settling Defendant may assert that certain Records are privileged under the attorney-client privilege or any other privilege recognized by federal law. If Settling Defendant asserts such a privilege, it shall provide Plaintiff with the following: (a) the title of the Record; (b) the date of the Record; (c) the name, title, affiliation (e.g., company or firm), and address of the author of the Record; (d) the name and title of each addressee and recipient; (e) a description of the subject of the Record; and (f) the privilege asserted by Settling Defendant. If a claim of privilege applies only to a portion of a Record, the Record shall be provided to the United States in redacted form to mask the privileged portion only. Settling Defendant shall retain all Records that it claims to be privileged until the United States has had a reasonable opportunity to dispute the privilege claim and any such dispute has been resolved in Settling Defendant's favor. However, no Records created or generated pursuant to the requirements of this Consent Decree shall be withheld on the grounds that they are privileged or confidential.

104. Settling Defendant certifies that, to the best of its knowledge and belief, after thorough inquiry, it has not altered, mutilated, discarded, destroyed, or otherwise disposed of any Records (other than identical copies) relating to its potential liability regarding the Site since January 1, 2009 and that it has fully complied with any and all EPA requests for information regarding the Site pursuant to Sections 104(e) and 122(e) of CERCLA, 42 U.S.C. §§ 9604(e) and 9622(e), and Section 3007 of RCRA, 42 U.S.C. § 6927.

XXVI. NOTICES AND SUBMISSIONS

105. Whenever, under the terms of this Consent Decree, written notice is required to be given or a report or other document is required to be sent by one Party to another or to the State, it shall be directed, as applicable, to the individuals at the addresses specified below, unless those individuals or their successors give notice of a change to the other Parties in writing. All notices and submissions shall be considered effective upon receipt, unless otherwise provided. Written notice as specified in this Section shall constitute complete satisfaction of any written notice requirement of the Consent Decree with respect to the United States, the State, and Settling Defendant, respectively. Notices required to be sent to EPA, and not to the United States, under the terms of this Consent Decree should not be sent to the U.S. Department of Justice.

As to the United States:	Chief, Environmental Enforcement Section Environment and Natural Resources Division U.S. Department of Justice P.O. Box 7611 Washington, D.C. 20044-7611 Re: DJ # 90-11-3-07250/1
As to EPA:	Remedial Project Manager American Cyanamid Superfund Site, OU 4 Special Projects Branch Emergency and Remedial Response Division U. S. Environmental Protection Agency, Region 2 290 Broadway, 19th Floor New York, NY 10007-1866
and:	American Cyanamid Superfund Site Attorney New Jersey Superfund Branch Office of Regional Counsel U. S. Environmental Protection Agency, Region 2 290 Broadway, 17th Floor New York, NY 10007-1866
As to the State:	Haiyesh Shah, Case Manager Bureau of Case Management Mail code 401-05F P.O. Box 420 Trenton, NJ 08625-0420.
As to Settling Defendant:	Russell Downey, Wyeth Holdings, LLC 100 Route 206 North Peapack, NJ

M.S. 4-LLA-401
russell.g.downey@pfizer.com

XXVII. RETENTION OF JURISDICTION

106. This Court retains jurisdiction over both the subject matter of this Consent Decree and Settling Defendant for the duration of the performance of the terms and provisions of this Consent Decree for the purpose of enabling any of the Parties to apply to the Court at any time for such further order, direction, and relief as may be necessary or appropriate for the construction or modification of this Consent Decree, or to effectuate or enforce compliance with its terms, or to resolve disputes in accordance with Section XIX (Dispute Resolution).

XXVIII. APPENDICES

107. The following appendices are attached to and incorporated into this Consent Decree:

"Appendix A" is the OU 4 ROD (without appendices).

"Appendix B" is the SOW.

"Appendix C" is the description and/or map of the Site.

"Appendix D" is the performance guarantee.

"Appendix E" is the OU 2 ROD (without attachments).

"Appendix F" is the OU 2 ESD.

"Appendix G" is the 1999 RAP (without appendices).

XXIX. COMMUNITY INVOLVEMENT

108. Settling Defendant shall participate in community involvement activities pursuant to the current Community Involvement Plan dated February 2012, and any amended plan that EPA requests Settling Defendant develop. EPA will determine the appropriate role for Settling Defendant under the Community Involvement Plan, as amended. Settling Defendant shall also cooperate with EPA in providing information regarding the Work to the public. As requested by EPA, Settling Defendant shall participate in the preparation of such information for dissemination to the public and in public meetings that may be held or sponsored by EPA to explain activities at or relating to the Site.

109. Costs incurred by the United States under this Section, including the costs of any technical assistance grant under Section 117(e) of CERCLA, 42 U.S.C. § 9617(e), shall be considered Future Response Costs that Settling Defendant shall pay pursuant to Section XVI (Payments for Response Costs).

XXX. MODIFICATION

110. Except as provided in Paragraph 13 (Modification of SOW or Related Work Plans), material modifications to this Consent Decree, including the SOW, shall be in writing, signed by the United States and Settling Defendant, and shall be effective upon approval by the Court. Except as provided in Paragraph 13, non-material modifications to this Consent Decree, including the SOW, shall be in writing and shall be effective when signed by duly authorized representatives of the United States and Settling Defendant. A modification to the SOW shall be considered material if it fundamentally alters the basic features of the selected remedy within the meaning of 40 C.F.R. § 300.435(c)(2)(ii). Before providing its approval to any modification to the SOW, the United States may provide the State with a reasonable opportunity to review and comment on the proposed modification.

111. Nothing in this Consent Decree shall be deemed to alter the Court's power to enforce, supervise, or approve modifications to this Consent Decree.

XXXI. LODGING AND OPPORTUNITY FOR PUBLIC COMMENT

112. This Consent Decree shall be lodged with the Court for a period of not less than 30 days for public notice and comment in accordance with Section 122(d)(2) of CERCLA, 42 U.S.C. § 9622(d)(2), and 28 C.F.R. § 50.7. The United States reserves the right to withdraw or withhold its consent if the comments regarding the Consent Decree disclose facts or considerations that indicate that the Consent Decree is inappropriate, improper, or inadequate. Settling Defendant consents to the entry of this Consent Decree without further notice.

113. If for any reason the Court should decline to approve this Consent Decree in the form presented, this agreement is voidable at the sole discretion of any Party and the terms of the agreement may not be used as evidence in any litigation between the Parties.

XXXII. SIGNATORIES/SERVICE

114. The undersigned representative of the Settling Defendant to this Consent Decree and the Assistant Attorney General for the Environment and Natural Resources Division of the Department of Justice certifies that he or she is fully authorized to enter into the terms and conditions of this Consent Decree and to execute and legally bind such Party to this document.

115. Provided this Consent Decree is not in any way modified or otherwise altered following Settling Defendant's execution, Settling Defendant agrees not to oppose entry of this Consent Decree by this Court or to challenge any provision of this Consent Decree unless the United States has notified Settling Defendant in writing that it no longer supports entry of the Consent Decree.

116. Settling Defendant shall identify, on the attached signature page, the name, address, and telephone number of an agent who is authorized to accept service of process by mail on behalf of that Party with respect to all matters arising under or relating to this Consent Decree. Settling Defendant agrees to accept service in that manner and to waive the formal service

requirements set forth in Rule 4 of the Federal Rules of Civil Procedure and any applicable local rules of this Court, including, but not limited to, service of a summons. Settling Defendant need not file an answer to the complaint in this action unless or until the Court expressly declines to enter this Consent Decree.

XXXIII. FINAL JUDGMENT

117. This Consent Decree and its appendices constitute the final, complete, and exclusive agreement and understanding among the Parties regarding the settlement embodied in the Consent Decree. The Parties acknowledge that there are no representations, agreements, or understandings relating to the settlement other than those expressly contained in this Consent Decree.

118. Upon entry of this Consent Decree by the Court, this Consent Decree shall constitute a final judgment between and among the United States and Settling Defendant. The Court enters this judgment as a final judgment under Fed. R. Civ. P. 54 and 58.

SO ORDERED THIS __ DAY OF _____, 20__.

_____

United States District Judge

Signature Page for Consent Decree regarding the American Cyanamid Superfund Site

FOR THE UNITED STATES OF AMERICA:

9/23/15
Date

JOHN C. CRUDEN
Assistant Attorney General
Environment and Natural Resources Division
U.S. Department of Justice
Washington, D.C. 20530

DAVID L. GORDON
Trial Attorney
Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611
Washington, D.C. 20044-7611

PAUL J. FISHMAN
United States Attorney
District of New Jersey

ALLAN URGENT
Assistant United States Attorney
District of New Jersey

Signature Page for Consent Decree regarding the American Cyanamid Superfund Site

9/15/15
Date

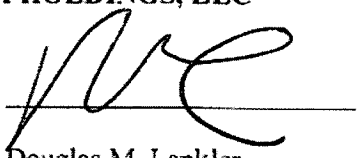
WALTER E. MUGDAN
Director
Emergency and Remedial Response Division
U.S. Environmental Protection Agency, Region 2
290 Broadway, 19th Floor
New York, New York 10007

AMELIA M. WAGNER
Assistant Regional Counsel
New Jersey Superfund Branch
Office of Regional Counsel
U.S. Environmental Protection Agency, Region 2
290 Broadway, 17th Floor
New York, NY 10007

Signature Page for Consent Decree regarding the American Cyanamid Superfund Site

FOR WYETH HOLDINGS, LLC

September 15, 2015
Date

Signature: 

Print Name: Douglas M. Lankler

Title: Vice President

Address: c/o Pfizer Inc.
235 East 42nd Street
New York, NY 10017

Agent, Authorized to Accept Service
On behalf of Above-signed Party:

Name (print): C T Corporation System

Address: 1536 Main Street
Readfield, ME 04355

Appendix A

RECORD OF DECISION

American Cyanamid Superfund Site
Operable Unit 04

Bridgewater Township
Somerset County, New Jersey

United States Environmental Protection Agency
Region II
New York, New York

September 2012

DECLARATION STATEMENT

RECORD OF DECISION - OPERABLE UNIT 04

American Cyanamid Superfund Site

SITE NAME AND LOCATION

American Cyanamid Superfund Site
Bridgewater Township, Somerset County, New Jersey
EPA ID# NJD002173276
Operable Unit 04

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedy for the American Cyanamid Superfund Site (Site), which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300. This decision is based on the Administrative Record file for the Site. The attached index (see Appendix III) identifies the items that comprise the Administrative Record, upon which the selection of the remedial action is based.

The New Jersey Department of Environmental Protection (NJDEP) concurs with the selected remedy (see Appendix IV).

ASSESSMENT OF THE SITE

The response action selected in this Record of Decision (ROD) is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

DESCRIPTION OF THE SELECTED REMEDY

The remedy described in this document represents the fourth Operable Unit (OU) of the American Cyanamid Site. Due to the volume, complexity and nature of contamination at the Site,

waste disposal areas (referred to as impoundments), Site-wide soils and groundwater were originally separated into seven phased or operable units. The Site-wide remedy for OU4 presented in this ROD also combines OU1 to OU5 and OU7 response actions. The Hill Property (OU6) was addressed in a July 1996 ROD and was deleted from the National Priorities List in December 1998. Impoundments 1 and 2 are being addressed separately under a recently created OU8. In March 2010, the Region II Office of the U.S. Environmental Protection Agency (EPA) discussed the proposed alternatives to remedy the Site with EPA's National Remedy Review Board (NRRB). The remedy described in this ROD was selected based upon NRRB input.

Materials meeting the definition of principal threat waste exist at the Site that could pose a potential risk from exposure if appropriate remedial actions are not implemented. Principal threat wastes are materials that include or contain hazardous substances, pollutants or contaminants that act as a reservoir for the migration of contamination to groundwater, surface water or air, or act as a source for direct exposure. In this OU4 ROD, materials that meet the definition of principal threat waste will be treated through solidification/stabilization (S/S) technologies to prevent the migration of contaminants.

The selected remedy for OU4 includes the following components:

- Waste material located within Impoundments 3, 4 and 5 will be entirely treated through in-situ S/S to prevent the migration of contaminants. An impermeable engineered vapor control barrier and an engineered soil cover system will be installed following solidification. The waste materials in these impoundments typically consist of tarry substances or high-hazard materials defined by EPA as principal threat waste.

  Site-wide soils that consist of tarry substances or principal threat wastes will require complete excavation and relocation to Impoundments 3, 4 and 5. Following relocation, these soils will be treated using in-situ S/S, along with the remaining materials in Impoundments 3, 4 and 5 as stated above.

  In-situ S/S reduces the mobility of principal threat waste by sequestering contaminants to restrict migration and reduce leaching to the groundwater. In addition to immobilizing contaminants in a solid matrix, in-situ S/S may also chemically convert certain contaminants into a less toxic form. Effective sequestering mixes would be needed to effectively treat principal threat wastes. Different in-situ

S/S mixes and methods may be required for different areas of the Site. Treatability testing would be conducted prior to full-scale implementation to optimize the in-situ S/S mix and demonstrate a correlation between leachability and unconfined compressive strength (UCS) and permeability performance criteria. Materials that are treated with in-situ S/S will be required to meet performance measures, such as minimum UCS, maximum permeability and leachability testing for Site-related constituents.

Prior to in-situ S/S of the contents in Impoundments 3, 4 and 5, the area would be cleared of vegetation and excavated for surface and subsurface debris removal (e.g., large boulders, tank pads, conduits and concrete), as these materials could interfere with the in-situ S/S process. In-situ S/S will be implemented for the full depth of the impoundment material prior to capping. The actual depth of treatment will be established and confirmed during the remedial design phase. The selection of mixing equipment would be determined during final design. Dust, vapor and noise management controls would be put in place to protect workers and the community during construction activities.

Since the selected remedy requires the transportation of materials to the Site, EPA will evaluate all transportation options, including the use of rail and trucks. A thorough review will be conducted to understand and consider the impacts to the community.

- For Site-wide soils that are determined to require vapor controls, an impermeable multi-layered engineered cap with a vapor mitigation system will be constructed. The engineered vapor control cap will reduce infiltration and the vapor mitigation system will capture and treat emissions. These soils typically contain volatile and semi-volatile organic compounds that have the potential to migrate into the atmosphere. All engineered caps will be designed and constructed to withstand the effects of a 500-year flood event. In addition, the engineered caps will be designed and constructed to protect against all Site-specific hazards which may pose a threat to their integrity, such as flooding, inadequate drainage, slope instability, erosion, freeze/thaw cycle effects, surface vegetation and any other risks associated with being located in a flood hazard area. An inspection and maintenance program for the engineered capping systems will be developed as part of the ongoing operation plan for the Site.

- For Site-wide soils determined to require a direct contact barrier, an engineered soil cover system will be utilized. Soils requiring this engineered cover typically consist of low-level contaminated soils containing hazardous substances at levels greater than NJDEP nonresidential direct contact soil remediation standards.

- An ecological risk assessment will be conducted for Impoundments 13, 17 and 24 to confirm the appropriate treatment for these materials. If the ecological risk assessment identifies any impoundment contents that present an unacceptable risk, these materials would be relocated and consolidated in the North Area in areas where the same types of controls are warranted. Any impoundment contents that do not present an unacceptable risk could remain in their current location. Any impoundment contents requiring excavation and relocation would be remediated to acceptable levels, such as NJDEP ecological soil screening criteria or ecologically protective benchmarks.

- The existing bedrock groundwater collection system will be improved by relocating the primary extraction wells to a more central location and by adding new extraction wells, as necessary, to ensure that all Site-related groundwater is captured. In addition, a recovery system (such as trenches, wells and/or containment walls) will be constructed for collection of overburden groundwater at several locations. The details of these improvements will be developed during the remedial design phase. These improvements will eliminate the migration of contaminants exceeding the more stringent of federal maximum contaminant levels (MCLs) and New Jersey groundwater quality standards (GWQS) in the overburden and bedrock aquifers beyond the point of compliance through a combination of source actions and hydraulic controls and, further, will restore the overburden and bedrock aquifers within the area of attainment to their expected beneficial use and to concentrations below the more stringent of federal MCLs and NJ GWQS within a reasonable period, as practicable. The waters collected at the Site will be discharged to surface water following complete on-site treatment. If it is determined that this treatment method is not appropriate or feasible, then collected groundwater will either be re-injected following complete on-site treatment or be discharged to the local sewerage authority directly or following pre-treatment.

- Institutional controls, monitoring and periodic reviews will also be required to ensure that the remedy remains protective of public health and the environment. The following institutional controls will be implemented as part of the remedy: deed restrictions, restrictive covenants and a groundwater Classification Exception Area/Well Restriction Area. Monitoring of the engineered capping systems, sediment, surface water and groundwater will be required as part of the ongoing operation plan at the Site. The details of the maintenance and monitoring requirements for the engineering controls will be determined in the design phase.

STATUTORY DETERMINATIONS

Part 1: Statutory Requirements
The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable.

Part 2: Statutory Preference for Treatment
This remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces toxicity, mobility or volume of hazardous substances, pollutants or contaminants as a principal element through treatment).

Part 3: Five-Year Review Requirements
Because this remedy will result in hazardous substances, pollutants or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

ROD DATA CERTIFICATION CHECKLIST

The ROD contains the remedy selection information noted below. More details may be found in the Administrative Record file supporting this ROD.

- Contaminants of concern and their respective concentrations may be found in the "Summary of Site Characteristics" section.

- Baseline risk represented by the contaminants of concern may be found in the "Summary of Site Risks" section.

- Cleanup levels established for contaminants of concern and the basis for these levels can be found in the "Remedial Action Objectives" section.

- Manner of addressing source materials constituting principal threats may be found in the "Principal Threat Wastes" section.

- Current and reasonably-anticipated future land use assumptions and current and potential future uses of groundwater considered in the baseline risk assessment and ROD can be found in the "Current and Potential Future Site and Resource Uses" section.

- Estimated capital, operation and maintenance (O&M) and total present worth costs, discount rate and the number of years over which the remedy cost estimates are projected can be found in the "Description of Alternatives" section.

- Key factors that led to the selection of the remedy may be found in the "Comparative Analysis of Alternatives" section.

AUTHORIZING SIGNATURE

Walter E. Mugdan, Director
Emergency and Remedial Response Division
U.S. EPA Region II

Sept. 27, 2012
Date

DECISION SUMMARY

American Cyanamid Superfund Site

Bridgewater Township
Somerset County, New Jersey

United States Environmental Protection Agency
Region II
New York, New York

September 2012

TABLE OF CONTENTS

APPENDICES

ATTACHMENTS TO RESPONSIVENESS SUMMARY

SITE NAME, LOCATION AND DESCRIPTION

The American Cyanamid Superfund Site (Site), located in the central portion of New Jersey, is within the southeastern section of Bridgewater Township, Somerset County. It is bounded by Main Street to the north, the Raritan River to the west and south and Interstate 287 to the east, as shown in Figure 1.

The Site encompasses approximately 435 acres and was used for numerous chemical and pharmaceutical manufacturing operations over the past 90 years. The facility was originally built in 1915 as Calco Chemical Company to manufacture intermediate chemicals and dyes. The plant expanded over the following 60 years to become one of the nation's largest dye and organic chemical plants, resulting in the production of thousands of chemical products. The majority of the expansion at the plant occurred after American Cyanamid purchased the facility in 1929 and was driven by the large increase in demand for chemicals in the United States, particularly during and immediately after World War II. The large increase in manufacturing capacity during the period from 1930 through 1970 required more buildings, support services and disposal capabilities. As a result of past activities at the facility, a number of waste storage and disposal areas, referred to as "impoundments," were constructed. Due to these activities, the surrounding soils and groundwater were eventually adversely impacted. Throughout its more than 75-year manufacturing history, numerous organic and inorganic chemical raw materials were used at the facility to produce products including rubber chemicals, pharmaceuticals, dyes, pigments, chemical intermediates and petroleum-based products.

Previously, the Site was generally divided into two main portions, referred to as the Main Plant and the Flood Plain. The Main Plant area referred to the portion of the Site within a flood control berm, where manufacturing activities were historically conducted. The Flood Plain area referred to the portion of the Site outside of the flood control berm. These terms were derived when the facility was operational and failed to recognize that both of these areas lie within the flood hazard area of the Raritan River. For this ROD and future documents, the Site has been re-designated into five new areas for ease of understanding. As shown in Figure 2, the Site is now divided into the following five areas: North Area, South Area, West Area, East Area and the Impoundment 8 Facility. The North Area, which was referred to as the Main Plant area in previous documents, refers to that portion of the Site property within a

flood control dike. The portion of the Site previously referred to as the Flood Plain area has been separated into the following three areas: West Area, South Area and East Area. The West Area refers to the portion of the Site bounded by the Somerset County Recycling Center to the north, the Raritan River to the west, the Port Reading rail line to the south and the flood control berm to the east. The South Area refers to the portion of the Site located west of Interstate-287 between the Port Reading rail line and the Raritan River. The East Area, which is the only portion of the Site located in the Borough of Bound Brook, refers to the small triangular portion of the Site located to the east of Interstate-287. The Impoundment 8 Facility, which is designated as a corrective action management unit (CAMU) under the Resource Conservation and Recovery Act (RCRA), is located to the northwest of the Site across Polhemus Lane. The entire Site lies within the flood hazard area of the Raritan River, with the exception of the Impoundment 8 Facility.

Approximately 50% of the North Area was used for production activities over the time the facility was active. Impoundments cover approximately 10 to 15% of the North Area. The remaining 35 to 40% was used for storage of general equipment, raw material and finished product, as well as incidental waste disposal. Approximately 80% of the West, South and East Areas contain impoundments. The remaining 20%, consisting of the East Area and portions of the South and West Areas, continues to be virtually undisturbed. A map of the Site can be found in Figure 2.

The Hill Property, which was formerly part of the Site, consists of 140 acres located northeast of the Site. The Hill Property was separated from the Site and included a research laboratory and administrative buildings. In December 1990 (amended March 1992), a Baseline Site-wide Endangerment Assessment (BEA) Report established that there are no current or future unacceptable risks to human health and the environment associated with the Hill Property. Based on this finding, no remedial action was required other than the implementation of a classification exception area (CEA) and a well restriction area (WRA) for the groundwater, shown on Figure 3.

In June 1999, all manufacturing ceased at the Site. By the end of November 2000, almost all buildings on-site were demolished.

In December 1994, American Home Products Corporation purchased the American Cyanamid Company. In March 2002, American Home Products Corporation changed its name to Wyeth. In October 2009,

Wyeth was purchased by Pfizer Inc. and became a wholly owned subsidiary of Pfizer. Title to the Site property is held by Wyeth Holdings Corporation (Wyeth).

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Preliminary investigations completed in 1981 verified that approximately one-half of the Site was utilized to support manufacturing, waste storage or waste disposal activities, and that contaminated source areas were confined primarily to the North Area and in the on-site waste storage areas (impoundments). Twenty-seven impoundments are believed to have been constructed for disposal purposes. Of the 27, 16 are being addressed under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) since they were used for storing by-products of rubber chemical production, dye production and coal tar distillation, as well as for disposal of general plant waste and demolition debris. These impoundments were originally estimated to contain 877,000 tons of waste material. Hence, these impoundments, along with identified areas of contaminated soils, are the primary focus of current remedial activities. Both media have been found to be sources of groundwater contamination. On September 8, 1983, the site was placed on the National Priorities List (NPL).

American Cyanamid entered into an Administrative Consent Order (ACO) with the N.J. Department of Environmental Protection (NJDEP) (referred to as the 1988 NJDEP ACO) in May 1988 to address the 16 impoundments, Site-wide contaminated soils and groundwater. In addition to the regulatory requirements established under the 1988 NJDEP ACO, a New Jersey Pollutant Discharge Elimination System/Discharge to Groundwater (NJPDES/DGW) permit was issued in 1987. This permit required American Cyanamid to conduct extensive groundwater monitoring on a quarterly basis and to continue pumping bedrock production wells, at a minimum rate of 650,000 gallons per day. This action was designed to capture groundwater contamination within the Site boundaries.

In May 1994, American Cyanamid and NJDEP executed an ACO Amendment (1994 NJDEP ACO Amendment) which incorporated the existing groundwater pumping and monitoring requirements of the NJPDES/DGW permit and included additional groundwater monitoring underlying the Impoundment 8 RCRA Facility.

The 16 impoundments being addressed under CERCLA have been

identified using numbers, which include: Impoundments 1, 2, 3, 4, 5, 11, 13, 14, 15, 16, 17, 18, 19, 20, 24 and 26. Due to the volume, complexity and nature of contamination at the Site, all impacted and affected impoundments, Site-wide soils and groundwater were originally separated into seven Operable Units (OUs). A summary of the specific OUs and their status are as follows:

OU1 (Group I): Impoundments 11, 13, 19 and 24

A Corrective Measures Study/Feasibility Study (CMS/FS) was completed for the Group I Impoundments in 1992 and a Record of Decision (ROD) was signed in September 1993. The remedies for Impoundments 11 and 19 were completed in November 1997 and November 1995, respectively. The remedial activities for Impoundments 13 and 24 are being re-evaluated based upon the results of a remedy review report (Impoundment Remedy Appropriateness Evaluation, 2005) and a subsequent Comprehensive Site-wide Feasibility Study (FS) report (2012).

OU2 (Group II): Impoundments 15, 16, 17 and 18

The CMS/FS for Group II Impoundments was completed in November 1993 and a ROD was signed in July 1996. The remediation of Impoundment 18 was completed in April 1998. The remedy for Impoundments 15 and 16 was modified by NJDEP with an Explanation of Significant Differences (ESD) on November 30, 1998. The ESD selected an alternative remedy consisting of recycling of the material (iron oxide) within both impoundments. The recycling started in the spring of 2000 and is ongoing with an expected completion in 20 years. The remedial activities for Impoundment 17 are being re-evaluated based upon the results of a remedy review report (Impoundment Remedy Appropriateness Evaluation, 2005) and a subsequent 2012 Comprehensive Site-wide FS.

OU3 (Group III): Impoundments 1, 2, 3, 4, 5, 14, 20, 26

The CMS/FS for Group III Impoundments was completed in November 1997. A ROD followed in September 1998.

The remedial activities for Impoundments 1 and 2 were never initiated and eventually suspended in 2004. These impoundments are currently being re-evaluated as part of a separate study due to the nature of their contents and their complexity. After a brief pilot test confirmed that the selected 1998 remedy was technically infeasible and could not be performed as originally scoped, remediation of Impoundments 3, 4 and 5 was suspended in

2004 and is being re-evaluated based upon the results of a remedy review report (Impoundment Remedy Appropriateness Evaluation, 2005) and a subsequent Comprehensive Site-wide FS. Impoundments 14 and 20 were remediated under CERCLA pursuant to a 2007 ESD and completed in August 2010. Impoundment 26 was excavated, solidified with cement and placed in the Impoundment 8 Facility. Remediation of Impoundment 26 was completed under CERCLA in May 2002.

OU4: Site Soils

A 1992 Surface Soil Remedial/Removal Action Program was completed addressing specific areas of soil contamination that posed a potential risk to worker health and safety. The program addressed several soil areas contaminated with polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and chromium. The program included excavation and off-site disposal of PCB-contaminated soil, excavation and disposal of PAH-contaminated soil, capping of another PAH-contaminated area, as well as placement of a geotextile, soil and vegetative cover over a chromium-contaminated area. This program, along with plans for an OU4 Surface Soils ROD, was suspended in 2004, re-evaluated as part of the Comprehensive Site-wide FS and included as part of this ROD.

OU5: Site Groundwater

In accordance with the NJDEP ACO, a groundwater monitoring program was established and included Site-wide groundwater pumping and monitoring. To control groundwater contamination related to the Site, Wyeth operates bedrock production wells with pumping at a minimum rate of 650,000 gallons per day and monitors groundwater quality on a semi-annual basis. The groundwater monitoring program was re-evaluated as part of the Comprehensive Site-wide FS and is included as part of this ROD. A Site-wide CEA/WRA is currently being developed with NJDEP to restrict potable use of groundwater until groundwater has been restored and chemical-specific ARARs have been met.

OU6: Hill Property

The Hill Property was addressed in a July 1996 ROD. This ROD selected a remedy consisting of no further action with monitoring and institutional controls. As a part of the ROD, NJDEP established a CEA/WRA on the Hill property to maintain water use restrictions. The CEA/WRA was subsequently closed in June 2008 after residual groundwater contamination was

recovered. The Hill Property has since been deleted from the NPL on December 29, 1998 and was redeveloped for commercial use (i.e., retail stores, a professional baseball stadium and a commuter/stadium parking lot).

OU7: Site-related Wetlands

A Baseline Ecological Risk Assessment (BERA) was completed in January 2005 and a Human Health Risk Assessment (HHRA) for the South and West Areas was completed in December 2006. Site-related wetlands were re-evaluated as part of Site-wide soils in the Site-wide FS.

Non-CERCLA Impoundments (RCRA)

Lagoons 6 and 7 and Impoundments 8, 9A and 25 either have been or are currently being addressed under RCRA. In May 1991, Impoundment 8 was developed into a RCRA Subtitle-C landfill, referred to as the Impoundment 8 Facility. The design included a triple liner, leachate detection and collection system and a groundwater monitoring system. As part of the 1998 OU3 ROD, Impoundment 8 was designated as a CAMU in accordance with RCRA regulations. The Impoundment 8 Facility accepts only Site-related materials defined under RCRA Subtitle C landfill requirements. The use of Lagoons 6 and 7 as Treatment/Storage/Disposal facilities under RCRA was discontinued in 1984. All of Lagoon 6 and approximately 95% of Lagoon 7 soils and silts have undergone remediation through excavation/solidification and were placed into the Impoundment 8 Facility. The remainder of the material in Lagoon 7 is in the process of being closed in accordance with RCRA closure plans. Impoundment 9A was closed in-place by installing a double synthetic liner capping system and Impoundment 25 was closed under RCRA in 1988.

Comprehensive Site-wide Feasibility Study

In Spring 2004, Wyeth submitted several documents to EPA and NJDEP seeking a suspension of remedial design and remedial action work on the OU3 remedy and proposed to reassess the entire Site through a Comprehensive Site-wide FS. In its proposal, Wyeth stated that the remedy selected for the OU3 impoundments could not be performed as intended based on technical infeasibility. The difficulties mentioned included the technical infeasibility of the selected remedy, the impracticability of containing air emissions within permissible levels, a schedule to complete the actions was estimated at 15

to 20 years and a major cost escalation of over 100% higher than the original estimate provided in the September 1998 ROD. Based on these issues and the belief that previous decisions may also benefit from a comprehensive review, Wyeth proposed to reassess the OU3 remedial action and the other ROD remedies; complete the remedial investigations (RIs)/studies for Site-wide soils, groundwater and wetlands; and evaluate potential future-use plans for the Site. All ongoing remedial activities at the Site (with the exception of other ongoing investigation and remediation activities associated with Impoundments 14, 15, 16 and 20 and the bedrock groundwater capture system) were suspended pending the completion of a remedy review report to evaluate the appropriateness of the remaining impoundment remedial programs. Based upon this report, referred to as the 2005 Impoundment Remedy Appropriateness Evaluation, it was recommended that a Comprehensive Site-wide FS be conducted. The objective of the Site-wide FS, completed in February 2012, was to develop and evaluate remedial alternatives in a comprehensive manner.

Impoundment 1 and 2 Focused Feasibility Study (FFS)

In 2009, both EPA and NJDEP agreed to separate Impoundments 1 and 2 from the Site-wide FS and Site-wide remedy decision. Due to the highly complex nature of the contaminants within Impoundments 1 and 2 and their proximity to the Raritan River, a FFS is currently being performed for these impoundments with its own specific remedy to follow.

Summary of Impoundment Status

Of the 16 impoundments addressed under CERCLA, Impoundments 3, 4, 5, 13, 17 and 24 were re-evaluated as part of the 2012 Comprehensive Site-wide FS. Impoundments 1 and 2 are being re-evaluated as part of an ongoing FFS due to their complexity, location and volume. Impoundments 15 and 16 are currently undergoing remediation. Impoundments 11, 14, 18, 19, 20 and 26 were remediated in accordance with CERCLA closure plans.

Impoundments 9, 10 and 12 were never used for waste disposal. Impoundment 21 was used to contain emergency fire water and Impoundments 22 and 23 were used to contain river silt from the facility's former river water settling operation. Lagoon 6 and Impoundments 8, 9A and 25 were closed and classified as Treatment/Storage/Disposal facilities pursuant to regulations issued under RCRA. Lagoon 7 is in the process of being closed in accordance with RCRA closure plans.

Removal Action on Groundwater Discharges

In December 2010, Wyeth performed a Site-wide inspection of the facility to note any environmental-related concerns. As a result, Wyeth observed groundwater discharge (referred to as seeps) from the Site banks in the vicinity of Impoundments 1 and 2 into the Raritan River. After sampling was performed and preliminary laboratory analytical results were reported on January 6, 2011, it was determined that the seeps contained up to 20,000 parts per billion of benzene.

In February 2011, EPA and Wyeth developed an Interim Mitigation System plan to immediately address the seeps while a longer term solution could be discussed, planned and implemented. This plan required the installation of activated carbon-filled sand bags along the river at the seep discharge points.

For the long-term solution, Wyeth signed an Administrative Settlement Agreement and Order on Consent (AOC) with EPA on July 19, 2011 requiring the design and construction of a groundwater removal system to intercept and capture the releases of groundwater originating from the Site into the Raritan River. The groundwater capture system includes a collection trench, a containment wall and an interim groundwater treatment plant. This system was completed in May 2012 and is currently operating. The treated water is discharged to Cuckel's Brook (formerly referred to as Cuckhold's Brook) under a New Jersey Pollution Discharge Elimination System/Discharge to Surface Water (NJPDES/DSW) Permit Equivalency.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

EPA has encouraged and received public involvement throughout the history of the Site. A Community Involvement Plan was established in 1988 by NJDEP and implemented for a series of RODs in the 1990s. An updated Community Involvement Plan was established in January 2011 to serve as a guide for Pfizer and EPA in sharing information and obtaining public input on the Site-wide remedy. In 1992, EPA awarded a technical assistant grant (TAG) to CRISIS, Inc. This grant provides funding for activities that help a community participate in decision making at eligible Superfund sites. Since that time, CRISIS has been the primary community-based group serving as liaison between the NJDEP, EPA and the community. CRISIS has consistently participated in monthly project calls and served in a technical review capacity on behalf of the community.

Documents such as RI reports, the Site-wide FS and both the Human Health and Ecological Risk Assessment reports, which describe the nature and extent of contamination, identify Site-related risks to public health and the environment and evaluate remedial alternatives to address the identified contamination were made available to the public in information repositories maintained at the Superfund Records Center in the EPA Region 2 offices at 290 Broadway, New York, New York, the NJDEP Office of Records at 401 East State Street, Trenton, New Jersey and the Bridgewater Township Library at 1 Vogt Drive, Bridgewater, New Jersey.

In addition, the Proposed Plan (see Attachment A of Appendix V), which identifies EPA's preferred remedy and the basis for that preference is also included in the repositories.

On February 16, 2012, a notice of the commencement of the public comment period was published in the Courier News, a local newspaper (see Attachment B of Appendix V). The notice also informed the public of a public meeting date (held on March 8, 2012), a description of EPA's preferred remedy and the availability of the above referenced documents. Due to several requests for additional time to review EPA's preferred remedy, the public comment period was extended from 45 days to 90 days, ending May 15, 2012.

As mentioned earlier, the public meeting was held to present EPA's preferred remedy and to solicit input from the public about the Site, the remedial alternatives and the proposed remedy. The meeting was well attended by local residents, local and regional stakeholders, business owners, government officials and members of the responsible party's project team and their consultants.

EPA has received written comments along with a number of oral comments from the public meeting. Responses to the comments are included in the Responsiveness Summary (see Appendix V). The transcript and written public comments are found in Attachment C and Attachment D of Appendix V, respectively.

SCOPE AND ROLE OF OPERABLE UNIT 04 REMEDY

Due to the volume, complexity and nature of contamination at the Site, impoundments, Site-wide soils and groundwater were originally separated into seven OUs:

- OU1: Impoundments 11, 13, 19 and 24
- OU2: Impoundments 15, 16, 17 and 18
- OU3: Impoundments 1, 2, 3, 4, 5, 14, 20 and 26
- OU4: Site Soils
- OU5: Site Groundwater
- OU6: Hill Property
- OU7: Site-related Wetlands

RODs have been signed for OU1 (9/28/93), OU2 (7/12/96), OU3 (9/28/98) and OU6 (7/12/96).

However, in June 2004, all ongoing remedial activities at the Site, with the exception of other ongoing investigation and remediation activities associated with Impoundments 14, 15, 16 and 20 and the bedrock groundwater capture system, were suspended pending the completion of a remedy review report to evaluate the appropriateness of the remaining impoundment remedial programs. Based upon this report, referred to as the 2005 Impoundment Remedy Appropriateness Evaluation, it was recommended that a Comprehensive Site-wide FS be conducted.

Wyeth undertook completion of a Comprehensive Site-wide FS designed to address all remaining contamination within the various media on-site through a single comprehensive program.

The remedy presented in this ROD combines all remaining active OUs (OU1-OU5, OU 7) and is now being addressed under the existing OU4, which is referred to as the Site-wide remedy. Impoundments 3, 4, 5, 13, 17 and 24, as well as Site-wide soils and groundwater are being addressed as part of the Site-wide remedy under OU4. As mentioned earlier, Impoundments 1 and 2 are being addressed separately under a recently created OU8 due to their complexity and volume.

The groundwater seeps into the Raritan River in the vicinity of Impoundments 1 and 2 are currently being addressed through a Removal Action and will be incorporated into the Site-wide remedy under OU4.

SUMMARY OF SITE CHARACTERISTICS

Overview

The area surrounding the Site is an urban mixture of industrial and residential uses. The 435-acre Site (currently zoned for industrial use) is fenced and covered with a mixture of

vegetation and asphalt patches. About 100 acres of the Site are comprised of waste disposal areas and the remainder of the Site consists of soils and wetland areas.

The Site is generally bounded by NJ Transit and Main Street to the north, the Raritan River to the west and south and Interstate 287 to the east. In addition, a small parcel of land is situated between the Conrail freight rail line and the Raritan River in the Borough of Bound Brook. There are several commercial and industrial properties neighboring the Site, such as a tire manufacturing company, a local sewerage authority, a public water utility, a professional baseball stadium and an adult daycare center.

For the most part, the surrounding community is serviced by a public water supply, which is not connected to the contaminated groundwater beneath the Site. Private wells are utilized by some residents as a potable water supply in the communities of Franklin Township and South Bound Brook, which are located south of the Raritan River.

Geology and Hydrology

Geology

The Site is situated in the New Jersey Piedmont geomorphologic province, which is an area of rolling, low-lying terrain interrupted only by the Watchung Mountains, about 1.5 miles to the north. Overall, the Site is generally flat, with a natural slope to the south-southeast toward the Raritan River. The following paragraphs discuss the generalized stratigraphy of the Site.

Surface geology

The natural soils of the Site are a mixture of sand, silt and clay (loam). Man-made fill/general solid wastes and disturbed soil and gravel also exist at ground surface in portions of the Site.

Geology of unconsolidated deposits

The general area of and around the Site is covered by naturally occurring unconsolidated sediments ranging in thickness from 5 to 30 feet. These sediments are either the weathering product (residual soils) of the underlying bedrock or they are fluvial deposits related to the adjacent Raritan River.

The unconsolidated deposits are composed of a silt and clay sequence, a sand and gravel sequence and a weathered shale layer. The silt and clay sequence acts as a hydraulic barrier, which can prevent the vertical migration of groundwater due to its low permeability. The sand and gravel sequence underlies the silt and clay sequence, but it also penetrates upwards into the silt and clay sequence in some locations. The weathered shale layer underlies the sand and gravel sequence. The weathered shale layer was created by weathering of bedrock and consists of shale and siltstone fragments in a clay matrix. This layer acts as a low permeability boundary between the overlying deposits and the underlying bedrock. When viewing the overburden deposits from a Site-wide perspective, it can be seen that the entire sequence of overburden deposits (silt and clay, sand and gravel and residual soil) tend to be present across the Site, although the silt and clay layer is not continuous across the Site.

Bedrock geology

The unconsolidated deposits are underlain by bedrock. This bedrock layer is part of the Passaic Formation, which consists of a series of reddish-brown shale, siltstone and fine-grained sandstone units. The bedrock contains highly fractured zones which allow vertical groundwater flow. The bedrock contains discrete bedding plane fractures which allow horizontal groundwater flow. These bedrock fractures control the composition and distribution of the overlying water-bearing units and the groundwater flow regime in the overburden aquifer system.

Hydrogeology

A principal objective for understanding the Site hydrogeology is to understand the potential for movement of Site contaminants from source areas. The chemistry data and interpreted distribution of key marker compounds indicates that there are a few reasonably well-defined areas of contamination in overburden groundwater as opposed to one or more gradational plumes. This distribution is likely caused by the generally downward hydraulic gradients between the overburden and the bedrock, which is significantly influenced by the pumping of the bedrock extraction wells (PW-2 and PW-3). The overall transport of overburden impacts is horizontal, likely within the sand and gravel unit at the base of the overburden, until a hydraulic connection is made between overburden and bedrock. Across most of the North Area, impacts are further transported in the

bedrock co-located with structural bedding plains and migrate within the overall capture of the groundwater collection system.

Impoundments, Site-wide Soils and Groundwater Characteristics

Based on information provided in previous studies and reports, Site areas of concern include: impoundment contents, North Area soils, South Area soils, West Area soils and impacted groundwater.

Impoundment Contents

The locations of the impoundments are shown on Figure 2. Out of the 27 impoundments constructed for waste storage or disposal, 16 were determined to potentially contribute to groundwater contamination and threaten human health and the environment. For a more comprehensive description and the current status of the impoundments, see Tables 1A-1F. These 16 impoundments are separated into previously remediated impoundments and remaining impoundments and are discussed as follows:

Previously Remediated Impoundments

Numerous impoundments have been remediated or partially remediated. The total area remediated (Lagoons 6 and 7; Impoundments 8 and 9A; Impoundments 11, 14, 18, 19, 20, 25 and 26; and portions of Impoundments 1, 2, 4 and 5) is approximately 79.8 acres, with an approximate volume of 1,089,100 cubic yards (CY) of waste material addressed. Of this amount, approximately 50,000 CY consisted of the highly mobile and toxic material from Impoundments 1, 2, 4 and 5. This material, which was considered to meet the definition of principal threat wastes (as defined by EPA under CERCLA), was treated off-site for energy recovery. Tables 1A-1F also provide the areas and volumes remediated by impoundment.

Impoundments 15 and 16 are currently undergoing remediation albeit on a slower pace. The ongoing remedy for these impoundments is considered appropriate and consists of recycling/reuse of iron oxide. Therefore, Impoundment 15 and 16 are not included as part of this Site-wide remedy.

Remaining Impoundments

The total area of the impoundments yet to be remediated (Impoundments 1, 2, 3, 4, 5, 13, 17 and 24) is approximately 27.7 acres, with an approximate volume of 387,700 CY. As

previously stated, Tables 1A-1F show the contaminants of concern (COCs) per impoundment. As previously noted, Impoundments 1 and 2 are being addressed separately under OU8.

Based on historical analytical data and information provided in previous studies and reports, the waste material in the remaining impoundments will generally require some form of control to eliminate direct contact exposures and migration to groundwater. Two additional exposure routes, inhalation or ingestion of dust or vapors and physical movement of the materials beyond their location and subsequent contact with receptors, must also be addressed.

Site-wide Soils

The term "Site-wide soils" constitutes media that do not include impoundment contents or groundwater. The estimated total area of impacted surface and subsurface soils being addressed is approximately 284 acres; 194 acres in the North Area and 90 acres in the South and West Areas, with a total volume of approximately 3,339,000 CY. The East Area is a 10-acre parcel of land located east of I-287 in Bound Brook, NJ. These areas are discussed in further detail below.

North Area Soils

Approximately 50% of the North Area was used for active manufacturing and production operations. The remainder of the North Area was used for waste disposal, as well as for equipment and material storage. Soil impacts within the North Area are widespread and include volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and inorganics with no discernable patterns or distinct areas of specific contamination.

South and West Area Soils

Historical records indicate that manufacturing activities were never conducted within the South or West Areas. Disposal of wastes was limited to Impoundments 1, 2, 13, 15, 16, 17, 18, 24 and the former drying bed area. It is suspected that the impacted soils in the South and West Areas are likely the result of incidental contamination, since they also have no discernible or specific sources.

East Area Soils

Historical records, aerial photographs and sampling efforts indicate that manufacturing and waste disposal activities were not conducted in the East Area.

Groundwater

For the past 60 years, production operations at the Site withdrew water from the on-site bedrock production wells for use as noncontact cooling water. The 1982 and 1988 NJDEP ACOs (as amended in 1994), require the current average withdrawal of over 650,000 gallons per day which results in groundwater flow inward from the perimeter of the Site toward the pumping wells. This system contains the existing groundwater contamination within the North Area of the Site. Recovered groundwater is discharged to the adjacent Somerset-Raritan Valley Sewerage Authority (SRVSA) wastewater facility for subsequent treatment and eventual release into Cuckel's Brook.

Site groundwater quality is currently monitored as part of a semi-annual monitoring program. Historical data is generally clustered around the impoundments, because this is where much of the past work at the Site was focused. In November 2005, as part of the groundwater RI, a Site-wide round of groundwater samples was collected with the objective of obtaining a Site-wide understanding of groundwater quality conditions. The results of this sampling effort indicated that VOCs, SVOCs, metals were present above state and federal standards in both the overburden and bedrock aquifers.

As noted above, the bedrock groundwater recovery system hydraulically controls bedrock groundwater in the North Area. Bedrock groundwater in the South and West Areas is not hydraulically controlled by the pumping of the production wells and eventually discharges to the Raritan River. Overburden groundwater in the vicinity of the bedrock groundwater recovery system migrates vertically due to induced hydraulic gradients, while overburden groundwater migrates horizontally due to natural hydraulic gradients near Cuckel's Brook and the Raritan River. Groundwater elevation contour maps for the overburden and bedrock aquifers are shown in Figures 4 and 5, respectively.

Investigation Summary

The impoundments and contaminated soils have been the primary focus of the Site remedial activities since they have been found

to be the contributing sources of groundwater contamination. An Impoundment Characterization Program was completed in 1990, which was intended to fulfill the requirements of an RI for the impoundments. A soils RI was completed in May 1992 to characterize and delineate contaminated soils. Subsequent to the Impoundment Characterization Program, three CMS/FS reports were completed for the three impoundment groups between 1992 and 1997. RODs were issued for these impoundment groups consistent with the remedial alternatives recommended in the CMS/FS reports and remedial actions were completed in accordance with their respective RODs for Impoundments 11, 14, 18, 19, 20 and 26.

All remedial activities were suspended in 2004 pending the completion of a remedy review report, with the exception of other ongoing investigation and remediation activities associated with Impoundments 14, 15, 16, 20 and continued bedrock groundwater extraction and treatment. The remedy review report, known as the Impoundment Remedy Appropriateness Evaluation (July 2005) concluded that the remedies selected for Impoundments 1, 2, 3, 4, 5, 13, 17 and 24 were inappropriate, as previously discussed.

In 2005, a Data Adequacy Review (DAR) was completed to assess the adequacy of existing soil and groundwater data assembled through previous investigatory and monitoring programs at the Site. The DAR Report concluded that there was sufficient existing data related to Site soils and impoundment materials, but additional groundwater data was necessary to adequately characterize groundwater for the evaluation of remedial alternatives. Following the completion of a groundwater RI report in February 2006, NJDEP requested that additional monitoring wells be installed and additional data be collected. In February 2008, a supplemental groundwater RI report was issued by Wyeth and approved by NJDEP. The Report concluded that sufficient groundwater data existed for the completion of the Comprehensive Site-wide FS.

NATURE AND EXTENT OF CONTAMINATION

Impoundment Contents

Of the six impoundments (3, 4, 5, 13, 17 and 24) addressed in this ROD, there are two general types of impoundments being addressed:

- Those used to dispose mainly process wastes.
- Those used to dispose wastewater sludge.

Impoundments 3, 4 and 5 were used for mainly process waste disposal, and Impoundments 13, 17 and 24 were used for disposal of wastewater sludge. Impoundments 3, 4, 5, 13, 17 and 24 contain elevated levels of VOCs, such as benzene, chlorobenzene, toluene and xylene. VOCs contained in impoundments may be released to the atmosphere through volatilization from impoundment solids or impoundment water covers. These six impoundments have also been found to contain SVOCs, such as naphthalene, 2-methylnaphthalene, nitrobenzene, n-Nitrosodiphenylamine and 1,2-dichlorobenzene, as well as inorganics, such as antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver and vanadium. In general, the concentrations of VOCs and SVOCs in Impoundments 3, 4 and 5 are significantly higher than in Impoundments 13, 17 and 24. Table 2A presents the COCs for the impoundments addressed in this ROD, as well as their mean, minimum and maximum concentrations for each impoundment. The information in this table is based upon the data contained in the Impoundment Characterization Program Report (1990), as well as additional information obtained since 1990.

The physical characteristics of the impoundments do not allow for the contents of these impoundments to be transported by surface water runoff, thus significant overland transport of the chemicals of interest with stormwater runoff does not occur. VOCs, SVOCs and inorganics have also been found in soils, as well as both the overburden and bedrock groundwater aquifers.

Site-wide Soils

As mentioned earlier, past leaks and spills have generally impacted soils in the eastern portion of the North Area, as well as some soil areas in the western portion of the North Area. Site-wide soils in the North Area contain VOCs, SVOCs and inorganics. North Area soils contain elevated levels of VOCs, such as benzene, chlorobenzene, toluene and xylene; SVOCs, such as naphthalene, nitrobenzene, benzo(a)anthracene, 1,2-dichlorobenzene and Total PCBs; and inorganics, such as antimony, arsenic, chromium, cobalt, cyanide and mercury. Table 2B presents the COCs for North Area soils, as well as the frequency of their detection and the mean, minimum and maximum concentrations for each COC.

As discussed previously, it is suspected that the impacted soils in the South and West Areas are likely the result of incidental contamination, since they also have no discernible or specific

sources. Site-wide soils in the South and West Areas contain VOCs, SVOCs and inorganics. South and West Area soils contain elevated levels of VOCs, such as benzene, chlorobenzene, toluene and xylene; SVOCs, such as naphthalene, nitrobenzene, n-Nitrosodiphenylamine and 1,2-dichlorobenzene; and inorganics, such as chromium, lead and mercury. Table 2C present the COCs for South and West Area soils, as well as the frequency of their detection and the mean, minimum and maximum concentrations for each COC.

Chemical migration from both impoundments and soils to the groundwater is a primary transport mechanism at the Site. Dust generation, volatilization and surface water runoff are considered secondary transport mechanisms at the Site. Chemicals such as PAHs, PCBs or most heavy metals have an affinity to bind to material with high organic carbon content such as certain types of soil or sediment. Substances retained in soils are exposed to additional transport mechanisms. These include overland transport with stormwater runoff, atmospheric transport with dusts, biodegradation and bioaccumulation in soil biota.

Groundwater

Organic and inorganic chemical contaminants detected above New Jersey groundwater quality standards (GWQS) are present in North Area bedrock groundwater, as well as South and West Area bedrock groundwater. As indicated earlier, impoundments and Site-wide soils act as the potential sources of contamination to groundwater.

North Area bedrock groundwater is captured by the bedrock groundwater recovery system and, therefore, is controlled and limits off-site migration. Bedrock groundwater in the South and West Areas is outside the zone of influence of the bedrock groundwater extraction system. Therefore, bedrock groundwater in the South and West Areas is not captured by the pumping wells and eventually discharges to the Raritan River. Contaminants present in the bedrock groundwater in these areas also discharge to the Raritan River. While bedrock groundwater concentrations in the South and West Areas are found above NJ GWQS, concentrations in these areas are generally lower than those detected in overburden groundwater. The highest bedrock groundwater concentrations in the South and West Areas are generally found in the vicinity of Impoundments 1 and 2. An evaluation was conducted to assess the potential for bedrock groundwater to flow south of the Raritan River into the communities of Franklin Township and South Bound Brook. Based

upon both regional and local groundwater characteristics, this evaluation concluded that a complete pathway does not exist for the transport of Site-related contaminants beyond the Raritan River to the south.

Under natural conditions, overburden groundwater at the Site flows toward the Raritan River and its tributaries; however, previous and current data indicates that overburden groundwater over most of the Site, particularly in the North Area, migrates vertically into the bedrock aquifer as a result of the bedrock pumping system.

The majority of North Area overburden groundwater migrates vertically into the bedrock aquifer due to induced hydraulic gradients and is eventually captured by the bedrock groundwater system. This capture is strongest in the northern portion of the North Area and weakens to the south. The bedrock groundwater extraction system has resulted in local areas with lower water table surface elevations, referred to as depressions, which indicate that groundwater flows downward into the bedrock aquifer at these locations. The bedrock system has also resulted in areas with elevated water table levels, referred to as mounds, specifically located in the northern and southern parts of the Site. The water table mounding directly influences the overburden groundwater by generating a flow gradient towards the depressions thereby extending the overall capture of overburden groundwater by the bedrock extraction wells. Any contaminants present in North Area overburden groundwater, therefore, tend to be drawn down into the bedrock aquifer and are eventually captured by the bedrock extraction system. Although portions of overburden groundwater in the North Area are not captured by the bedrock pumping system and discharge to Cuckel's Brook, the results of the overburden groundwater investigation in the North Area indicated no significant impacts to Cuckel's Brook.

Overburden groundwater in the South and West Areas is not captured by the bedrock pumping system and eventually discharges to the Raritan River. As discussed later on, the 2005 BERA evaluated the potential exposures to surface water and sediment in Cuckel's Brook and the Raritan River and concluded that the level of potential significant impact of Site-related COCs on ecological receptors is likely to be low. As discussed previously, the groundwater in the vicinity of Impoundments 1 and 2 is currently being addressed as part of the Removal Action and will be incorporated as part of the Site-wide remedy.

In both the overburden and bedrock aquifers, the most frequently

found VOCs above NJ GWQS and federal maximum contaminant levels (MCLs) are benzene, chlorobenzene, toluene and xylene. The most commonly found SVOCs above the GWQS or MCLs are 1,2-dichlorobenzene and 1,4-dichlorobenzene. In both the overburden and bedrock aquifers, inorganic contaminants found at concentrations above either the GWQS or MCLs included manganese, iron and arsenic. Other inorganic contaminants were occasionally found above the standards, although these were typically at concentrations close to the GWQS. Tables 2D and 2E present the COCs for overburden and bedrock groundwater, as well as the frequency of their detection and the mean, minimum and maximum concentrations for each COC.

CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

The title to the American Cyanamid Site property is held by Wyeth Holdings Corporation, a wholly owned subsidiary of Pfizer, Inc. The Site property lies within the M-2 General Manufacturing Zone. The current owner has discussed a number of potential future uses for portions of the Site, ranging from light industrial use to recreational use. The reuse of any portion of the Site will require approval from EPA. Institutional controls will be implemented to ensure the protectiveness of the remedy and its compatibility with future reuse.

The surrounding community located north of the Raritan River is serviced by a public water supply that is not connected to the contaminated groundwater beneath the Site. Private wells are utilized by some residents as a potable water supply in the communities of Franklin Township and South Bound Brook, which are located south of the Raritan River. An evaluation was conducted to assess the potential for groundwater to flow south of the Raritan River into these communities. Based upon both regional and local groundwater characteristics, this evaluation concluded that a complete pathway does not exist for the transport of Site-related contaminants beyond the Raritan River to the south. Groundwater is designated by the State as a Class IIA aquifer which requires it to be considered as a future potable water supply. Therefore, source control and eventual restoration of groundwater quality are important objectives of the selected remedy.

SUMMARY OF SITE RISKS

Baseline Risk Assessment

As part of the Site investigation process, a baseline risk assessment was conducted to determine the current and future effects of contaminants on human health and the environment.

A baseline risk assessment is an analysis of the potential adverse human health and ecological effects of releases of hazardous substances from a Site in the absence of any actions or controls to mitigate such releases, under current and future land, groundwater, surface water and sediment uses. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action.

Human Health Risk Assessment (HHRA)

The potential noncarcinogenic hazards and carcinogenic risks associated with potential exposures to the impoundments, surface soil and groundwater were evaluated in the BEA (BB&L, 1992) for the North Area and the HHRA (O'Brien & Gere, 2006) for the South and West Areas. The 1992 BEA and the 2006 HHRA were approved by NJDEP. EPA Region 2 prepared a streamlined HHRA in February, 2010 which evaluated additional pathways.

The objective of the streamlined HHRA was to determine the cancer risks and noncancer hazards associated with exposure to contaminated surface soil (North Area), groundwater (overburden and bedrock) and the impoundments. Since the current zoning of the Site is industrial, the streamlined HHRA evaluated the Site worker's exposure to surface soil and the impoundments, as well as the trespasser's exposure to surface soil. The groundwater is a designated potable water supply; therefore, the residential exposure pathway was also evaluated.

The maximum detected concentrations in each medium were compared to their respective regional screening level (RSLs). The surface soil RSLs are based on a worker's direct exposure (via ingestion, inhalation and dermal contact) while working at the Site (25 years). Since the groundwater at the Site is classified by NJDEP as a potable water supply, the RSLs represent a resident's exposure to groundwater contamination over the time reasonably expected for a resident to live in an area.

Tables 3A-3C provide a summary of the COCs and medium-specific

exposure point concentrations for impoundments, North Area soils and both overburden and bedrock groundwater. Tables 4A-4D show the RSLs for impoundments, North Area soils and groundwater. Tables 5A-5C and Tables 6A-6C provide a summary of the noncarcinogenic and carcinogenic risk characterization for impoundments, North Area soils and groundwater.

In general, the industrial worker's exposure to the impoundments exceeded EPA's acceptable risk range of 10^{-4} to 10^{-6} and NJDEP's acceptable cancer risk level of 10^{-6}, as well as the noncancer hazard threshold of 1. The streamlined HHRA indicates that the total noncarcinogenic risk for the commercial/industrial worker's exposure to impoundments contents is between 1.3 and 280 with nitrobenzene as the primary risk driver. The total carcinogenic risk for an industrial/commercial worker's exposure to impoundment contents varied from $1.5x10^{-5}$ to $1.3x10^{-2}$ with benzene, naphthalene and n-Nitrosodiphenylamine as the primary risk drivers. It should be noted that the risks and hazards for this receptor's exposure to the impoundments are underestimated since a limited number of chemicals were included in the risk calculation. Due to the high concentrations of several contaminants, other Site-related contaminants may not have been detected due to high method detection limits. Therefore, the risk drivers are not limited to only the contaminants listed above. However, it should be noted that any other risk drivers at the Site are co-located with the risk drivers identified in the risk calculations.

For exposure to North Area surface soil, the acceptable risk range and the noncancer hazard threshold of 1 were exceeded for both the industrial worker and the trespasser. The total noncarcinogenic hazard index for the commercial/industrial worker's exposure to North Area surface soils is 170, with antimony and cobalt as the primary risk drivers. The total noncarcinogenic hazard index for the trespasser's exposure to North Area surface soils is 1000, with cobalt, chromium VI and antimony as the primary risk drivers. The total carcinogenic risk is $3.2x10^{-3}$ for the commercial/industrial worker's exposure to surface soils and the primary risk drivers are chromium VI, Total PCBs, benzo(a)anthracene, benzo(a)pyrene and arsenic. The total carcinogenic risk for the trespasser's exposure to North Area surface soils is $3.7x10^{-4}$ with Total PCBs, benzo(a)anthracene and benzo(a)pyrene as the primary risk drivers.

The cancer risks and noncancer hazards associated with a resident's exposure to groundwater exceeded the acceptable risk

range and the noncancer threshold of 1. The streamlined HHRA indicates that the hazard index for a resident's exposure to bedrock groundwater is 14, while the hazard index for a resident's exposure to overburden groundwater is 160. The primary risk drivers in bedrock groundwater are 1,2,4-trichlorobenzene and chlorobenzene, while the primary risk drivers in overburden groundwater are aniline and chlorobenzene. The total carcinogenic risk for a resident's exposure to bedrock groundwater is $1.1x10^{-3}$, while the total carcinogenic risk for a resident's exposure to overburden groundwater is $1.0x10^{-2}$. The primary risk drivers in the bedrock groundwater are benzene, tetrachloroethylene, nitrobenzene, arsenic, benzo(a)pyrene and 1,4-dichlorobenzene. The primary risk drivers in the overburden groundwater are naphthalene, benzene, arsenic, 1,2-dichlorobenzene, 1,4-dichlorobenzene, chloroform, nitrobenzene and tetrachloroethylene.

It should be noted that other media (sediment and surface water) were not evaluated as part of the streamlined HHRA, which could underestimate the cancer risks and noncancer hazards. Overall, the streamlined risk assessment indicates that exposure to Site-related contamination results in an excess lifetime cancer risk that exceeds EPA's target risk range of 10^{-4} to 10^{-6}, as well as NJDEP's acceptable cancer risk level of 10^{-6}. Therefore, Site-related contamination poses an unacceptable human health risk to current and potential future receptors.

Ecological Risk Assessments

Ecological risks at the Site were addressed in two documents: the BEA approved by NJDEP and EPA in 1992 and the BERA in 2005. The Qualitative Ecological Assessment section of the BEA included the results of a Site-wide habitat survey, evidence from direct field observations and a Natural Heritage Data Base (NJDEP, 1991) search. The BEA indicated that the on-site habitat does not support threatened or endangered species. The BERA identified potential risks to ecological receptors from exposure to soils in an isolated portion of the West Area and from exposure to sediment and surface water in Cuckel's Brook. Potential risks to ecological receptors from exposure to Raritan River sediment and/or surface water were low. Groundwater discharge mass loading calculations suggest that exposure to concentrations of Site chemicals of interest resulting from overburden groundwater discharge is unlikely to affect the health and diversity of aquatic biota in the Raritan River.

Because the ecological risk associated with locations outside of the North Area had not been previously studied, the 2005 BERA evaluated the potential exposures for soils in the South and West Areas, as well as surface water and sediment in Cuckel's Brook and the Raritan River. Although tissue concentrations of contaminants in small mammals, invertebrates and vegetation were similar to those detected in reference samples, modeling indicated potential risk to some receptors from exposure to contaminants, primarily metals, in soils in an isolated cattail bank area of the West Area. Sediment toxicity was observed throughout Cuckel's Brook, impaired benthic communities were identified throughout the brook and concentrations of some metals were slightly above screening criteria in fish tissue. Due to the limited areal extent of contamination in the West Area and the physical limitations to habitat use in Cuckel's Brook, the BERA concluded that the level of potential significant impact of Site-related COCs on ecological receptors is likely to be low.

Impoundments 13, 17 and 24 were not included in either the 1992 BEA or the 2005 BERA because the contents of these impoundments were scheduled to be remediated under the OU1 and OU2 RODs. These impoundments will be the subject of an ecological risk assessment performed during the remedial design. As stated previously, the conclusions of this ecological risk assessment will influence how the contents of Impoundments 13, 17 and 24 will be addressed during the remedial action.

Conclusion

Based upon the results of the risk assessments conducted to date, EPA has determined that actual or threatened releases of hazardous substances from the Site, if not addressed by the preferred alternative or one of the other active measures considered, may present a current or potential threat to human health and the environment.

REMEDIAL ACTION OBJECTIVES

The following remedial action objectives (RAOs) address the human health risks and environmental concerns at the American Cyanamid Site. The RAOs are organized into three categories: principal threat waste, soil/impoundment material and groundwater.

Principal Threat Waste:

- Remove or treat material that meets the definition of principal threat waste, to the extent practical, and
- Prevent current or potential future migration of material that meets the definition of principal threat waste from the Site that would result in direct contact or inhalation exposure, to the extent practicable.

Soil/Impoundment Material:

- Prevent or minimize human and ecological exposure to contaminants in soils and impoundment materials at levels above relevant risk-based remediation criteria, and
- Prevent or minimize sources of groundwater impacts (*i.e.*, reduce chemical loadings to groundwater) resulting in long-term improvement of groundwater quality and eventual achievement of applicable regulatory standards.

Groundwater:

- Restore, as practicable, the overburden and bedrock aquifers within the area of attainment to its expected beneficial use and to concentrations below the more stringent of federal MCLs and NJ GWQS within a reasonable period, and
- Eliminate the migration of contaminants exceeding the more stringent of federal MCLs and NJ GWQS in the overburden and bedrock aquifers beyond the point of compliance through a combination of source actions and hydraulic controls to the extent practicable.

Note: Consistent with EPA Guidance (OSWER Directive 9283.1-2), the area of attainment includes the entire contaminant plume and the point of compliance is throughout the contaminant plume.

REMEDIATION GOALS

To meet the RAOs defined above, EPA has identified remediation goals to aid in defining the extent of contaminated media requiring remedial action. In general, remediation goals establish media-specific concentrations of Site contaminants that will pose no unacceptable risk to human health and the environment. Remediation goals have also been developed to establish criteria to define the source areas deemed principal

threats for the Site, areas for which EPA has concluded treatment should be considered as part of the remedy.

In addition, to develop remedial alternatives for the Site, impacted media are characterized based on the actions required to minimize potential exposures to human and ecological receptors.

These potential exposures consist of:

- Direct contact with impacted media and their contaminants (referred to as "direct contact control")
- Inhalation or ingestion of impacted media or their contaminants, including those that emit dust or vapors at unacceptable levels (referred to as "vapor control" [airborne contaminants])
- Physical movement of media beyond their containment areas that could result in contact by receptors (referred to as "movement control")

Likewise, potential adverse ecological impacts resulting from the remedial alternatives need to be assessed. Based on the data collected to date, impoundment contents, soils and groundwater will require some form of control to address the potential exposure pathways. Addressing these exposure routes by providing direct contact, vapor and movement control, as appropriate, will result in applying different remedial approaches across the Site.

Below is a summary of the remediation goals for source areas; most notably the impoundments as well as some areas within the North Area soils, South and West Area soils and groundwater established in the Site-wide FS.

Remediation goals for source areas, Site-wide soils and groundwater are presented in Tables 7A-7D.

Source Area Remediation Goals

Source Area Remediation Goals were developed for areas requiring movement control and vapor control. Numerical criteria were developed to aid in defining the extent of contaminated media requiring movement control. The visual observation of tarry substances will also be utilized to identify areas requiring movement control, regardless of whether these tarry substances

exceed the numerical criteria.

After reviewing the previous RIs, 2006 HHRA and the Site-wide FS, EPA has identified that the sludges and tarry substances in Impoundments 3, 4 and 5 require a remedy for movement and vapor control. Additionally, some soils within the North Area will also require movement control. A portion of the former drying bed in the South Area was also identified as requiring movement control. Pre-design investigations will be conducted to confirm the identified areas and further delineate areas containing principal threat waste.

Site-wide Soil Remediation Goals

Site-wide soil Remediation Goals were developed for areas requiring direct contact and, in some select areas, vapor control. Risk-based soil remediation goals were developed based on the potential exposure risks for ingestion, dermal contact and inhalation human health exposure pathways. Soil remediation goals were selected based upon consideration of these risk-based concentrations and promulgated NJDEP nonresidential direct contact soil remediation standards. NJDEP impact-to-groundwater soil screening criteria were also evaluated as "to-be-considered" (TBC) criteria.

Soils that exceed the soil remediation goal values, but do not constitute source areas, can generally be managed in place with engineering controls (capping) and proper land-use restrictions (institutional controls). As described earlier, both soils and impoundment contents in the North Area have concentrations that warrant the limiting of direct contact. This includes soils and impoundment contents in the entire North Area, with the exception of soils underneath Impoundments 14, 21 and 26, which have either never been used for waste disposal or were previously remediated. Existing data also indicates that some form of direct contact control is warranted in portions of the South and West Areas. This includes Impoundments 13, 17 and 24, but not the impoundments that were never used for waste disposal (9, 10, 12, 21, 22, 23), were previously remediated (11, 18, 19 and Lagoon 6), are in the process of being closed in accordance with RCRA closure plans (Lagoon 7) or are currently being remediated (15 and 16). Additionally, direct contact control is required for the former drying bed, as well as the isolated area located between Impoundment 13 and the railroad tracks that was identified as a potential risk in the HHRA and BERA. Regarding the Site soil areas requiring vapor control, there are locations within the North Area soils with contaminant concentrations

exceeding screening criteria. Data for the South and West Areas indicates that vapor control is only warranted in the tarry waste portion of the former drying bed area. The direct contact, vapor and movement control areas are identified on Figures 6-8.

Groundwater Remediation Goals

Remediation goals were developed for groundwater based on the RAOs discussed earlier. The most stringent of the EPA federal MCLs, NJDEP groundwater quality criteria, NJDEP MCLs and Site-specific risk-based concentrations was selected as the remediation goal. Consistent with the RAOs for groundwater, these remediation goals will be used for developing use restrictions and other actions to prevent exposure and for assessing potential containment and restoration of the groundwater.

DESCRIPTION OF ALTERNATIVES

CERCLA requires that each remedial alternative be protective of human health and the environment, be cost-effective, comply with other statutory laws and utilize permanent solutions and alternative treatment technologies and resource recovery technologies to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility or volume of hazardous substances. Remedial alternatives for the American Cyanamid Site are presented in this section.

A total of seven of the eleven original alternatives were carried through the screening process presented in the Comprehensive Site-wide FS. Please refer to the Comprehensive Site-wide FS for a more detailed discussion of all the remedial alternatives.

Common Elements

Many of these alternatives include common components. Because any combination of remedial alternatives will result in some contaminants remaining on the Site above levels that would allow for unrestricted use, a review of the remedy will be conducted every five years, at minimum. The following institutional controls will also be required to maintain the long-term protectiveness of the remedy: deed restrictions to maintain the protectiveness and functional integrity of engineered capping systems; restrictive covenants to prevent future land uses that

interfere with the implementation or protectiveness of the selected remedy; and a groundwater CEA/WRA to prohibit future use of the groundwater in this area and to restrict the installation of wells (other than for monitoring or remediation purposes) in the area for the duration of the CEA.

Alternative 1 - No Action

Capital Cost:	$0
Annual O&M Costs:	$0
Total Present Worth:	$0
Implementation Time frame:	*Not Applicable*

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) requires that a "No Action" alternative be developed as a baseline for comparing other remedial alternatives. Under this alternative, no action would be taken to remediate impacted soils and impoundment contents or groundwater at the Site. The current bedrock pumping system would be turned off. This alternative would only involve long-term monitoring of groundwater quality through a sampling program. Alternative 1 does not include institutional controls.

Alternative 2 - Limited Action

Capital Cost:	$683,283
Annual O&M Costs:	$32,399,257
Total Present Worth:	$33,082,537
Implementation Time frame	
Soils/Impoundments:	*Not Applicable*
Groundwater:	*30 Years*

Under this alternative, the current groundwater pumping system would continue to operate and implementation of institutional controls as described above would be implemented. Groundwater monitoring would continue to be performed as a basis for evaluating the CEA/WRA and assessing the added value of the bedrock pumping system on impacted groundwater. Restrictions placed on the Site to limit its future use would be accomplished by recording in the property deeds that potentially hazardous media may be present and that use restrictions have been imposed. Should this alternative be implemented, the potential addition of monitoring wells to supplement the current monitoring scheme would be evaluated as part of the remedial action design development.

Alternative 3 - Soil Cover and Stabilization/Capping with Hydraulic Control/Treatment of Groundwater

Capital Cost:	$87,976,060
Annual O&M Costs:	$49,973,383
Total Present Worth:	$137,949,443
Implementation Time frame	
Soils/Impoundments:	*10 Years*
Groundwater:	*30 Years*

This alternative would provide a combination of containment caps over impacted areas at the Site to control the potential for exposure to contaminated soils and impoundment contents.

North/South/West Area Soils and Impoundments

For areas identified as requiring direct contact control, a 24-inch soil cover would be utilized to provide a barrier to prevent direct contact exposure with impacted media. This soil cover system would utilize an engineered cap designed and constructed to withstand the effects of up to a 500-year flood event. Appropriate controls and engineered mechanisms would also be included to safeguard against scouring, erosion or other effects from being constructed in a flood plain. In addition, an inspection and maintenance program will be developed as part of the ongoing operation plan for the soil cover system.

An engineered soil cover system would be installed over Impoundments 13, 17 and 24 (located in the South and West Areas) to prevent direct contact.

For areas identified in the Site-wide FS as requiring both vapor and movement control, a multi-layer engineered cap would be used. Measures would be employed in accordance with New Jersey requirements for vapor control as part of future construction. Where additional structural stability is needed to support a multi-layer cap (namely over Impoundments 3, 4 and 5), stabilization, or a similar physical process as determined to be appropriate during the conceptual design phase, would be employed prior to capping. This is anticipated to consist of the use of standard construction technologies such as the addition of amendments, stabilizing agents and/or the installation of physical structure (i.e., geogrids).

Groundwater

The groundwater component consists of collection of bedrock

groundwater within the North, South and West Areas. While the existing bedrock groundwater collection system provides hydraulic control over much of the North Area groundwater, the effectiveness of the bedrock groundwater collection system will be improved to better achieve the groundwater RAOs. Conceptual improvements to the bedrock collection system include placing the primary extraction well(s) in a more central location of the impacted bedrock and placing targeted bedrock groundwater extraction wells to address more localized impacts, such as in the vicinity of Lagoons 6 and 7 and Impoundment 24, or in other to be determined areas (See Figure 9). Additional details of these improvements would be developed during remedial design. This remedy also includes institutional controls that would prohibit potable use of groundwater at the Site.

Additionally, localized collection of overburden groundwater in specific areas would be included, as required, to prevent the migration of contaminants not currently captured by the existing collection system (see Figure 9).

Based on the information presented in the groundwater RI reports, the following presents the proposed collection component for these areas:

- recovery system (trenches, wells and/or containment walls) around Impoundments 1 and 2 and between these impoundments and the Raritan River;

- recovery system (trenches, wells and/or containment walls) to collect impacted overburden groundwater along the north side of the North Area flood berm, north of Cuckel's Brook and the rail line;

- recovery system (trenches, wells and/or containment walls) trench between Lagoon 7/Impoundment 24 and the Raritan River to the southwest, and extending around to the area between Impoundment 24/Lagoon 6 and New Jersey American Water to the south; and

- bedrock pumping well or a series of wells in the Lagoon 7 Area to capture bedrock groundwater not currently collected by the existing bedrock pumping system.

The waters collected at the Site will be discharged to surface water following complete on-site treatment. However, if it is determined that this treatment method is not appropriate or feasible, then collected groundwater will either be re-injected

following complete on-site treatment or be discharged to the local sewerage authority directly or following pre-treatment.

Alternative 4 - Consolidation/Soil Cover and Stabilization/Capping with Hydraulic Control/Treatment of Groundwater

Capital Cost:	*$129,530,494*
Annual O&M Costs:	*$49,973,383*
Total Present Worth:	*$179,503,877*
Implementation Time frame	
Soils/Impoundments:	*10 Years*
Groundwater:	*30 Years*

This alternative would provide a combination of caps over impacted areas at the Site to control the potential for direct contact with impacted soils and impoundments with the addition of excavation of the South and West Areas and consolidation in the North Area.

North Area Soils, Impoundments 3, 4 and 5
Includes same remedies as Alternative 3 with the exception of the South and West Area.

South and West Area Soils and Drying Bed Area
The areas identified in the FS requiring direct contact, vapor and movement control would be excavated and consolidated at the North Area in areas where the same types of controls are warranted.

Impoundments 13, 17 and 24
The material in Impoundments 13, 17 and 24 would be excavated and relocated to the North Area under an engineered soil cap.

Groundwater
Includes the same groundwater remedy as described in Alternative 3.

Alternative 4A - Consolidation/Treatment/Soil Cover and Stabilization/Capping with Hydraulic Control/Treatment of Ground Water

Capital Cost:	*$154,224,898*
Annual O&M Costs:	*$49,973,383*
Total Present Worth:	*$204,198,282*
Implementation Time frame	
Soils/Impoundments:	*10 Years*

Groundwater: *30 Years*

This alternative would provide a combination of caps over impacted portions of the North Area to control the potential for direct contact with impacted soils and impoundments, which is one of the primary RAOs for the Site, with the addition of excavation and consolidation in the North Area for the contents of Impoundments 13, 17 and 24 as determined by an ecological risk assessment. In addition, this alternative would address principal threat wastes found in the North Area and in Impoundments 3, 4 and 5 by consolidating them into Impoundments 3, 4 and 5 and treating these materials using in-situ solidification/stabilization (S/S) followed by capping, thereby also addressing the RAOs. See Figure 10 for details on this alternative.

North Area Soils, Impoundments 3, 4 and 5
Includes same remedies as Alternatives 3 and 4 with the exception of the South and West Areas area and treatment of principal threat wastes.

For impoundment areas meeting the definition of principal threat wastes, (namely, the contents of Impoundments 3, 4 and 5), in-situ S/S would be employed for the full depth of the impoundment material prior to capping (the actual depth of treatment will be established and confirmed during the remedial design phase).

For North Area soils outside of the impoundment limits that meet the definition of principal threat wastes, the material would be excavated to its full depth and consolidated within Impoundments 3, 4 and 5 for subsequent treatment with those wastes. The excavated areas outside Impoundments 3, 4 and 5 would then be backfilled and covered with the multi-layer engineered cap discussed above.

An evaluation would be conducted during the remedial design phase to identify those soils that could potentially meet the definition of principal threat wastes. This evaluation would consist of first identifying areas where constituent concentrations, based on existing data, are above those presented within EPA's soil screening guidance, when adjusted to 1×10^{-3} risk (future Site user). Following this, field investigations (*e.g.*, air sampling) would be conducted to verify the potential air risks. Those areas subsequently identified as potential principal threat wastes (*i.e.*, presenting a 1×10^{-3} risk based on measured concentrations in the breathing zone) would be excavated and consolidated in the Impoundments 3, 4 and

5 area for subsequent treatment with those materials (see below). Excavation extent and depth would be determined based on sampling data in the breathing zone. These excavated areas outside Impoundments 3, 4 and 5 would then be backfilled and covered with the multi-layer engineered cap discussed above. Additionally, any future structures constructed within areas requiring vapor control at the Site would include a vapor mitigation system, as required.

For the remaining areas requiring direct contact and vapor controls, the same remedy as described in Alternatives 3 and 4 would be implemented.

South and West Area Soils and Drying Bed Area
The areas identified in the FS requiring direct contact, movement and vapor control would be excavated and consolidated within the North Area where the same types of controls are warranted.

Impoundments 13, 17 and 24
An ecological risk assessment will be conducted for Impoundments 13, 17 and 24 to confirm the appropriate treatment for these materials. If the ecological risk assessment identifies that any impoundment contents present an unacceptable risk, these materials would be relocated and consolidated in the North Area in areas where the same types of controls are warranted. Any impoundment contents that do not present an unacceptable risk would remain in their current location. Any impoundment contents requiring excavation and relocation would be remediated to acceptable levels, such as NJDEP ecological soil screening criteria or ecologically protective benchmarks.

Groundwater
Includes the same groundwater remedy as Alternative 3.

Alternative 5 - Consolidation/Capping and In-Situ S/S with Hydraulic Control/Treatment of Groundwater

Capital Cost:	$257,918,074
Annual O&M Costs:	$49,973,383
Total Present Worth:	$307,891,457
Implementation Time frame	
Soils/Impoundments:	*20 Years*
Groundwater:	*30 Years*

This alternative would consist of a combination of technologies to address soils and impoundment contents.

North Area Soils, Impoundments 3, 4 and 5
In the areas identified in the FS requiring direct contact control, a 24-inch soil cover would be utilized to provide a barrier to prevent direct contact exposure with impacted media. This soil cover system would be an engineered cap designed and constructed to withstand the effects of up to a 500-year flood event. Appropriate controls and engineered mechanisms will be included to safeguard against scouring, erosion or other effects from being constructed in a flood plain. In addition, an inspection and maintenance program will be developed as part of the ongoing operation plan for the soil cover system.

Impoundments 3, 4 and 5 and a few soil areas located in the North Area have been identified as requiring vapor and movement controls. These impoundment and soil areas would utilize in-situ S/S as a means to reduce contaminant mobility. During S/S activities, emissions would be collected and treated to the extent practicable.

South and West Areas (including soils, Impoundments 13, 17 and 24 and drying bed area)
The material in Impoundments 13, 17 and 24 would be excavated and relocated to the North Area under an engineered soil cap.

Groundwater
Includes the same groundwater remedy as Alternative 3.

Alternative 7 - Consolidation/Capping and Ex-Situ LTTD and S/S with Hydraulic Control/Treatment of Groundwater

Capital Costs:	$774,315,057
Annual O&M Costs:	$49,973,383
Total Present Worth:	$824,288,040
Implementation Time frame	
Soils/Impoundments:	*> 25 Years*
Groundwater:	*30 Years*

This alternative would consist of a combination of technologies to address soils and impoundment contents.

In the North Area, areas identified in the FS requiring direct contact control would receive a 24-inch soil cover to provide a barrier to prevent direct contact exposure with contaminated soil. This soil cover system would be an engineered cap designed and constructed to withstand the effects of up to a 500-year flood event. Appropriate controls and engineered mechanisms will

be included to safeguard against scouring, erosion or other effects from being constructed in a flood plain. In addition, an inspection and maintenance program will be developed as part of the ongoing operation plan for the soil cover system.

Portions of the North Area requiring vapor and movement controls would be excavated and transported to a central area within the North Area for consolidation and staging. *Ex-situ* treatment would then be applied on-site, via low temperature thermal desorption (LTTD) and S/S. LTTD is a technology that uses heat to physically separate contaminants from the excavated soils. S/S would be used to provide appropriate geotechnical properties for backfilling treated materials as well as having the potential added benefit of reducing the mobility of the remaining constituents.

Treated materials from vapor control areas would be backfilled in the North Area, while treated materials from movement control areas would be placed in the Impoundment 8 RCRA Facility. Areas requiring direct contact control and vapor control would be excavated and treated on-site using a combination LTTD and ex-situ S/S. Treated materials would be backfilled on-site or placed in the on-site RCRA facility.

The material in Impoundments 13, 17 and 24 would be excavated and relocated to the North Area under an engineered soil cap.

Groundwater
Includes the same groundwater remedy as Alternative 3.

Alternative 11 - On-Site/Off-Site Treatment with Hydraulic Control/Treatment of Groundwater

Capital Costs:	$1,750,292,506
Annual O&M Costs:	$49,973,383
Total Present Cost:	$1,800,265,890
Implementation Time frame	
Soils/Impoundments:	*> 25 Years*
Groundwater:	*30 Years*

This alternative would consist of a combination of technologies to address soils and impoundment contents.

Impoundments and soils in the North, South and West Areas, would be excavated and consolidated and staged at a predetermined location within the North Area. These materials would receive on-site ex-situ treatment, via LTTD and S/S. Treated materials

from direct contact control areas would be backfilled at the North Area, while treated materials from areas warranting vapor control would be placed in the Impoundment 8 RCRA facility.

For areas identified in the Site-wide FS requiring movement control, soils and impoundment contents would be excavated and transported to either an off-site incineration or recycling facility for treatment or beneficial re-use. During S/S activities, emissions would be collected and treated, as practicable.

Groundwater
Includes the same groundwater remedy as Alternative 3

COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, EPA considered the factors set out in CERCLA §121, 42 U.S.C. §9621, by conducting a detailed analysis of the viable remedial response measures pursuant to the NCP, 40 Code of Federal Regulations (CFR) 300.430(e)(9)(iii) and Office of Solid Waste and Emergency Response (OSWER) Directive 9355.3-01. The detailed analysis consisted of an assessment of the individual response measure against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each response measure against the criteria. A summary of this analysis is provided below. A Detailed Analysis of Alternatives can be found in the Site-wide FS Report.

Threshold Criteria *- The first two criteria are known as "threshold criteria" because they are the minimum requirements that each response measure must meet in order to be eligible for selection as a remedy.*

1. Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced or controlled, through treatment, engineering controls and/or institutional controls.

Alternative 1 is used as a baseline for comparison of the alternatives and is designed to represent baseline conditions at the Site and would not meet the RAOs established for the Site. Alternative 2, by comparison, would be protective of human

health and the environment for groundwater currently captured by the existing groundwater control system and SRVSA treatment, and would employ access restrictions and institutional controls to address potential exposures to other media and transport mechanisms, but would not meet RAOs for principal threat wastes and groundwater outside the current capture zone. Alternatives 3, 4, 4A, 5 and 7 include capping of material requiring direct contact control and groundwater collection/treatment and, therefore, would be protective of human health and the environment. Alternatives 3 and 4 include capping of materials requiring vapor and movement control, which would prevent exposure to impacted materials. Alternative 4A would also prevent exposure to impacted materials through capping, as well as treatment for the most-highly mobile materials, which would reduce toxicity and mobility of contaminants.

Alternatives 3, 4, 4A, 5, 7 and 11 each meet the RAOs for principal threat wastes. However, Alternatives 3 and 4 accomplish this primarily through containment while 4A, 5, 7 and 11, accomplish this primarily through treatment. Alternatives 5 and 7 include treatment of vapor and movement control material in the North, South and West Areas as an element of protection of human health and the environment; however, their treatment components are not proven for all Site contaminants and RAOs may not be met for these contaminants. Alternative 11 removes the material requiring movement control from the North, South and West Areas for off-site treatment/ disposal, while treating direct contact and vapor control material on-site which would be protective of human health and the environment. However, the capping, groundwater control and treatment-based remedy components of Alternative 4A essentially provide equivalent protection of human health and the environment by eliminating potential exposure pathways.

2. Compliance with Applicable or Relevant and Appropriate Requirement (ARARs)

Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate federal and state requirements, standards, criteria and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4). Applicable requirements are those cleanup standards, standards of control and other substantive requirements, criteria or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance,

pollutant, contaminant, remedial action, location or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable. Relevant and appropriate requirements are those cleanup standards, standards of control and other substantive requirements, criteria or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a CERCLA site address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate. Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes or provides a basis for invoking a waiver.

Applicable or Relevant and Appropriate Requirements (ARARs) would not be met for Alternative 1. ARARs would not be met for groundwater outside the current capture zone of the existing groundwater collection system or for soils and impoundment contents under Alternative 2. ARARs would generally be met for the remaining alternatives. However, more significant issues would be associated with location- and action-specific ARARs (e.g., stream encroachment, wetlands, flood hazard, etc.) in the South and West Areas for Alternatives 4, 4A, 5, 7 and 11; chemical- and action-specific ARARs associated with NJ Air Pollution Control Regulations may not be met for Alternatives 5, 7 and 11; and Alternative 7 would not meet the chemical-specific ARARs associated with the Treatment Objectives established in the Group III ROD/CAMU and Land Disposal Restrictions (LDRs). Table 8 provides a list of the current ARARs and TBCs used in the evaluation of remedial alternatives.

Primary Balancing Criteria *- The next five criteria, criteria 3 through 7, are known as "primary balancing criteria". These criteria are factors with which tradeoffs between response measures are assessed so that the best option will be chosen, given site-specific data and conditions.*

---

3. Long-Term Effectiveness and Permanence

A similar degree of long-term effectiveness and permanence refers to the expected residual risk and the ability of a remedy

to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain on-site following remediation and the adequacy and reliability of controls.

Long-term effectiveness and permanence do not apply to the baseline conditions represented by Alternative 1. By comparison, Alternative 2 would provide some degree of long-term remediation for groundwater within the current capture zone of the existing bedrock groundwater pumping system, but would not specifically address other media or groundwater outside the current capture zone. The groundwater remedy components for Alternatives 3, 4, 4A, 5, 7 and 11 provide a more certain effectiveness of groundwater control over the long-term, and remedies that would be functionally permanent with proper maintenance. Capping of material requiring direct contact control associated with Alternatives 3, 4, 4A, 5 and 7 would be effective over the long-term in controlling potential direct contact exposure. A cap is functionally permanent with proper maintenance. Alternatives 3, 4, 4A, 5, 7 and 11 would result in making the Site available for beneficial community reuse, although the time required to achieve this would be longer for Alternatives 5, 7 and 11, compared to Alternatives 3, 4 and 4A. Alternative 4A also utilizes some degree of treatment and/or consolidation which would provide additional permanence over Alternatives 3 and 4. Treatment associated with Alternatives 7 and 11 has not demonstrated effectiveness for the full range of contaminants, which would likely prolong schedules and increase time before RAOs would be attained, if they would be attained at all.

4. Reduction in Mobility, Toxicity or Volume through Treatment

Reduction of toxicity, mobility or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Alternative 1 would provide no reduction in mobility, toxicity or volume. For Alternative 2, the mobility, toxicity and volume of contaminants in groundwater within the capture zone of the existing groundwater collection system would be reduced, but would not be reduced outside the existing capture zone or in other media. Groundwater collection and treatment associated with the remaining alternatives (3, 4, 4A, 5, 7 and 11) would control mobility of contaminants through capture, would reduce the volume and toxicity of contaminants through treatment and would be permanent. Capping associated with Alternatives 3, 4

and 4A would reduce mobility via control of vapor, movement and infiltration. In-situ S/S associated with Alternatives 4A and 5 would reduce contaminant mass through media transfer and mobility through binding the treated mass and limiting infiltration. LTTD and S/S associated with Alternatives 4A, 5, 7 and 11 would reduce contaminant mass through the treatment and capture of contaminants; however, S/S associated with Alternatives 4A, 5, 7 and 11 would increase the total volume of material.

5. Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

No short-term effects would be anticipated with implementation of Alternatives 1 or 2, and the implementation time frames for both would be immediate. The duration of implementation for Alternatives 3, 4 and 4A would be relatively short at approximately 10 years. The implementation duration for Alternatives 5, 7 and 11 would be relatively long (over 20 years). Implementation of the remedial actions associated with Alternative 3 would be minimally disruptive, resulting in minimal short-term impacts and would be limited in wetland areas and ecological habitats, as well as the South and West Areas. Implementation impacts would occur in wetlands and ecological habitats with implementation of Alternatives 4 and 4A; however, enhancement of existing, nonimpacted wetlands and habitats and/or creation of new wetlands/habitats would be employed to mitigate impacts. Implementation of excavation, consolidation and treatment activities associated with Alternatives 5, 7 and 11 would result in large-scale intrusions and material disturbances, increasing the opportunity for emission generation and material release to the environment with commensurate complexity in implementation of effective controls. Additionally, such large-scale intrusions as associated with Alternatives 5, 7 and 11 would result in destruction of existing wetlands and habitats; and, temporary, but detrimental, disruption of habitat and flora/fauna communities would occur in surrounding areas during implementation; however, enhancement of existing, nonimpacted wetlands and habitats and/or creation of new wetlands/habitats would be employed to mitigate impacts.

Increases in truck traffic through the local community would

occur during construction of Alternatives 3, 4, 4A, 5, 7 and 11. However, trucks would be carrying only S/S admixtures, clean fill and construction materials with the implementation of Alternatives 3, 4, 4A, 5 and 7, while trucks would be carrying the most highly contaminated material from the Site to off-site treatment/disposal facilities with the implementation of Alternative 11. The potential for exposure to workers during construction for Alternative 3 would be minimal due to the minimally invasive nature of the construction. However, worker exposures would be increased with the implementation of Alternatives 4 and 4A, and even more so with Alternatives 5, 7 and 11, due to the increase in generation of air emissions related to excavation, consolidation and treatment. The potential for exposure to workers would be reduced with appropriate use of personal protective equipment and proper implementation of engineering controls and material/waste handling procedures.

6. Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility and coordination with other governmental entities are also considered.

A review of the implementability of Alternatives 1 and 2 is not applicable since either no action is taken or the actions are largely already complete. The engineered capping systems associated with Alternatives 3, 4, 4A, 5, 7 and 11 are proven, reliable technologies and would be readily constructed and maintained. Alternatives 3, 4 and 4A rely on capping as a component of the remedy and would be readily implementable; however, Alternative 4A also utilizes in-situ S/S to limit infiltration and reduce the mass and mobility of contaminants. Alternative 4A offers additional protection by also excavating materials which could meet the definition of principal threat waste with subsequent consolidation into Impoundments 3, 4 and 5 and treatment via in-situ S/S. In-situ S/S associated with Alternative 5 may prove difficult due to locations, nature of material and surroundings (*i.e.*, South and West Areas, wetlands, etc.).

The treatment components of Alternatives 7 and 11 for the Site material are unproven. The effectiveness of the LTTD component of Alternatives 7 and 11 would be limited by the characteristics of the waste at the Site. The waste materials contain high

concentrations of tars and other organics, elevated sulfur levels, large quantities of heterogeneous debris and have a high moisture content, all of which limit the effectiveness of LTTD. The intrusive excavation activities and extensive materials handling required for Alternatives 7 and 11 would result in increased air emissions, which could pose an increased risk to Site workers and the surrounding community if not adequately controlled. LTTD was tested on Impoundment 3 and found not to be effective due to the high levels of air emissions, even with extensive controls. The potential for worker and community exposure would be minimized with the implementation of Alternative 4A in comparison with other alternatives, such as Alternatives 7 and 11. In addition, treatment via in-situ S/S associated with Alternative 4A would be equally effective at achieving the RAOs for soils and impoundment contents at the Site.

Equipment, materials and personnel necessary to implement Alternatives 3, 4, 4A, 5, 7 and 11 are typically available in the marketplace; however, qualified contractors that would implement the types of remedial projects associated with Alternatives 5, 7 and 11 may not be available or accessible for the entire duration of construction due to their relatively long implementation time frames. The stabilization of materials to support a cap for Alternatives 3, 4 and 4A utilizes proven geotechnical technologies; however, the variability of materials on-site could require additional treatment and affect intermediate milestones in a construction schedule.

The excavation of material proposed in Alternatives 4, 4A, 5, 7 and 11 would trigger LDRs; consequently, CAMU requirements would apply. The remaining capacity in Impoundment 8 may not be sufficient to receive treated material volumes resulting from implementation of Alternative 7 or 11. Invasive construction activities in the South and West Areas may increase the time required prior to initiation of the remedies employed by Alternatives 4, 4A, 5, 7 and 11. Regulatory review and approvals would be required from state and federal agencies; these would be of a standard, routine nature for Alternatives 3, 4 and 4A, but would be more extensive for Alternatives 5, 7 and 11. Failures/iterations relative to S/S and LTTD associated with Alternatives 5, 7 and 11 would likely cause construction delays and may result in ARARs not being attained.

For the material in Impoundments 13, 17 and 24, Alternative 3 utilizes an engineered soil cover to prevent direct contact. Alternatives 4, 5 and 7 call for the excavation and relocation

of these materials into the North Area followed by the placement of an engineered soil cover. Alternative 11 requires the excavation and relocation of this material into the North Area for treatment via LTTD and S/S. Alternative 4A is readily implementable and would be similar to Alternatives 4, 5 and 7, if relocation of the impoundment material in the South and West Areas to the North Area where the same types of controls is warranted, if required by the results of an ecological risk assessment. This approach ensures that existing wetlands and habitat are not impacted unnecessarily and ensures that materials which pose an unacceptable risk are adequately addressed.

The groundwater collection and treatment component of Alternatives 3, 4, 4A, 5, 7 and 11 are proven, reliable technologies and would be readily implementable. Monitoring for Alternatives 2, 3, 4, 4A, 5, 7 and 11 would be effective in identifying successful operation of the remedy.

7. Cost

Includes estimated capital and Operations and Maintenance (O&M) costs, and net present worth value of capital and O&M costs.

The estimated capital cost, O&M and present worth cost are discussed in detail in the Site-wide FS. The cost estimates are based on the best available information. Alternatives 1 ($574,000) and 2 ($33.1 million), No Action and Limited Action, respectively, would incur the least cost to implement. Alternative 3 would cost $138 million. Alternative 4 ($180 million) would cost 30% more than Alternative 3. Alternative 4A ($205 million) would cost 49% more than Alternative 3 and 14% more than Alternative 4. Alternatives 5 ($308 million) and 7 ($825 million) are significantly more costly, at more than two and almost six times more costly than Alternative 3, respectively. Alternative 11 ($1.8 billion) would be the most costly, at more than twice the cost of the next most costly (Alternative 7), and would be at least an order of magnitude higher in cost than other alternatives that meet the RAOs.

Modifying Criteria *- The final two evaluation criteria, criteria 8 and 9, are called "modifying criteria" because new information or comments from the state or the community on the Proposed Plan may modify the preferred response measure or cause another response measure to be considered.*

8. State/Support Agency Acceptance

Indicates whether based on its review of the RI/FS reports and the Proposed Plan, the state supports, opposes and/or has identified any reservations with the selected response measure.

The State of New Jersey concurs with EPA's Selected Remedy in this ROD.

9. Community Acceptance

Summarizes the public's general response to the response measures described in the Proposed Plan and the RI/FS reports. This assessment includes determining which of the response measures the community supports, opposes and/or has reservations about.

EPA solicited input from the community on the remedial alternatives proposed for OU4 and received extensive oral and written comments. The attached Responsiveness Summary addresses the comments received during the public comment period. The community (residents, nearby property and business owners) had widely varied positions, from support to strong reservations about EPA's Proposed Plan. The Mayor of Bridgewater and township council members expressed strong support for EPA's preferred remedy. More specifically, support was received by a New Jersey Assemblyman, a member of the New Jersey Senate Environmental Committee, the Somerset County Board of Chosen Freeholders and a Bridgewater Township Councilman. Representatives from CRISIS, the primary community group and TAG recipient, endorsed EPA's preferred remedy, although some concerns were expressed regarding the details of the remedy. In addition, EPA received written and oral comments from the representatives of several regional environmental groups expressing concerns over the remedy's impact on flooding and the practicability of capping contaminated materials in a flood hazard area. These environmental groups generally opposed EPA's preferred alternative and favored a remedy that removes waste from the Site and/or treats impacted media with thermal desorption technologies.

Through general comments received during the public comment period and the public meeting, EPA has identified several issues emphasized by the community that require further clarification by the agency:

- A number of commenters expressed concerns regarding the durability of engineered caps during flood events, and how that might affect the protectiveness of the remedy;
- A number of commenters expressed concerns about the practicability of capping in a flood plain and the potential impacts of an impervious surface and the addition of fill on the stormwater patterns in the immediate vicinity;
- A number of commenters indicated a preference for the selection of a remedy that removes waste from the Site and/or treats impacted media using thermal desorption;
- A number of commenters expressed concerns over the proposed surface water discharge effluent limits for the interim treatment plant being constructed as part of the groundwater seep removal action;
- A number of commenters indicated a preference for the construction of an on-site treatment plant for the Site-wide groundwater remedy, as opposed to the use of the local sewerage authority; and
- A number of commenters indicated a preference for the use of railroads for the transportation of materials to and from the Site, as opposed to the use of trucks.

To the extent that these issues are not addressed here, they are discussed in Appendix V of this document.

PRINCIPAL THREAT WASTES

EPA's findings to date indicate the presence of principal threat wastes at the American Cyanamid Site. Principal threat wastes are considered source materials, *i.e.*, materials that include or contain hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater, surface water or as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. By utilizing treatment as a significant component of the remedy, the statutory preference for remedies that employ treatment as a principal element is satisfied.

SELECTED REMEDY

Based upon consideration of the results of the Site investigations, the requirements of CERCLA, input from the National Remedy Review Board (NRRB), the detailed analysis of the response measures and public comments, EPA has selected Alternative 4A as the appropriate remedy for the impoundments, Site-wide soils and groundwater at the Site. The alternatives were discussed with the NRRB in March 2010 as part of the effort to evaluate an appropriate remedy for the remainder of the Site. The remedy presented in this ROD was selected based upon the recommendations of the NRRB.

Summary of the Rationale for the Selected Remedy

The remedy described under Alternative 4A is both a treatment- and a containment-based alternative consisting of proven technologies that would be effective in controlling and reducing the risks associated with the exposure pathways identified at the Site. The use of an engineered soil cover system throughout the North Area would effectively control direct contact and a multi-layer vapor control cap would minimize the release of contaminants into the air. The vapor control cap would be impermeable to reduce infiltration and would also include a vapor mitigation system designed to capture and treat emissions. In addition to the use of engineered capping systems, Alternative 4A also utilizes in-situ S/S in areas requiring movement control to further reduce infiltration and decrease the mass and mobility of contaminants. Alternative 4A offers additional protection by excavating materials that meet the definition of principal threat waste with subsequent consolidation into Impoundments 3, 4 and 5 and treatment via in-situ S/S.

For Impoundments 13, 17 and 24, an ecological risk assessment will be conducted to determine whether excavation and relocation into the North Area is warranted. This approach ensures that existing wetlands and habitat are not impacted unnecessarily and ensures that any materials which pose an unacceptable risk are adequately addressed. This approach also reduces the risk of impoundments in the South and West Areas being compromised by any flooding, if necessary.

Although excavation of materials from the South and West Areas would remove the potential risks associated with the potential exposure pathways in those areas, there are risks associated with excavation activities. These could include air emission and

dust generation, damage to existing ecological systems, worker safety and control of construction activities

Hydraulic controls provided by improved collection/treatment of bedrock and overburden groundwater coupled with institutional controls that prohibit potable use of on-site groundwater would achieve the groundwater RAOs and provide for protection of human health and the environment. The continued use of the groundwater extraction and treatment system, supplemented by additional measures to contain and collect overburden groundwater in select areas, would provide for protection of human health and the environment by containing impacted groundwater.

This alternative is readily implementable using conventional technologies, would be potentially cost-effective and would return the Site to beneficial reuse as soon as practicable with an estimated implementation time frame of approximately 10 years for impoundments and soils and approximately 30 years for groundwater.

The selected remedy is believed to provide the best balance of tradeoffs among the alternatives based on the information available to EPA at this time. EPA believes that the selected remedy would be protective of human health and the environment, comply with ARARs, be cost-effective and utilize permanent solutions and alternative treatment technologies to the maximum extent practicable.

Description of the Selected Remedy

The selected remedy involves a combination of caps over impacted areas at the Site to control the potential for direct contact with impacted soils and impoundments, which is one of the primary RAOs for the Site. This alternative would address principal threat wastes found at several locations in the North Area through consolidation into Impoundments 3, 4 and 5, followed by treatment via in-situ S/S and capping, thereby addressing the RAOs. Impoundments 13, 17 and 24 would be excavated and relocated into the North Area where the same types of control are warranted, if an ecological risk assessment determines that an unacceptable risk is present. See Figure 10 for visual details on this alternative. The major components of the selected remedy include:

- Waste material located within Impoundments 3, 4 and 5 will be entirely treated through in-situ S/S to prevent the migration of contaminants. An impermeable engineered vapor control

barrier and an engineered soil cover system will be installed following solidification. The waste materials in these impoundments typically consist of tarry substances or high-hazard materials defined by EPA as principal threat waste.

Site-wide soils that consist of tarry substances or principal threat wastes will require complete excavation and relocation to Impoundments 3, 4 and 5. Following relocation, these soils will be treated using in-situ S/S, along with the remaining materials in Impoundments 3, 4 and 5 as stated above.

In-situ S/S reduces the mobility of principal threat waste by sequestering contaminants to restrict migration and reduce leaching to the groundwater. In addition to immobilizing contaminants in a solid matrix, in-situ S/S may also chemically convert certain contaminants into a less toxic form. Effective sequestering mixes would be needed to properly treat principal threat wastes. Different in-situ S/S mixes and methods may be required for different areas of the Site. Materials that are treated with in-situ S/S will be required to meet three performance measures: minimum unconfined compressive strength of 40 pounds per square inch; maximum permeability of $1x10^{-6}$ centimeters per second; and leachability testing for site-related constituents. Leachability testing would require site-specific development during remedial design, using EPA's Synthetic Precipitation Leaching Procedure, the ANSI/ANS 16.1 method, or other appropriate methods. EPA would develop specific leaching values and select specific analytical methods in the design phase pending results of treatability studies. EPA would seek a 90 percent or greater reduction of leaching potential as a point of departure for S/S performance. Different in-situ S/S technologies would require different performance measures, though the overall in-situ S/S performance would need to be comparable (*i.e.*, similar leaching performance, from one in-situ S/S technology to the next).

Treatability testing would be conducted prior to full-scale implementation to optimize the in-situ S/S mixture and demonstrate a correlation between leachability, unconfined compressive strength and permeability performance criteria. Once this correlation is established, unconfined compressive strength and permeability would be used as the primary field criteria during implementation. During implementation of the full-scale remedial action, these performance measures would be used for the purposes of mix optimization, quality assurance and verification that the remedy is effective.

Prior to in-situ S/S of the contents in Impoundments 3, 4 and 5, the area would be cleared of vegetation and excavated for surface and subsurface debris removal (e.g., large boulders, tank pads, conduits and concrete), as these materials could interfere with the in-situ S/S process. In-situ S/S will be employed for the full depth of the impoundment material prior to capping. The actual depth of treatment will be established and confirmed during the remedial design phase. The selection of mixing equipment would be determined during final design. Dust, vapor and noise management controls would be put in place to protect workers and the community during construction activities. The potential for exposure to workers would be reduced with appropriate use of personal protective equipment and proper implementation of engineering controls and material/waste handling procedures.

Since the selected remedy requires the transportation of materials to the Site (and from the Site to a lesser extent), EPA will evaluate all transportation options, including the use of rail and trucks. A thorough review will be conducted to understand and consider the impacts to the community.

- For Site-wide soils that are determined to require vapor controls, an impermeable multi-layered engineered cap with a vapor mitigation system will be constructed. The engineered vapor control cap will reduce infiltration and the vapor mitigation system will capture and treat emissions. These soils typically contain VOCs and SVOCs, which have the potential to migrate into the atmosphere. All engineered caps will be designed and constructed to withstand the effects of a 500-year flood event; in addition, the engineered caps will be designed and constructed to protect against all Site-specific hazards which may pose a threat to their integrity, such as flooding, inadequate drainage, slope instability, erosion, freeze/thaw cycle effects, surface vegetation and any other risks associated with being located in a flood hazard area. An inspection and maintenance program for the engineered capping systems will be developed as part of the ongoing operation plan for the Site.

- For Site-wide soils determined to require a direct contact barrier, an engineered soil cover system will be utilized. Soils requiring this engineered cover typically consist of low-level contaminated soils containing hazardous substances at levels greater than NJDEP nonresidential direct contact soil remediation standards.

- An ecological risk assessment will be conducted for Impoundments 13, 17 and 24 to confirm the appropriate treatment for these materials. If the ecological risk assessment identifies that any impoundment contents present an unacceptable risk these materials would be relocated and consolidated in the North Area in areas where the same types of controls are warranted. Any impoundment contents that do not present an unacceptable risk could remain in their current location. Any impoundment contents requiring excavation and relocation would be remediated to acceptable levels, such as NJDEP ecological soil screening criteria or ecologically protective benchmarks.

- The existing bedrock groundwater collection system will be improved by relocating the primary extraction wells to a more central location and by adding new extraction wells, as necessary, to ensure that all Site-related groundwater is captured. In addition, a recovery system (such as trenches, wells and/or containment walls) will be constructed for collection of overburden groundwater at several locations. The potential components of the groundwater remedy are shown on Figure 9. The details of these improvements will be developed during the remedial design phase. These improvements will eliminate the migration of contaminants exceeding the more stringent of federal MCLs and NJ GWQS in the overburden and bedrock aquifers beyond the point of compliance through a combination of source actions and hydraulic controls and will restore the overburden and bedrock aquifers within the area of attainment to its expected beneficial use and to concentrations below the more stringent of federal MCLs and NJ GWQS within a reasonable period, as practicable. The waters collected at the Site will be appropriately treated or pre-treated, as necessary, for subsequent discharge in accordance with appropriate requirements. The waters collected at the Site will be discharged to surface water following complete on-site treatment. However, if it is determined that this treatment method is not appropriate or feasible, then collected groundwater will either be re-injected following complete on-site treatment or be discharged to the local sewerage authority directly or following pre-treatment.

- Institutional controls, monitoring and periodic reviews will also be required to ensure that the remedy remains protective of public health and the environment. The following institutional controls will be implemented as part of the remedy: deed restrictions to maintain the protectiveness and

functional integrity of engineered capping systems; restrictive covenants to prevent future land uses that interfere with the implementation or protectiveness of the selected remedy; and a groundwater CEA/WRA to prohibit future use of the groundwater in this area and to restrict the installation of wells (other than for monitoring or remediation purposes) in the area for the duration of the CEA. Monitoring of the engineered capping systems, sediment, surface water and groundwater will be required as part of the ongoing operation plan at the Site. The details of the maintenance and monitoring requirements for the engineering controls will be determined in the remedial design phase.

STATUTORY DETERMINATIONS

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that achieve adequate protection of human health and the environment. In addition, Section 121 of the CERCLA establishes several other statutory requirements and preferences. These specify that, when complete, the selected remedial action for a site must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws unless a statutory waiver is justified. The selected remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity or mobility of hazardous wastes as its principal element. The following sections discuss how the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy will be protective of both human health and the environment. The soil cover system would contain source materials and eliminate potential direct-contact exposure to material, thereby eliminating risk. Additionally, the placement of the multi-layer caps in the areas of vapor and movement control would eliminate potential exposure to these materials, thereby eliminating risks. The collection and treatment of both the overburden and bedrock groundwater would control the migration of contaminants along with implementing institutional controls to eliminate potential exposure pathways. In this manner, the RAOs for the Site would be met. If it is determined

that an unacceptable ecological risk is present, invasive excavation activities in the South and West Areas may pose additional risks during implementation (*e.g.* air emissions, increased potential for migration of materials to nearby receptors). Excavation of the material, even under state-of-the-art control conditions, may result in the release of constituents to the environment. Materials which could meet the definition of a principal threat waste will be addressed in this remedy through consolidation within Impoundments 3, 4, 5 and treatment via in-situ S/S. Following treatment, the residual material will be further secured through the implementation of the multi-layered engineered cap.

The remedy will not impede the established beneficial reuse of the Site (*i.e.*, controlled, restricted access only) and will minimize the height and construction activities at the Impoundment 8 Facility. The Site could be made available for reuse within a reasonably short time after implementation (construction) of the remedy. The remedy implementation time frame of 10 years is considered to be relatively short given the complexity and volume of contamination at the Site. The remedy will provide a number of reuse options for the local community, aligning with local needs for potential recreational use and regional green-way initiatives.

Compliance with Applicable or Relevant and Appropriate Requirements

The selected remedy, Alternative 4A, will comply with all federal and state requirements which are applicable or relevant and appropriate to its implementation. As listed in Table 8, chemical-specific ARARs, such as NJ GWQSs and MCLs, would be met over time within the capture zone of the groundwater collection system for site-related chemicals. However, the time required to return groundwater to NJ GWQS is estimated at over 30 years. Capping would meet chemical-specific ARARs for other materials (*i.e.*, NJ soil remediation standards, RCRA requirements and ecologically-based screening criteria).

The remedial action would be conducted in accordance with location- and action-specific ARARs, pertinent TBCs and guidance, including the NJ Spill Compensation Control Act, Brownfields and Contaminated Site Remediation Act, NJ technical requirements for site remediation and NJ guidance for the remediation of contaminated soils (including deed notice as well as modification to groundwater CEA), NJ and federal wetlands and flood plain requirements, NJDEP air pollution control limits,

LDRs (40 CFR Part 268), CAMU requirements (40 CFR Part 264, Subpart S), RCRA requirements and Clean Water Act requirements.

Cost-Effectiveness

The selected remedy is cost-effective at approximately $205 million. Capital costs associated with the alternative are approximately $155 million and the estimated total O&M cost for this alternative is approximately $50 million. A summary of the cost estimate for the selected remedy can be found in Table 9. A more detailed cost estimate is presented in Appendix G of the Site-wide FS.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site. Of those alternatives that are protective of human health and the environment and comply with ARARs to the extent practicable, EPA has determined that the selected remedy provides the best balance of trade-offs among the alternatives with respect to the five balancing criteria, while also considering the statutory preference for treatment as a principal element, compliance with ARARs and state and community acceptance.

The selected remedy treats source materials constituting principal threats at the Site, achieving significant reductions in the mobility and toxicity of movement control materials, while also substantially mitigating sources of groundwater contamination at the Site. The selected remedy satisfies the criteria for long-term effectiveness by in-situ S/S of wastes and capping that will effectively reduce the mobility of and potential for direct contact with contaminants remaining on-site. The selected remedy also presents substantially fewer short-term risks compared with other treatment/excavation alternatives and involves significantly fewer implementability issues, setting it apart from other alternatives involving extensive excavation of contaminated media.

Preference for Treatment as a Principal Element

By utilizing in-situ S/S treatment to the extent practicable, the statutory preference for remedies that employ treatment as a principal element is satisfied.

Five-Year Review Requirements

Because the remedy will result in hazardous substances, pollutants or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

DOCUMENTATION OF SIGNIFICANT CHANGES

All written and verbal comments submitted during the public comment period were reviewed by EPA. All comments and EPA responses are included in the Responsiveness Summary (Appendix V). Upon review of these comments, EPA has determined that no significant changes are necessary to the preferred alternative, Alternative 4A, Consolidation/Treatment/Soil Cover and Stabilization/Capping with Hydraulic Control/Treatment of Groundwater, as presented in the Proposed Plan.

Appendix B

APPENDIX B

STATEMENT OF WORK

American Cyanamid Superfund Site
Bridgewater Township, Somerset County, New Jersey

I. INTRODUCTION

This Statement of Work (SOW) shall mean the statement of work for implementation of the Remedial Action for the remedy selected in the Operable Unit 4 Record of Decision (OU 4 ROD) issued on September 27, 2012 by the United States Environmental Protection Agency (EPA) for the American Cyanamid Superfund Site (Site) located in Bridgewater Township, Somerset County, New Jersey. This SOW also incorporates certain tasks remaining from the Administrative Settlement Agreement and Order on Consent for Removal Action, U.S. EPA Region 2, CERCLA Docket No. CERCLA: 02-2011-2015, as well as the 1998 OU 2 Explanation of Significant Differences (OU 2 ESD), the 1996 OU 2 ROD (OU 2 ROD) and the 1999 Remedial Action Plan for the Closure of Impoundments 15 and 16 (1999 RAP), as specified in this SOW. This SOW is incorporated into the Consent Decree for the Remedial Action, *U.S. v. Wyeth Holdings Corp.* (D.N.J.), and is an enforceable part of the Consent Decree. In the event of any conflict in requirements related to the Removal Action or the remediation of Impoundments 15 and 16, the Consent Decree and this SOW shall govern.

Settling Defendant shall perform the Work (as defined in the Consent Decree) in accordance with the Consent Decree, the OU 4 ROD, OU 2 ROD (as amended by the OU 2 ESD) and this SOW, including all terms, conditions and schedules (subject to *force majeure* or other agreed-upon schedule changes) set forth herein or developed and approved hereunder. All definitions in the Consent Decree are incorporated by reference into this SOW.

II. OBJECTIVES AND WORK TO BE PERFORMED

A. The objectives of the Work required by this SOW relating to OU 4:

1. Remove or treat material that meets the definition of Principal Threat Waste (PTW) contained in "A Guide to Principal Threat and Low Level Wastes," EPA OSWER 9380.3-06FS (1991), to the extent practicable;

2. Prevent current or potential future migration of material that meets the definition of PTW from the Site that would result in direct contact or inhalation exposure, to the extent practicable;

3. Prevent or minimize human and ecological exposure to contaminants in soils

and impoundment materials at levels above relevant risk-based remediation criteria;

4. Prevent or minimize sources of groundwater impacts (*i.e.,* reduce chemical loadings to groundwater) resulting in long-term improvement of groundwater quality and eventual achievement of applicable regulatory standards;

5. Restore, as practicable, the overburden and bedrock aquifers within the area of attainment to its expected beneficial use and to concentrations at or below the more stringent of federal Maximum Contaminant Levels (MCLs) and New Jersey Groundwater Quality Standards (NJ GWQS) within a reasonable period; and

6. Eliminate the migration of contaminants exceeding the more stringent of federal MCLs and NJ GWQS in the overburden and bedrock aquifers beyond the point of compliance through a combination of source actions and hydraulic controls to the extent practicable.

The Remedial Action required by this SOW includes the construction and operation and maintenance (O&M) of the remedy selected in the OU 4 ROD.

B. The major components of the Remedial Action for Impoundment Contents and Site-wide Soils are as follows:

1. Excavation, relocation, consolidation and/or treatment via in-situ solidification/stabilization (S/S), as appropriate, of impoundment contents and Site-wide soils;

2. Construction of engineered capping systems, including vapor collection and treatment systems, as appropriate, and a Site-wide storm water drainage system, as appropriate;

3. As determined by the results of the ecological risk assessment, relocation and consolidation of Impoundments 13, 17, and 24 materials into appropriate portions of the North Area where the same types of controls are warranted; and

4. Completion of certain tasks associated with the Removal Action, including, but not limited to:

   a. Management of any spoils generated from the Removal Action that are approved for on-Site reuse by New Jersey Department of Environmental Protection (NJDEP). Any spoils not approved by both NJDEP and EPA for on-site reuse will be disposed of off-site;

b. Mitigation of permanent wetland impacts that occurred during the Removal Action construction, subject to EPA approval;

c. Address potential impacts from continuing discharges of surface water from Pond 287, as necessary;

d. Decommissioning of the decontamination pad within the former Remediation Enclosure remaining from the Removal Action. The decontamination pad shall be decommissioned following the off-site disposal and/or on-site reuse of the spoils, unless otherwise indicated by EPA. The decommissioning procedures approved by EPA on May 20, 2014 shall be utilized for the demolition of this decontamination pad, unless otherwise indicated by EPA; and

e. Address any areas of impacted soils between the groundwater collection trench/hydraulic barrier wall and Impoundments 1 and 2 that were discovered during the implementation of the Removal Action.

C. The major components of the Remedial Action for Groundwater are as follows:

1. Construction of enhancements to the existing bedrock groundwater collection system, including relocating the primary extraction wells to a more central location, to ensure that all contaminated groundwater at or from the Site is captured, including contaminated bedrock groundwater in the area where the Removal Action was performed;

2. Construction of a recovery system (including, but not limited to interceptor trenches, wells, and/or containment walls) for the collection of contaminated overburden groundwater at or from the Site, incorporating and refining, as necessary, the existing overburden groundwater collection system installed as part of the Removal Action;

3. Construction of a conveyance system for bedrock and overburden groundwater, and a system to convey contaminated groundwater from the area where the Removal Action was performed to the future Site-wide groundwater treatment facility(s) (GWTF);

4. Construction of an on-Site GWTF with discharge to the Raritan River and/or groundwater, as appropriate;

5. Treatment and discharge of contaminated groundwater collected by the bedrock collection system and the overburden recovery system, as well as water derived from RCRA units and their closures, wastewater generated during remedial construction, and other water, as approved by EPA, by

reinjection to groundwater and/or discharge to surface water in accordance with NJDEP requirements; and

6. Operation and maintenance of all components of the groundwater remedy, including, but not limited to the bedrock collection system, overburden recovery system (including the existing Removal Action system), conveyance system, on-site treatment or pre-treatment facilities, and associated discharge system.

D. The work to be completed for Impoundments 15 and 16 includes:

1. Excavation, transport and reuse of iron oxide material in Impoundments 15 and 16 at an off-site recycling facility per the OU 2 ESD, OU 2 ROD (as amended) and the 1999 RAP;

2. The backfilling and re-vegetation of the former impoundment areas per the OU 2 ESD, OU 2 ROD (as amended) and the 1999 RAP; and,

3. Maintenance and monitoring of Impoundments 15 and 16, including but not limited to the monitoring of groundwater in the vicinity of the impoundments during and after their final closure in accordance with an approved comprehensive Site-wide monitoring program.

E. The Institutional Controls, Maintenance and Monitoring Required by the Remedial Action include:

1. Establishment of institutional controls, in accordance with the Institutional Control Implementation and Assurance Plan (ICIAP), including, but not limited to deed restrictions, restrictive covenants, and a classification exception area/well restriction area (CEA/WRA) for groundwater; and

2. Maintenance and monitoring for all systems noted in the OU 4 ROD, including, but not limited to, engineered capping, drainage, and groundwater capture and treatment systems, and incorporating and modifying, as necessary, maintenance and monitoring requirements for the overburden groundwater collection and treatment system installed as part of the Removal Action.

III. PERFORMANCE STANDARDS

A. Performance Standards

Performance Standards are the cleanup standards and other measures of achievement of the goals of the Remedial Action, set forth in the RODs and this SOW and any modified

standards established pursuant to this Consent Decree.

Settling Defendant shall continue to implement the Remedial Action until the Performance Standards are achieved. Settling Defendant may petition for a waiver of Performance Standards pursuant to applicable law and EPA policy and guidance at the time of such petition. Settling Defendant shall implement O&M for so long thereafter as is required by the Consent Decree.

IV. PROJECT SUPERVISION/MANAGEMENT

A. Supervising Contractor

All aspects of the Work to be performed by Settling Defendant pursuant to Sections VI, VII, VIII, IX, X, XI and XV of the Consent Decree shall be done under the direction and supervision of one or more Supervising Contractor(s), the selection of which shall be subject to approval by EPA.

Settling Defendant shall comply with the requirements set forth in Paragraph 10. (Selection of a Supervising Contractor for Remedial Action) of the Consent Decree.

Settling Defendant has retained Golder Associates Inc., Woodard & Curran, Inc., and Brown and Caldwell Inc. as Supervising Contractors and such retention is hereby approved by EPA. Settling Defendant also has retained Quantum Management Group, Inc. as a contractor and such retention is hereby approved by EPA. If requested, Settling Defendant shall notify EPA of the name(s) and qualification(s) of any other contractor(s) or subcontractor(s) retained to perform the Work at least fourteen (14) days prior to commencement of such Work. EPA retains the right to disapprove of any or all of the contractors and/or subcontractors retained by Settling Defendant. If EPA disapproves of a selected contractor, Settling Defendant shall retain a different contractor and shall notify EPA of that contractor's name and qualifications within seven (7) days of EPA's disapproval. The Supervising Contractor shall be a qualified licensed professional engineering firm. All plans and specifications for construction of the Remedial Action shall be prepared under the supervision of, and signed/certified by, a licensed New Jersey professional engineer. With respect to any contractor proposed to be the Supervising Contractor, Settling Defendant shall demonstrate that the proposed contractor has a quality system that complies with the Uniform Federal Policy for Implementing Quality Systems (UFP-QS), (EPA/505/F-03/001, March 2005), by submitting a copy of the proposed contractor's Quality Management Plan ("QMP"), unless EPA has determined that such QMP is not required. EPA will issue a notice of disapproval or an authorization to proceed. Any decision not to require submission of the contractor's QMP should be documented in a memorandum from the Remedial Project Manager (RPM) and

Regional Quality Assurance personnel to the Site file.

B. Project Coordinator

Settling Defendant has designated, and EPA hereby approves Roman Pazdro (Quantum Management Group, Inc.) as the Primary Project Coordinator and Russell Downey (Pfizer, Inc.) as the Alternate Project Coordinator for the Remedial Action, who shall be responsible for administration of all actions by Settling Defendant required by the Consent Decree. The Project Coordinator and Alternate Project Coordinator shall not be an attorney for Settling Defendant in this matter. To the greatest extent possible, the designated Project Coordinator or Alternate Project Coordinator shall be present on Site or readily available during Site Work. EPA retains the right to disapprove of the designated Project Coordinator and/or Alternate Project Coordinator. The Project Coordinator and Alternate Project Coordinator shall have the technical expertise sufficient to adequately oversee all aspects of the Work. If EPA disapproves of the designated Project Coordinator or Alternate Project Coordinator, Settling Defendant shall retain a different Project Coordinator or Alternate Project Coordinator and shall notify EPA of that person's name, address, telephone number and qualifications within 14 days following EPA's disapproval. If Settling Defendant chooses to change either of its Project Coordinators, it will notify EPA of that person's name, address, telephone number and qualifications 14 days prior to the change. Receipt by Settling Defendant's Project Coordinator of any notice or communication from EPA relating to the Consent Decree shall constitute receipt by Settling Defendant.

V. PROJECT REPORTS AND CONSTRUCTION MEETINGS

In accordance with the Consent Decree, Settling Defendant shall provide written progress reports to EPA with respect to actions and activities undertaken pursuant to Section X of the Consent Decree. The progress reports shall be submitted on or before the 15th day of each month following the effective date of the Consent Decree unless otherwise agreed by EPA. Settling Defendant's obligation to submit progress reports continues until EPA gives Settling Defendant written notice under Section X of the Consent Decree. At a minimum, these progress reports shall include the following:

A. A description of all actions which have been taken toward achieving compliance with the Consent Decree during the prior reporting period;

B. A description of any violations and/or deviations from the Consent Decree and other problems encountered during the prior reporting period;

C. A description of all corrective actions taken in response to any issues or problems which occurred during the prior reporting period;

D. The results of all validated sampling, test results and other data received or generated by Settling Defendant during the course of implementing the Work during the prior reporting period, to the extent that such results and data have not been included in another required deliverable. Such results shall be validated in accordance with the appropriate EPA-approved Quality Assurance Project Plan(s) ("QAPP") developed in conformity with this SOW;

E. Identification of all plans, reports, and other deliverables required by the Consent Decree completed and submitted during the prior reporting period;

F. A description of all plans, actions and data scheduled for the next eight weeks, or longer as determined by EPA;

G. A description of all activities undertaken in support of community relations during the prior reporting period and those to be undertaken in the next eight weeks, or longer as determined by EPA;

H. A description of any modifications to the work plans or other schedules that Settling Defendant has proposed or is proposing to EPA, or that have been approved by EPA, and a description of all plans, actions, and data subject to such modifications scheduled for the next eight weeks, or longer as determined by EPA;

I. An estimate of the percentage of the Work required by the Consent Decree which has been completed as of the date of the progress report; and

J. An identification of all delays encountered or anticipated that may affect the future schedule for performance of the Work, and all efforts made by Settling Defendant to mitigate delays or anticipated delays.

During the construction of the Remedial Action, Settling Defendant shall participate in construction meetings with representatives from EPA and/or EPA's contractor, as determined by EPA. At least one of the Settling Defendant's Supervising Contractors, as well as the Project Coordinator or Alternate Project Coordinator shall attend the construction meetings. If requested, an EPA-approved designee may be substituted for the Project Coordinator(s) for construction meetings. If the Project Coordinator or Alternate Project Coordinator (or EPA-approved designee) is an employee of the Supervising Contractor, only the Project Coordinator (or EPA-approved designee) needs to attend the construction meetings with representatives from EPA and/or EPA's contractor. At a minimum, these construction meetings shall include, but not be limited to the following:

A. A description of all field activities and field actions which have been conducted pursuant to the Consent Decree since the last construction meeting;

B. A description of all field activities and field actions which are planned pursuant to

the Consent Decree until the next construction meeting;

C. A description of all corrective activities and actions taken in response to any issues or problems which occurred since the last construction meeting; and

D. An identification of all delays encountered or anticipated that may affect the future schedule for performance of the Work, and all efforts made by Settling Defendant to mitigate delays or anticipated delays.

VI. REMEDIAL ACTION

The Remedial Action for OU 4 shall be addressed in two remedial components: (1) Impoundment Contents and Site-wide Soils; and (2) Groundwater. These remedial components will be addressed simultaneously, on parallel tracks; however, the parties recognize that the schedule of one remedial component may impact the schedule of the other, and the parities will schedule these components pursuant to an EPA-approved plan or as approved by EPA. The Remedial Action shall comply with Paragraph 11 of the Consent Decree. The Impoundments Contents and Site-wide Soils remedial component shall include the following subcomponents: i) Impoundment Contents, and ii) Site-wide Soils. The Groundwater remedial component shall include the following subcomponents: i) Groundwater Extraction, and ii) Groundwater Treatment. The remedial components and subcomponents may be separated further and may later be recombined in subsequent phases of the Work, as approved by EPA. All remaining Removal Action work will be integrated and incorporated into both remedial components, as appropriate.

The Remedial Action deliverables for each remedial component includes: a Remedial Action Work Plan ("RAWP"), an Operation and Maintenance ("O&M") Plan, a Remedial Action Report, a Post-Remediation Monitoring Plan, a Notice of Completion, and a Certification of Completion Report. Each of these deliverables shall be separately implemented for the two components and/or subcomponents in order to facilitate efficient and effective implementation of the Work; therefore reference to these deliverables below shall apply to either Impoundment Contents and Site-wide Soils or Groundwater, as indicated, or to their subcomponents. Separated subcomponents may later be recombined in subsequent phases of the Work, for example, a separate RAWP may be prepared and submitted to EPA for specific subcomponents which may later be combined with other subcomponents for operations and maintenance and/or construction and completion reporting.

1. Impoundment Contents and Site-wide Soils Component

A. Within ninety (90) days after EPA approval of the applicable Final Remedial Design Report or thirty (30) days after the effective date of the Consent Decree, whichever is later, Settling Defendant shall submit to EPA a draft RAWP for Impoundment Contents and Site-wide Soils.

B. With EPA approval, separate RAWPs may be submitted for subcomponents in order to facilitate efficient and effective construction of the Work. The RAWP(s) shall provide for the construction and implementation of the applicable elements of the remedy set forth in the EPA-approved Final Remedial Design Report(s) consistent with the OU4 ROD and achievement of the Performance Standards, in accordance with the Consent Decree, the OU 4 ROD and this SOW. At the same time as it submits draft RAWP(s) for Impoundment Contents and Site-wide Soils, Settling Defendant shall submit to EPA a Health and Safety Plan ("HSP") for Impoundment Contents and Site-wide Soils for field activities which conforms to the applicable Occupational Safety and Health Administration and EPA requirements including, but not limited to, 29 C.F.R. § 1910.120.

C. The draft RAWP(s) for Impoundment Contents and Site-wide Soils shall include at a minimum the following:

1. A final schedule for the completion of the Remedial Actions for this component and all major tasks therein, as well as a schedule for completion of required plans, and other deliverables;

2. The initial formulation of Settling Defendant's Remedial Action project team (including, but not limited to, the Supervising Contractor);

3. A description of the personnel requirements, responsibilities, and duties, including a discussion for training and lines of authority;

4. The method for selection of the contractor, if necessary;

5. Methodology for implementation of the Remedial Action for this component;

6. A Construction Quality Assurance Plan, which may be submitted as an amendment to the Construction Quality Assurance Plan completed as part of the Final Remedial Design Report;

7. The methodology for implementing the Construction Quality Assurance Plan;

8. The procedures and plans for the decontamination of equipment and disposal of contaminated materials and debris;

9. Discussion of the methods by which construction operations for this component shall proceed, which shall include the following:

   a. Timing of and manner in which activities shall be sequenced;

b. Preparation of the construction area including security, utilities, decontamination facilities, construction trailers and equipment storage;

c. Coordination of construction activities;

d. Maintenance of the construction area during the Remedial Action;

e. Coordination with local authorities regarding contingency planning and potential traffic obstruction; and

f. Entry and access during the construction period(s) and periods of inactivity, including provisions for decontamination, erosion control and dust control.

10. Discussion of construction quality control, including:

a. Methods of performing the quality control inspections, including when inspections should be made and what to look for;

b. Control testing procedures, as appropriate, for each specific test. This includes information which authenticates that personnel and laboratories performing the tests are qualified and the equipment and procedures to be used comply with applicable standards;

c. Procedures for scheduling and managing submittals, including those of subcontractors, off-Site fabricators, suppliers, and purchasing agents; and

d. Reporting procedures including frequency of reports and report formats.

11. A maintenance and monitoring plan for engineered capping systems;

12. The methods for satisfying permitting requirements;

13. The methodology for implementing the O&M Plan;

14. A description of all construction-related sampling, analysis, and monitoring for this component to be conducted under the Consent Decree, as well as a description of all O&M requirements including long-term monitoring requirements;

15. If applicable, a "Request for Modification of Approved Final Remedial Design Report," including any requests for modification of the EPA-

approved Final Remedial Design Report(s), based on construction methods identified by the contractor(s), or proposed modification of the approved construction schedule, or any other requests for modification, subject to EPA approval;

16. A Methodology for implementation of the QAPP. The QAPP shall be amended, as necessary. All sampling, analysis, data assessment and monitoring shall be performed in accordance with the approved QAPP. All testing methods and procedures shall be fully documented and referenced to established methods or standards; and,

17. An updated HSP for the remedial construction phase of the Work shall be prepared. The HSP shall address health and safety measures to be implemented and observed by construction personnel, as well as recommended health and safety measures for the adjacent community and general public, together with a description of the program for informing the community of these recommendations. The HSP shall include the name of the person responsible in the event of an emergency situation, as well as the necessary procedures that must be taken in the event of an emergency, as outlined in the Consent Decree.

D. Approval of RAWP(s) for Impoundment Contents and Site-wide Soils

EPA will either approve the draft RAWP(s) for Impoundment Contents and Site-wide Soils or require modifications in accordance with the procedures set forth in Section XI (EPA Approval of Plans and Other Deliverables) of the Consent Decree. Following EPA approval, the draft RAWP(s) for Impoundment Contents and Site-wide Soils shall become the RAWP(s) for Impoundment Contents and Site-wide Soils and shall be incorporated into and become an enforceable part of the Consent Decree.

E. Upon approval of the draft RAWP(s) for Impoundment Contents and Site-wide Soils by EPA, Settling Defendant shall implement the activities required under the applicable RAWP(s) for Impoundment Contents and Site-wide Soils. Settling Defendant shall submit to EPA all reports and other deliverables required under the approved RAWP(s) for Impoundment Contents and Site-wide Soils in accordance with the approved schedule for review and approval pursuant to Section XI (EPA Approval of Plans and Other Deliverables). Unless otherwise directed by EPA, Settling Defendant shall not commence physical Remedial Action activities addressing impoundment contents and Site-wide soils at the Site prior to approval of the applicable RAWP(s) for Impoundment Contents and Site-wide Soils.

F. Performance of Remedial Construction for Impoundment Contents and Site-wide Soils

1. Upon approval of the draft RAWP(s) for Impoundment Contents and Site-wide Soils by EPA, Settling Defendant shall initiate the remedial construction in accordance with the applicable EPA-approved RAWP(s) and the applicable EPA-approved Final Remedial Design Report(s).

2. During performance of the remedial construction, Settling Defendant may identify and request EPA approval for field changes to the EPA-approved RAWP(s) for Impoundment Contents and Site-wide Soils, EPA-approved Final Remedial Design Report(s), and/or the construction schedule, as necessary, to complete the Work.

G. Settling Defendant shall continue to implement the Remedial Action for the Impoundment Contents and Site-wide Soils component until the Performance Standards for each remedial component are achieved. Settling Defendant shall implement the O&M plan for so long thereafter as is required by the Consent Decree and this SOW.

H. Operation and Maintenance Plan for Impoundment Contents and Site-wide Soils

1. No later than sixty (60) days prior to the scheduled completion date of the Remedial Action Work for the Impoundment Contents and Site-wide Soils component, Settling Defendant shall submit an O&M Plan to EPA for review and approval pursuant to Section XI (EPA Approval of Plans and Other Deliverables) of the Consent Decree. The O&M Plan shall be prepared in conformance with EPA guidelines contained in Considerations for Preparation of Operation and Maintenance Manuals, EPA 68-01-0341.

2. The O&M Plan will be developed for the Impoundment Contents and Site-wide Soils component of the Remedial Action. The O&M Plan shall be separated into Pre-Achievement O&M activities and Post-Achievement O&M activities, unless otherwise determined by EPA. The O&M Plan shall be prepared in accordance with instructions for preparation of operation and maintenance plans in the "Remedial Design/Remedial Action Handbook," dated June, 1995 (OSWER 9355.0-4A), which includes, but is not limited to, a description of the personnel requirements, responsibilities and duties, including discussion for training, lines of authority, sampling, analysis and monitoring conducted under the Consent Decree.

3. The O&M Plan shall include, at a minimum, the following:

a. An updated or amended QAPP if determined to be necessary by EPA;

b. An updated or amended HSP for O&M activities, if determined to be necessary by EPA;

c. A discussion of potential operating problems and remedies for such problems;

d. A discussion of alternative procedures in the event of system failure;

e. A schedule for equipment replacement;

f. The monitoring requirements and schedule for groundwater in the vicinity of solidified/stabilized materials, which may be incorporated into the comprehensive Site-wide monitoring program;

g. The general requirements for monitoring/sampling of S/S materials and all engineered capping systems, as appropriate;

h. An inspection schedule for all engineered capping systems; and

i. Requirements for submittal of progress reports to EPA.

4. Proposed modifications of the approved O&M Plan may be submitted to EPA for consideration upon completion of construction or thereafter if Settling Defendant can demonstrate that such considerations would enhance and/or maintain the environmental monitoring programs.

5. Once approved by EPA, Settling Defendant shall implement the activities in the O&M Plan in accordance with the schedule set forth therein. Once approved by EPA, the O&M Plan shall be incorporated into and become an enforceable part of the Consent Decree.

2. <u>Groundwater Component</u>

A. Within ninety (90) days after EPA approval of the applicable Final Remedial Design Report or thirty (30) days after the effective date of the Consent Decree, whichever is later, Settling Defendant shall submit to EPA a draft RAWP for Groundwater.

B. With EPA approval, separate RAWPs may be submitted for subcomponents in order to facilitate efficient and effective construction of the Work. The RAWP for Groundwater shall provide for the construction and implementation of the applicable elements of the remedy set forth in the EPA-approved Final Remedial Design Report(s) consistent with the OU 4 ROD and achievement of the

Performance Standards, in accordance with the Consent Decree, the OU 4 ROD and this SOW. At the same time as it submits a draft RAWP for Groundwater, Settling Defendant shall submit to EPA a HSP for Groundwater for field activities which conforms to the applicable Occupational Safety and Health Administration and EPA requirements including, but not limited to, 29 C.F.R. § 1910.120.

C. The draft RAWP(s) for Groundwater shall include at a minimum the following:

1. A final schedule for the completion of the Remedial Actions for this component and all major tasks therein, as well as a schedule for completion of required plans, and other deliverables;

2. The initial formulation of Settling Defendant's Remedial Action project team (including, but not limited to, the Supervising Contractor);

3. A description of the personnel requirements, responsibilities, and duties, including a discussion for training, and lines of authority;

4. The method for selection of the contractor, if necessary;

5. Methodology for implementation of the Remedial Action for this component;

6. A Construction Quality Assurance Plan which may be submitted as an amendment to the Construction Quality Assurance Plan completed as part of the Final Remedial Design Report;;

7. The methodology for implementing the Construction Quality Assurance Plan;

8. The procedures and plans for the decontamination of equipment and disposal of contaminated materials;

9. Discussion of the methods by which construction operations for this component shall proceed, which shall include the following:

   a. Timing of and manner in which activities shall be sequenced;

   b. Preparation of the construction area including security, utilities, decontamination facilities, construction trailers and equipment storage;

   c. Coordination of construction activities;

   d. Maintenance of the construction area during the Remedial Action;

e. Coordination with local authorities regarding contingency planning and potential traffic obstruction; and

f. Entry and access during the construction period(s) and periods of inactivity, including provisions for decontamination, erosion control and dust control.

10. Discussion of construction quality control, including:

a. Methods of performing the quality control inspections, including when inspections should be made and what to look for;

b. Control testing procedures, as appropriate, for each specific test. This includes information which authenticates that personnel and laboratories performing the tests are qualified and the equipment and procedures to be used comply with applicable standards;

c. Procedures for scheduling and managing submittals, including those of subcontractors, off-Site fabricators, suppliers, and purchasing agents; and

d. Reporting procedures including frequency of reports and report formats.

11. The methods for satisfying permitting requirements;

12. The methodology for implementing the O&M Plan;

13. A description of all construction-related sampling, analysis and monitoring for this component to be conducted under the Consent Decree, as well as a description of all O&M requirements including long-term monitoring requirements;

14. If applicable, a "Request for Modification of Approved Final Remedial Design Report," including any requests for modification of the EPA-approved Final Remedial Design Reports, based on construction methods identified by the contractor(s), or proposed modification of the approved construction schedule, or any other requests for modification, subject to EPA approval;

15. A Methodology for implementation of the QAPP. The QAPP shall be amended, as necessary. All sampling, analysis, data assessment and monitoring shall be performed in accordance with the approved QAPP. All testing methods and procedures shall be fully documented and

referenced to established methods or standards; and,

16. An updated HSP for the Remedial Construction phase of the Work shall be prepared. The HSP shall address health and safety measures to be implemented and observed by construction personnel, as well as recommended health and safety measures for the adjacent community and general public, together with a description of the program for informing the community of these recommendations. The HSP shall include the name of the person responsible in the event of an emergency situation, as well as the necessary procedures that must be taken in the event of an emergency, as outlined in the Consent Decree.

D. Approval of RAWP(s) for Groundwater

EPA will either approve the draft RAWP(s) for Groundwater or require modifications in accordance with the procedures set forth in Section XI (EPA Approval of Plans and Other Deliverables) of the Consent Decree. Following EPA approval, the draft RAWP(s) for Groundwater shall become the RAWP(s) for Groundwater and shall be incorporated into and become an enforceable part of the Consent Decree.

E. Upon approval of the draft RAWP(s) for Groundwater by EPA, Settling Defendant shall implement the activities required under the applicable RAWP for Groundwater. Settling Defendant shall submit to EPA all reports and other deliverables required under the approved RAWP(s) for Groundwater in accordance with the approved schedule for review and approval pursuant to Section XI (EPA Approval of Plans and Other Deliverables) of the Consent Decree. Unless otherwise directed by EPA, Settling Defendant shall not commence physical Remedial Action activities addressing groundwater at the Site prior to approval of the applicable RAWP(s) for Groundwater. The following ongoing activities addressing groundwater at the Site have been approved by EPA and NJDEP:

1. Groundwater extraction from wells PW-2 and PW-3, including incidental impacted storm water collection, and conveyance for treatment at the Somerset Raritan Valley Sewerage Authority (SRVSA);

2. Lagoon 7 water extraction and treatment via a NJPDES-DSW permit-equivalent or, under high-volume circumstances, via discharge to SRVSA for treatment; and

3. Collection, extraction and treatment of overburden groundwater south of Impoundments 1 and 2 via the Removal Action system.

F. Performance of Remedial Construction for Groundwater

1. Upon approval of the draft RAWP(s) for Groundwater by EPA, Settling Defendants shall initiate the remedial construction in accordance with the applicable EPA-approved RAWP(s) for Groundwater and the applicable EPA-approved Final Remedial Design Report(s).

2. During performance of the remedial construction, Settling Defendant may identify and request EPA approval for field changes to the EPA-approved RAWP(s) for Groundwater, EPA-approved Final Remedial Design Report and/or the construction schedule, as necessary, to complete the Work.

G. Settling Defendant shall continue to implement the groundwater component of the Work until the Performance Standards for that component are achieved. Settling Defendant shall implement O&M for so long thereafter as is required by the Consent Decree and this SOW.

H. Operation and Maintenance Plan for Groundwater

1. No later than sixty (60) days prior to the scheduled completion date of the Remedial Action Work for the groundwater component, Settling Defendant shall submit an O&M Plan to EPA for review and approval pursuant to Section XI (EPA Approval of Plans and Other Deliverables) of the Consent Decree. The O&M Plan shall be prepared in conformance with EPA guidelines contained in Considerations for Preparation of Operation and Maintenance Manuals, EPA 68-01-0341.

2. The O&M Plan will be developed for the groundwater component of the Remedial Action. The O&M Plan shall be separated into Pre-Achievement O&M activities and Post-Achievement O&M activities. The O&M Plan shall be prepared in accordance with instructions for preparation of operation and maintenance plans in the "Remedial Design/Remedial Action Handbook," dated June, 1995 (OSWER 9355.0-4A), which includes, but is not limited to, a description of the personnel requirements, responsibilities, and duties, including discussion for training, lines of authority, sampling, analysis, and monitoring conducted under the Consent Decree.

3. The O&M Plan shall include, at a minimum, the following:

a. An updated or amended QAPP if necessary;

b. An updated or amended HSP for O&M activities, if necessary;

c. A discussion of potential operating problems and remedies for

such problems;

d. A discussion of alternative procedures in the event of system failure;

e. A schedule for equipment replacement;

f. A monitoring schedule for the overburden and bedrock groundwater well networks;

g. A schedule for periodic trend analysis reports for both the overburden and bedrock aquifer monitoring well networks; and

h. Requirements for submittal of progress reports to EPA.

4. Proposed modifications of the approved O&M Plan may be submitted to EPA for consideration upon completion of construction or thereafter if Settling Defendant can demonstrate that such considerations would enhance and/or maintain the environmental monitoring programs.

5. Once approved by EPA, Settling Defendant shall implement the activities in the O&M Plan in accordance with the schedule set forth therein. Once approved by EPA, the O&M Plan shall be incorporated into and become an enforceable part of the Consent Decree.

VII. PRE-FINAL AND FINAL INSPECTIONS, REMEDIAL ACTION REPORTS, AND NOTICE OF CONSTRUCTION COMPLETION

1. Impoundment Contents and Site-wide Soils Component (OU 4)

A. Inspection(s) for Impoundment Contents and Site-wide Soils

1. At least fourteen (14) days prior to the completion of construction for each component, Settling Defendant and its contractor(s) shall be available to accompany EPA personnel and/or its representatives on a pre-final inspection. The pre-final inspection shall consist of a walkthrough of the construction areas to determine the completeness of the construction and its consistency with the Final Remedial Design Report(s), the Consent Decree, this SOW and the OU 4 ROD.

Following the pre-final inspection, EPA will either specify the necessary actions to complete the construction phase of the Remedial Action component, as appropriate, or determine that construction is complete. If EPA requires actions, Settling Defendant shall undertake such actions

according to a schedule proposed by Settling Defendant and approved by EPA. Within fourteen (14) days after completion of such actions, Settling Defendant and its contractor(s) shall be available to accompany EPA personnel and/or its representatives on an inspection as provided for in the preceding paragraph. Said inspection will be followed by further directions and/or notifications by EPA as provided in this paragraph.

B. Remedial Action Report(s) for Impoundment Contents and Site-wide Soils

1. Within seventy-five (75) days of EPA's determination that all construction for a given component required for the Remedial Action is complete, Settling Defendant shall submit a draft Remedial Action Report (the "draft Remedial Action Report for Impoundment Contents and Site-wide Soils") to EPA for review and approval pursuant to Section XI (EPA Approval of Plans and Other Deliverables) of the Consent Decree.

2. The draft Remedial Action Report for Impoundment Contents and Site-wide Soils shall include the following sections:

a. Introduction

i. A brief description of the location, size, environmental setting and history of the Site.

ii. A summary of the environmental regulatory and enforcement history of the American Cyanamid Site.

iii. The major findings and results of remedial investigation activities.

iv. An outline of major prior removal and remedial activities.

b. Background

i. Summarize requirements specified for the cap(s) in the OU 4 ROD, the Remedial Design Work Plan, the Final Remedial Design Report and related documents. Include information on the cleanup goals, institutional controls, monitoring requirements, operation and maintenance requirements, and other parameters applicable to the design, construction, operation and performance of the Remedial Action.

ii. Summarize all the Remedial Design activities completed for the Impoundment Contents and Site-wide Soils

component of the OU 4 remedy, including any significant regulatory or technical considerations or events occurring during the preparation of the Remedial Designs.

iv. Identify and briefly discuss any ROD amendments, explanation of significant differences, or technical impracticability waivers.

c. Construction Activities

i. Provide a step-by-step summary description of the major activities undertaken to construct and implement the Remedial Action (*e.g.*, mobilization and Site preparatory work; earthwork, quantity of material excavated/relocated, installation of engineered capping systems, implementation of in-situ S/S, cleanup levels achieved, materials and/or equipment used, post-excavation activities, including source(s) of any clean fill, the types of fill material used, the final grading and contouring of each area excavated, all other Site restoration activities, all remedial construction equipment decontamination, dismantlement, and removal, collection and treatment system/unit installation/assembly, operation of the S/S treatment technology; associated Site work, such as fencing and water collection and control; and sampling activities).

ii. Provide a section to include photographs that record the progress of major remedial construction activities including, at a minimum, the important features of the Site prior to the commencement of the Remedial Action, remedial construction activities for the various tasks, and the appearance of the Site after the remedial construction has been completed.

d. Chronology of Events

i. Provide a tabular summary that lists the major events for this component of the Remedial Action completed by or on behalf of Settling Defendant and associated dates of those events, starting with the issuance of the OU 4 ROD.

ii. Include significant milestones and dates, such as, remedial design submittals and approvals; mobilization and construction of the remedy; significant operational, monitoring and sampling events, system modifications,

variance or noncompliance situations, final sampling and confirmation-of-performance results; required inspections; demobilization; and completion or startup of post-construction operation and maintenance activities.

e. Performance Standards and Construction Quality Control

i. Describe the overall performance of the technologies in terms of comparison to cleanup goals and Performance Standards.

ii. Provide an explanation of the approved construction quality assurance and construction quality control requirements or cite the appropriate reference for this material. Explain any substantial problems or deviations.

iii. Provide an assessment of the performance data quality, including the overall quality of the analytical data, with a brief discussion of QA/QC procedures followed, use of a QAPP, comparison of analytical data quality objectives.

f. As-Built Drawings

i. Submit to EPA the as-built engineering drawings which depict the Remedial Action as implemented pursuant to the Consent Decree. Remedy implementation modifications if any to the approved plans and specifications of the Final Remedial Design Report shall be reported and shown on the as-built drawings. The reasons for all such modifications shall be described in detail.

ii. The as-built drawings shall be signed and stamped by a professional engineer licensed to practice in the State of New Jersey, and shall include a certification that the construction of the Remedial Action has been completed in conformance with the Final Remedial Design Report, OU 4 ROD, and the Consent Decree.

g. Continued Operation and Maintenance Activities

i. Describe, or reference as approved by EPA, the general activities for post-construction operation and maintenance activities, such as monitoring, site maintenance and closure activities.

h. Inspection Certificates

i. Report the results of any inspection required by EPA or NJDEP, and identify any deficiencies found.

ii. Briefly describe adherence to health and safety requirements while performing this component of the Remedial Action. Explain any substantial problems or deviations.

iii. Briefly summarize details of institutional controls (e.g. the type of institutional control implemented, who will maintain the control, who will enforce the control) and reference the ICIAP.

iv. This Section shall include a certification statement, signed by responsible corporate officials of Settling Defendant's Supervising Contractor, which states the following:

> To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

i. Contact Information: Provide contact information (names, addresses, phone numbers, and contract/reference data) for the major design and remediation contractors, as applicable.

3. EPA will either approve the draft Remedial Action Report for Impoundment Contents and Site-wide Soils, thus making it the Final Remedial Action Report for Impoundment Contents and Site-wide Soils, require modifications, or require corrective measures to fully and properly implement the Remedial Action in each case as per the Consent Decree.

2. **Groundwater Component (OU4)**

A. Inspection(s) for Groundwater

1. At least fourteen (14) days prior to the completion of construction for each component, Settling Defendant and its contractor(s) shall be available to accompany EPA personnel and/or its representatives on a pre-final inspection. The pre-final inspection shall consist of a walkthrough of the

construction areas to determine the completeness of the construction and its consistency with the Remedial Design Report(s), the Consent Decree, this SOW and the OU 4 ROD. .

Following the pre-final inspection, EPA will either specify the necessary actions to complete the construction phase of the Remedial Action component, as appropriate, or determine that construction is complete. If EPA requires actions, Settling Defendant shall undertake such actions according to a schedule proposed by Settling Defendant and approved by EPA. Within fourteen (14) days after completion of such actions, Settling Defendant and its contractor(s) shall be available to accompany EPA personnel and/or its representatives on an inspection as provided for in the preceding paragraph. Said inspection will be followed by further directions and/or notifications by EPA as provided in this paragraph.

B. Remedial Action Report(s) for Groundwater

1. Within seventy-five (75) days of EPA's determination that all construction for a given component required for the Remedial Action is complete, Settling Defendant shall submit a draft Remedial Action Report (the "draft Remedial Action Report for Groundwater") to EPA for review and approval pursuant to Section XI (EPA Approval of Plans and Other Deliverables) of the Consent Decree.

2. The draft Remedial Action Report for Groundwater shall include the following sections:

a. Introduction

i. A brief description of the location, size, environmental setting and history of the Site.

ii. A summary of the environmental regulatory and enforcement history of the American Cyanamid Site.

iii. The major findings and results of remedial investigation activities.

iv. A summary of major prior removal and remedial activities.

b. Background

i. Summarize requirements specified for all site-related groundwater in the OU 4 ROD, the Remedial Design Work Plan, the Final Remedial Design Report and related

documents. Include information on the cleanup goals, institutional controls, monitoring requirements, operation and maintenance requirements, and other parameters applicable to the design, construction, operation and performance of the Remedial Action.

ii. Summarize all the Remedial Design activities completed for the groundwater component of the OU4 remedy, including any significant regulatory or technical considerations or events occurring during the preparation of the Remedial Designs.

iii. Identify and briefly discuss any ROD amendments, explanation of significant differences, or technical impracticability waivers.

c. Construction Activities

i. Provide a step-by-step summary description of the major activities undertaken to construct and implement the Remedial Action for the groundwater remedial component (*e.g.*, mobilization and Site preparatory work; earthwork, quantity of material excavated/relocated, cleanup levels achieved, materials and/or equipment used, post-excavation activities, including source(s) of any clean fill, the types of fill material used, the final grading and contouring of each area excavated, all other Site restoration activities, all remedial construction equipment decontamination, dismantlement, and removal, collection and treatment system/unit installation/assembly, operation of the treatment/immobilization technology; associated Site work, such as fencing and water collection and control; and sampling activities).

ii. Refer the reader to the Appendices for characteristics, Site conditions and operating parameters for the groundwater treatment and extraction systems.

iii. Provide a section to include photographs that record the progress of major remedial construction activities including, at a minimum, the important features of the Site as it pertains to the groundwater remedy prior to the commencement of the Remedial Action, remedial construction activities for the various tasks and the appearance of the Site after the remedial construction has been completed.

d. Chronology of Events

i. Provide a tabular summary that lists the major events for this component of the Remedial Action completed by or on behalf of Settling Defendant and associated dates of those events, starting with the issuance of the OU 4 ROD.

ii. Include significant milestones and dates, such as, remedial design submittals and approvals; mobilization and construction of the remedy; significant operational, monitoring and sampling events, system modifications, variance or noncompliance situations, final sampling and confirmation-of-performance results; required inspections; demobilization; and completion or startup of post-construction operation and maintenance activities.

e. Performance Standards and Construction Quality Control

ii. Describe the overall performance of the technologies in terms of comparison to cleanup goals and Performance Standards.

ii. Provide an explanation of the approved construction quality assurance and construction quality control requirements or cite the appropriate reference for this material. Explain any substantial problems or deviations.

iii. Provide an assessment of the performance data quality, including the overall quality of the analytical data, with a brief discussion of QA/QC procedures followed, use of a QAPP, comparison of analytical data quality objectives.

f. As-Built Drawings

i. Submit to EPA the as-built engineering drawings which depict the Remedial Action as implemented pursuant to the Consent Decree. Remedy implementation modifications if any to the approved plans and specifications of the Final Remedial Design Report shall be reported and shown on the as-built drawings. The reasons for all such modifications shall be described in detail.

ii. The as-built drawings shall be signed and stamped by a professional engineer licensed to practice in the State of

New Jersey, and shall include a certification that the construction of the Remedial Action has been completed in conformance with the Final Remedial Design Report, OU 4 ROD, and the Consent Decree.

g. Continued Operation and Maintenance Activities

i. Describe, or reference as approved by EPA, the general activities for post-construction operation and maintenance activities, such as monitoring, site maintenance and closure activities.

h. Inspection Certificates

i. Report the results of any inspection required by EPA or NJDEP, and identify any deficiencies found.

ii. Briefly describe adherence to health and safety requirements while performing this component of the Remedial Action. Explain any substantial problems or deviations.

iii. Briefly summarize details of institutional controls (e.g. the type of institutional control implemented, who will maintain the control, who will enforce the control) and reference the ICIAP.

iv. This Section shall include a certification statement, signed by responsible corporate officials of Settling Defendant's Supervising Contractor, which states the following:

> To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

i. Contact Information: Provide contact information (names, addresses, phone numbers, and contract/reference data) for the major design and remediation contractors, as applicable.

3. EPA will either approve the draft Remedial Action Report for Groundwater, thus making it the Final Remedial Action Report for

Groundwater, require modifications, or require corrective measures to fully and properly implement the Remedial Action, in each case as per the Consent Decree.

VIII. PERFORMANCE STANDARDS FOR BOTH COMPONENTS OF THE OU 4 REMEDIAL ACTION

A. As set forth in the OU 4 ROD, the materials treated with in-situ S/S will be required to meet the following Performance Standards: minimum unconfined compressive strength of 40 pounds per square inch; maximum permeability of $1x10^{-6}$ centimeters per second; and leachability testing for Site-related constituents. Performance Standards for leachability will be determined in the Final Remedial Design Report based on treatability testing to demonstrate a correlation between leachability, unconfined compressive strength and permeability performance criteria. Settling Defendant shall perform O&M activities for the Impoundments and Site-wide Soils component until receipt of Certification of Completion of the Work under Section IX.B of this SOW.

As set forth in the OU 4 ROD, the Performance Standards for the groundwater contaminant plume are the more stringent of federal maximum contaminant levels (MCLs) and New Jersey groundwater quality standards (GWQS). Settling Defendant shall continue the Remedial Action for the groundwater component until the Performance Standards have not been exceeded for a period of three (3) consecutive years, or a shorter period if approved by EPA in its sole discretion.

B. Settling Defendant may petition EPA in writing for authorization to amend the O&M Plan for the groundwater component if, based on the results of the monitoring, Settling Defendant believes that some or all of the applicable Performance Standards specified in the OU 4 ROD will not be reached.

C. If Settling Defendant petitions for authorization to amend the O&M Plan, Settling Defendant shall continue the Remedial Action including O&M activities according to the EPA-approved O&M Plan until EPA directs Settling Defendant otherwise.

D. If EPA determines, based on its review of data and relevant guidance, one or more of the Performance Standards specified in the OU 4 ROD will not be reached in a reasonable time period and Settling Defendant has not petitioned EPA in writing for authorization to amend the O&M Plan, EPA may require Settling Defendant to implement contingency measures which may include alternate remedial strategies, and submission of a Contingency Measures Plan (see Subparagraph E., below) in accordance with the procedures set forth in Section XI (EPA Approval of Plans, Reports, and Other Deliverables) of the Consent Decree.

E. A Contingency Measures Plan, if required, shall be submitted to EPA by Settling Defendant within sixty (60) days of receipt of EPA's written determination that contingency measures are appropriate. The Contingency Measures Plan shall include, at a minimum, the following:

1. a discussion of the design, construction and O&M of the proposed contingency measures, as appropriate;

2. an updated QAPP and HSP for O&M activities, as necessary; and

3. a schedule for the implementation of the contingency measures.

F. EPA will review the Contingency Measures Plan pursuant to Section XI (EPA Approval of Plans, Reports and Other Deliverables) of the Consent Decree.

G. Settling Defendant shall commence with the implementation of the Contingency Measures Plan within thirty (30) days of receipt of EPA's written approval of the Contingency Measures Plan.

IX. NOTICES OF COMPLETION FOR THE IMPOUNDMENT CONTENTS AND SITE-WIDE SOILS COMPONENT

A. Certification of Completion of the Remedial Action

1. Within ninety (90) days after Settling Defendant concludes that the Remedial Action has been fully performed and the Performance Standards have been achieved for this component or subcomponent, Settling Defendant shall schedule and conduct a pre-certification inspection to be attended by Settling Defendant and EPA.

2. If, after the pre-certification inspection, Settling Defendant still believes that the Remedial Action has been fully performed and the Performance Standards have been achieved for this component, Settling Defendant shall submit a written report requesting certification to EPA for approval, with a copy to the State, pursuant to Section XI (EPA Approval of Plans and Other Deliverables) within thirty (30) days of the inspection. In the report, a registered professional engineer and Settling Defendant's Project Coordinator shall state that the Remedial Action for this component has been completed in full satisfaction of the requirements of the Consent Decree. The report shall contain the following statement, signed by a responsible corporate official of Settling Defendant or Settling Defendant's Project Coordinator:

I certify under penalty of law that this document and all attachments

were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

3. If, after completion of the pre-certification inspection and receipt and review of the written report, EPA, after reasonable opportunity for review and comment by the State, determines that the Remedial Action for this component or any portion thereof has not been completed in accordance with the Consent Decree or that the applicable Performance Standards have not been achieved, EPA will notify Settling Defendant in writing of the activities that must be undertaken by Settling Defendant pursuant to the Consent Decree to complete the Remedial Action and achieve the Performance Standards for this component; provided, however, that EPA may only require Settling Defendant to perform such activities pursuant to this Paragraph to the extent that such activities are consistent with the Scope of the Remedial Action, as that term is defined in Section IV of the Consent Decree. EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the SOW or require Settling Defendant to submit a schedule to EPA for approval pursuant to Section XI (EPA Approval of Plans and Other Deliverables). Settling Defendant shall perform all activities described in the notice in accordance with the specifications and schedules established pursuant to this Paragraph, subject to their right to invoke the dispute resolution procedures set forth in Section XIX (Dispute Resolution).

4. If EPA concludes, based on the initial or any subsequent report requesting Certification of Completion of the Remedial Action and after a reasonable opportunity for review and comment by the State, that the Remedial Action has been performed in accordance with the Consent Decree and that the applicable Performance Standards for this component have been achieved, EPA will so certify in writing to Settling Defendant. This certification shall constitute the Certification of Completion of the Remedial Action for purposes of the Consent Decree, including, but not limited to, Section XXI (Covenants by the United States). Certification of Completion of the Remedial Action shall not affect Settling Defendant's remaining obligations under the Consent Decree.

5. Following receipt of Certification of Completion of the Remedial Action, Settling Defendant shall initiate O&M activities for the Impoundment

Contents and Site-wide Soils component and continue to implement such activities until receipt of Certification of Completion of the Work under Section IX.B of this SOW.

B. Certification of Completion of the Work

1. Within ninety (90) days after Settling Defendant concludes that all phases of the Work for this component, other than any remaining activities required under Section VII (Remedy Review) of the Consent Decree, have been fully performed, Settling Defendant shall schedule and conduct a pre-certification inspection to be attended by Settling Defendant and EPA. If, after the pre-certification inspection, Settling Defendant still believes that the Work for this component has been fully performed, Settling Defendant shall submit a written report by a registered professional engineer stating that the Work for this component has been completed in full satisfaction of the requirements of the Consent Decree. The report shall contain the statement set forth in Paragraph 49.a of the Consent Decree, signed by a responsible corporate official of Settling Defendant or Settling Defendant's Project Coordinator. If, after review of the written report, EPA, after reasonable opportunity for review and comment by the State, determines that any portion of the Work for this component has not been completed in accordance with the Consent Decree, EPA will notify Settling Defendant in writing of the activities that must be undertaken by Settling Defendant pursuant to the Consent Decree to complete the Work, provided, however, that EPA may only require Settling Defendant to perform such activities pursuant to this Paragraph to the extent that such activities are consistent with the Scope of the Remedial Action, as that term is defined in Section IV of the Consent Decree. EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the SOW or require Settling Defendant to submit a schedule to EPA for approval pursuant to Section XI (EPA Approval of Plans and Other Deliverables). Settling Defendant shall perform all activities described in the notice in accordance with the specifications and schedules established therein, subject to their right to invoke the dispute resolution procedures set forth in Section XIX (Dispute Resolution).

2. If EPA concludes, based on the initial or any subsequent request for Certification of Completion of the Work by Settling Defendant and after a reasonable opportunity for review and comment by the State, that the Work for this component has been performed in accordance with the Consent Decree, EPA will so notify Settling Defendant in writing.

X. POST-REMEDIATION MONITORING AND NOTICES OF COMPLETION FOR THE GROUNDWATER COMPONENT

A. Certification of Completion of the Remedial Action

1. Within ninety (90) days after Settling Defendant concludes that the Remedial Action for this component has been fully performed, Settling Defendant shall schedule and conduct a pre-certification inspection to be attended by Settling Defendant and EPA.

2. If, after the pre-certification inspection, Settling Defendant still believes that the Remedial Action for this component has been fully performed, Settling Defendant shall submit a written report requesting certification to EPA for approval, with a copy to the State, pursuant to Section XI (EPA Approval of Plans and Other Deliverables) within thirty (30) days of the inspection. In the report, a registered professional engineer and Settling Defendant's Project Coordinator shall state that the Remedial Action for this component has been completed in full satisfaction of the requirements of the Consent Decree. The report shall contain the following statement, signed by a responsible corporate official of Settling Defendant or Settling Defendant's Project Coordinator:

> I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

3. If, after completion of the pre-certification inspection and receipt and review of the written report, EPA, after reasonable opportunity for review and comment by the State, determines that the Remedial Action for this component or any portion thereof has not been completed in accordance with the Consent Decree, EPA will notify Settling Defendant in writing of the activities that must be undertaken by Settling Defendant pursuant to the Consent Decree to complete the Remedial Action; provided, however, that EPA may only require Settling Defendant to perform such activities pursuant to this Paragraph to the extent that such activities are consistent with the Scope of the Remedial Action, as that term is defined in Section IV of the Consent Decree. EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the

SOW or require Settling Defendant to submit a schedule to EPA for approval pursuant to Section XI (EPA Approval of Plans and Other Deliverables). Settling Defendant shall perform all activities described in the notice in accordance with the specifications and schedules established pursuant to this Paragraph, subject to their right to invoke the dispute resolution procedures set forth in Section XIX (Dispute Resolution).

4. If EPA concludes, based on the initial or any subsequent report requesting Certification of Completion of the Remedial Action and after a reasonable opportunity for review and comment by the State, that the Remedial Action for this component has been performed in accordance with the Consent Decree, EPA will so certify in writing to Settling Defendant. This certification shall constitute the Certification of Completion of the Remedial Action for purposes of the Consent Decree, including, but not limited to, Section XXI (Covenants by the United States). Certification of Completion of the Remedial Action shall not affect Settling Defendant's remaining obligations under the Consent Decree.

5. Following receipt of Certification of Completion of the Remedial Action, Settling Defendant shall implement O&M activities until all designated groundwater monitoring points, as specified in the O&M plan, have recorded readings less than or equal to the applicable Performance Standards consistent with this SOW, the OU 4 ROD and the Consent Decree, for three full years (or a shorter period if approved by EPA in its sole discretion), or within thirty (30) days of the date that EPA determines, that one or more applicable and relevant and appropriate requirements (ARAR) waivers are granted and all other ARARs have been met and/or waived.

B. Post Remediation Monitoring Plan

1. Within sixty (60) days of the date on which all designated groundwater monitoring points, as specified in the O&M Plan for the groundwater component, have recorded readings less than or equal to the applicable Performance Standards consistent with this SOW, the OU 4 ROD and the Consent Decree, for three full years (or a shorter period if approved by EPA in its sole discretion), or within thirty (30) days of the date that EPA determines that one or more ARAR waivers are granted and all other ARARs have been met and/or waived, Settling Defendant shall submit to EPA for review and approval pursuant to Section XI (EPA Approval of Plans and Other Submissions) of the Consent Decree, a Post Remediation Monitoring (PRM) Plan.

2. This PRM Plan shall include, at a minimum, the following:

a. An updated QAPP for PRM activities, as necessary;

b. An updated HSP for PRM activities, as necessary;

c. A description of Work to be performed under PRM activities; and

d. A PRM schedule that identifies the frequency of monitoring and when these activities will commence.

3. Once approved by EPA, this PRM Plan shall be incorporated into and become an enforceable part of the Consent Decree.

4. Within thirty (30) days of EPA's approval of this PRM Plan, Settling Defendant shall commence with the PRM program therein for a period of five (5) years, unless EPA in its sole discretion approves a shorter time period, in accordance with the PRM Plan, which includes the PRM schedule.

C. Notice of Completion of Post-Remediation Monitoring

1. Within five (5) days of the completion of PRM, Settling Defendant shall submit to EPA a Notice of Completion for PRM.

2. Within sixty (60) days of the completion of PRM, Settling Defendant shall submit to EPA a Final Report for PRM. The Final Report for PRM shall summarize the Work performed under this PRM Plan and the data generated. Any modifications to the final Report for PRM required by EPA shall be in accordance with the procedures set forth in the Consent Decree.

3. EPA will determine whether the PRM activities or any portions(s) thereof have been completed in accordance with the standards, specifications, and reports required by either the EPA-approved Final Remedial Design Report(s), OU 4 ROD, the SOW and the Consent Decree. If EPA determines that PRM activities have not been completed, EPA will notify Settling Defendant in writing of those tasks which must be performed to complete the PRM. Settling Defendant shall then implement the specified activities and tasks in accordance with the specifications and schedules established by EPA and shall then submit a further report on the specified activities and tasks certified by a New Jersey registered professional engineer, within thirty (30) days after completion of the specified activities and tasks. EPA will notify Settling Defendant in writing when PRM activities have been completed in accordance with the requirements of the Consent Decree.

D. Certification of Completion of the Work

1. Within ninety (90) days after Settling Defendant concludes that all phases of the Work for this component, other than any remaining activities required under Section VII (Remedy Review) of the Consent Decree, have been fully performed and applicable Performance Standards have been achieved, Settling Defendant shall schedule and conduct a pre-certification inspection to be attended by Settling Defendant and EPA. If, after the pre-certification inspection, Settling Defendant still believes that the Work for this component has been fully performed, Settling Defendant shall submit a written report by a registered professional engineer stating that the Work has been completed in full satisfaction of the requirements of the Consent Decree. The report shall contain the statement set forth in Paragraph 49.a of the Consent Decree, signed by a responsible corporate official of Settling Defendant or Settling Defendant's Project Coordinator. If, after review of the written report, EPA, after reasonable opportunity for review and comment by the State, determines that any portion of the Work has not been completed in accordance with the Consent Decree, EPA will notify Settling Defendant in writing of the activities that must be undertaken by Settling Defendant pursuant to the Consent Decree to complete the Work and achieve applicable Performance Standards, provided, however, that EPA may only require Settling Defendant to perform such activities pursuant to this Paragraph to the extent that such activities are consistent with the Scope of the Remedial Action, as that term is defined in Section IV of the Consent Decree. EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the SOW or require Settling Defendant to submit a schedule to EPA for approval pursuant to Section XI (EPA Approval of Plans and Other Deliverables). Settling Defendant shall perform all activities described in the notice in accordance with the specifications and schedules established therein, subject to their right to invoke the dispute resolution procedures set forth in Section XIX (Dispute Resolution).

2. If EPA concludes, based on the initial or any subsequent request for Certification of Completion of the Work by Settling Defendant and after a reasonable opportunity for review and comment by the State, that the Work for this component has been performed in accordance with the Consent Decree, EPA will so notify Settling Defendant in writing.

XI. SPECIAL CIRCUMSTANCES

A flood event that causes an exceedance of an elevation of 28 feet (NGVD 1929) at USGS Station 01403060 (Raritan River at Bound Brook) during the Remedial Action, O&M and/or PRM activities, shall fall within the scope of Paragraph 61 of the Consent Decree, provided that

one or more of the following conditions are met: (a) the Work area is flooded, (b) routes of ingress/egress to and from the Work area are flooded, or (c) the imminent threat of potential flooding caused, for safety reasons, evacuation of personnel, supplies, and equipment from a flood-prone Work area thereby disrupting Work.

XII. IMPOUNDMENTS 15 AND 16

1. Remedial Action

The Remedial Action for Impoundments 15 and 16 shall be completed in accordance with the OU 2 ESD, OU 2 ROD (as amended), and 1999 RAP. Pursuant to the Consent Decree, the soils underlying Impoundments 15 and 16 will be addressed as part of OU 4. The Remedial Action deliverables required for Impoundments 15 and 16 include: an O&M Plan, a Remedial Action Report, a Post-Remediation Monitoring Plan, a Notice of Completion, and a Certification of Completion Report. Each of these deliverables may be incorporated into corresponding deliverables for the OU 4 Work. Prior to the execution of the Consent Decree, Settling Defendant continues to implement remedial activities per the OU 2 ESD, OU 2 ROD (as amended) and 1999 RAP.

A. Performance of Remedial Construction for Impoundments 15 and 16

1. Settling Defendant shall continue to implement the remedial construction in accordance with the 1999 RAP.

2. During performance of the remedial construction, Settling Defendant may identify and request EPA approval for field changes to the 1999 RAP, as necessary, to complete this portion of the Work.

B. Settling Defendant shall continue to implement the Remedial Action for Impoundments 15 and 16 until the Performance Standards set forth in the OU 2 ROD (as amended) and OU 2 ESD for that remedial component are achieved. Settling Defendant shall implement an O&M plan for Impoundments 15 and 16 so long thereafter as is required by the Consent Decree and this SOW.

C. Operation and Maintenance Plan for Impoundment 15 and 16

1. No later than sixty (60) days prior to the scheduled completion date of all Remedial Action work for Impoundments 15 and 16, Settling Defendant shall submit an O&M Plan to EPA for review and approval pursuant to Section XI (EPA Approval of Plans and Other Deliverables) of the Consent Decree. The O&M Plan shall be prepared in conformance with EPA guidelines contained in Considerations for Preparation of Operation and Maintenance Manuals, EPA 68-01-0341. The O&M Plan for Impoundments 15 and 16 may be incorporated into O&M Plans for OU4.

2. The O&M Plan will be developed for Impoundments 15 and 16. The O&M Plan shall be separated into Pre-Achievement O&M activities and Post-Achievement O&M activities, unless otherwise determined by EPA. The O&M Plan shall be prepared in accordance with instructions for preparation of operation and maintenance plans in the "Remedial Design/Remedial Action Handbook," dated June, 1995 (OSWER 9355.0-4A), which includes, but is not limited to, a description of the personnel requirements, responsibilities and duties, including discussion for training, lines of authority, sampling, analysis and monitoring conducted under the Consent Decree.

3. The O&M Plan shall include, at a minimum, the following, as applicable:

   a. An updated or amended QAPP for the Impoundment Contents and Site-wide Soils if determined to be necessary by EPA;

   b. An updated or amended HSP for O&M activities for Impoundment Contents and Site-wide Soils, if determined to be necessary by EPA;

   c. A discussion of potential operating problems and remedies for such problems;

   d. A discussion of alternative procedures in the event of system failure;

   e. A schedule for equipment replacement;

   f. The general requirements for maintenance/monitoring of the vegetative layer;

   g. An inspection schedule for the vegetative layer; and

   h. Requirements for submittal of progress reports to EPA.

4. Proposed modifications of the approved O&M Plan may be submitted to EPA for consideration upon completion of construction or thereafter if Settling Defendant can demonstrate that such considerations would enhance and/or maintain the environmental monitoring programs.

5. Once approved by EPA, Settling Defendant shall implement the activities in the O&M Plan in accordance with the schedule set forth therein. Once approved by EPA, the O&M Plan shall be incorporated into and become an enforceable part of the Consent Decree.

2. Pre-Final and Final Inspections, Remedial Action Reports, and Notice of Construction Completion

A. Inspection(s) for Impoundments 15 and 16

1. At least fourteen (14) days prior to the completion of construction, Settling Defendant and its contractor(s) shall be available to accompany EPA personnel and/or its representatives on a pre-final inspection. The pre-final inspection shall consist of a walkthrough of the construction areas to determine the completeness of the construction and its consistency with the 1999 RAP, the Consent Decree, this SOW, the OU 2 ESD and the OU 2 ROD.

Following the pre-final inspection, EPA will either specify the necessary actions to complete the construction phase of the Remedial Action, as appropriate, or determine that construction is complete. If EPA requires actions, Settling Defendant shall undertake such actions according to a schedule proposed by Settling Defendant and approved by EPA. Within fourteen (14) days after completion of such actions, Settling Defendant and its contractor(s) shall be available to accompany EPA personnel and/or its representatives on an inspection as provided for in the preceding paragraph. Said inspection will be followed by further directions and/or notifications by EPA as provided in this paragraph.

B. Remedial Action Report for Impoundments 15 and 16

1. Within seventy-five (75) days of EPA's determination that all construction for the Remedial Action for Impoundments 15 and 16 is complete, Settling Defendant shall submit a draft Remedial Action Report (the "draft Remedial Action Report for Impoundments 15 and 16") to EPA for review and approval pursuant to Section XI (EPA Approval of Plans and Other Deliverables) of the Consent Decree.

2. The draft Remedial Action Report for Impoundments 15 and 16 shall include the following sections, and may be incorporated into the Remedial Action Report for the Impoundments and Site-wide Soils Component of the OU4 Remedy:

a. Introduction

i. A brief description of the location, size, environmental setting and history of the Site.

ii. A summary of the environmental regulatory and

enforcement history of the American Cyanamid Site.

iii. The major findings and results of remedial investigation activities.

iv. An outline of major prior removal and remedial activities.

b. Background

i. Summarize requirements specified for the excavation, transport and recycling of iron oxide material in the OU 2 ROD (as amended), OU 2 ESD, 1999 RAP and related documents. Include information on the cleanup goals, institutional controls, monitoring requirements, operation and maintenance requirements, and other parameters applicable to the design, construction, operation and performance of the Remedial Action.

ii. Summarize all the Remedial Design activities completed for Impoundments 15 and 16, including any significant regulatory or technical considerations or events occurring during the preparation of the Remedial Designs.

iv. Identify and briefly discuss any ROD amendments, ESDs, or technical impracticability waivers.

c. Construction Activities

i. Provide a step-by-step summary description of the major activities undertaken to construct and implement the Remedial Action (*e.g.*, mobilization and Site preparatory work; earthwork, quantity of material excavated/relocated, cleanup levels achieved, materials and/or equipment used, post-excavation activities, including source(s) of any clean fill, the types of fill material used, the final grading and contouring of each area excavated, all other Site restoration activities, all remedial construction equipment decontamination, dismantlement, and removal, collection and treatment system/unit installation/assembly; associated Site work, such as fencing and water collection and control; and sampling activities).

ii. Provide a section to include photographs that record the progress of major remedial construction activities including, at a minimum, the important features of the Site prior to the

commencement of the work, remedial construction activities for the various tasks, and the appearance of the Site after the remedial construction has been completed.

d. Chronology of Events

i. Provide a tabular summary that lists the major events for the Impoundments 15 and 16 Work completed by or on behalf of Settling Defendant and associated dates of those events, starting with the issuance of the OU 2 ROD.

ii. Include significant milestones and dates, such as, remedial design submittals and approvals; mobilization and construction of the remedy; significant operational, monitoring and sampling events, system modifications, variance or noncompliance situations, final sampling and confirmation-of-performance results; required inspections; demobilization; and completion or startup of post-construction operation and maintenance activities.

e. Performance Standards and Construction Quality Control

iii. Describe the overall performance of the technologies in terms of comparison to cleanup goals and Performance Standards.

ii. Provide an explanation of the approved construction quality assurance and construction quality control requirements or cite the appropriate reference for this material. Explain any substantial problems or deviations.

iii. Provide an assessment of the performance data quality, including the overall quality of the analytical data, with a brief discussion of QA/QC procedures followed, use of a QAPP, comparison of analytical data quality objectives.

f. As-Built Drawings

iii. Submit to EPA the as-built engineering drawings which depict the Remedial Action as implemented pursuant to the Consent Decree. Remedy implementation modifications if any to the approved plans and specifications of the 1999 RAP shall be reported and shown on the as-built drawings. The reasons for all such modifications shall be described in detail.

iv. The as-built drawings shall be signed and stamped by a professional engineer licensed to practice in the State of New Jersey, and shall include a certification that the construction of the Remedial Action has been completed in conformance with the 1999 RAP, OU 2 ROD, OU 2 ESD and the Consent Decree.

g. Continued Operation and Maintenance Activities

i. Describe, or reference as approved by EPA, the general activities for post-construction operation and maintenance activities, such as monitoring, site maintenance and closure activities.

h. Inspection Certificates

i. Report the results of any inspection required by EPA or NJDEP, and identify any deficiencies found.

ii. Briefly describe adherence to health and safety requirements while performing this component of the Remedial Action. Explain any substantial problems or deviations.

iii. Briefly summarize details of institutional controls (e.g. the type of institutional control implemented, who will maintain the control, who will enforce the control) and reference the ICIAP.

iv. This Section shall include a certification statement, signed by responsible corporate officials of Settling Defendant's Supervising Contractor, which states the following:

> To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

i. Contact Information: Provide contact information (names, addresses, phone numbers, and contract/reference data) for the major design and remediation contractors, as applicable.

3. Performance Standards for Impoundments 15 and 16

The remedy for Impoundments 15 and 16 should be implemented to meet any performance standards identified in the OU 2 ROD (as amended), OU 2 ESD and/or 1999 RAP. Settling Defendant shall perform O&M activities for Impoundments 15 and 16 until receipt of Certification of Completion of the Work for Impoundments 15 and 16.

4. Notices of Completion for the Impoundments 15 and 16 Remedy

A. Certification of Completion of the Remedial Action

1. Within ninety (90) days after Settling Defendant concludes that the Remedial Action has been fully performed in accordance with the 1999 RAP, OU 2 ESD, and OU 2 ROD (as amended), Settling Defendant shall schedule and conduct a pre-certification inspection to be attended by Settling Defendant and EPA.

2. If, after the pre-certification inspection, Settling Defendant still believes that the Remedial Action has been fully performed and the Performance Standards have been achieved for Impoundments 15 and 16, Settling Defendant shall submit a written report requesting certification to EPA for approval, with a copy to the State, pursuant to Section XI (EPA Approval of Plans and Other Deliverables) within thirty (30) days of the inspection. In the report, a registered professional engineer and Settling Defendant's Project Coordinator shall state that the Remedial Action for this component has been completed in full satisfaction of the requirements of the Consent Decree. The report shall contain the following statement, signed by a responsible corporate official of Settling Defendant or Settling Defendant's Project Coordinator:

> I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

3. If, after completion of the pre-certification inspection and receipt and review of the written report, EPA, after reasonable opportunity for review and comment by the State, determines that the Remedial Action for

Impoundments 15 and 16 or any portion thereof has not been completed in accordance with the Consent Decree or that the applicable Performance Standards have not been achieved, EPA will notify Settling Defendant in writing of the activities that must be undertaken by Settling Defendant pursuant to the Consent Decree to complete the Remedial Action and achieve the Performance Standards for this component; provided, however, that EPA may only require Settling Defendant to perform such activities pursuant to this Paragraph to the extent that such activities are consistent with the Scope of the Remedial Action with respect to Impoundments 15 and 16 as set forth in the OU 2 ROD (as amended by the OU 2 ESD) EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the SOW or require Settling Defendant to submit a schedule to EPA for approval pursuant to Section XI (EPA Approval of Plans and Other Deliverables). Settling Defendant shall perform all activities described in the notice in accordance with the specifications and schedules established pursuant to this Paragraph, subject to their right to invoke the dispute resolution procedures set forth in Section XIX (Dispute Resolution).

4. If EPA concludes, based on the initial or any subsequent report requesting Certification of Completion of the Remedial Action and after a reasonable opportunity for review and comment by the State, that the Remedial Action has been performed in accordance with the Consent Decree and that the applicable Performance Standards for Impoundments 15 and 16 have been achieved, EPA will so certify in writing to Settling Defendant. This certification shall constitute the Certification of Completion of the Remedial Action for purposes of the Consent Decree, including, but not limited to, Section XXI (Covenants by the United States). Certification of Completion of the Remedial Action shall not affect Settling Defendant's remaining obligations under the Consent Decree.

5. Following receipt of Certification of Completion of the Remedial Action, Settling Defendant shall initiate O&M activities for Impoundments 15 and 16 and continue to implement such activities until receipt of Certification of Completion of the Work for Impoundments 15 and 16.

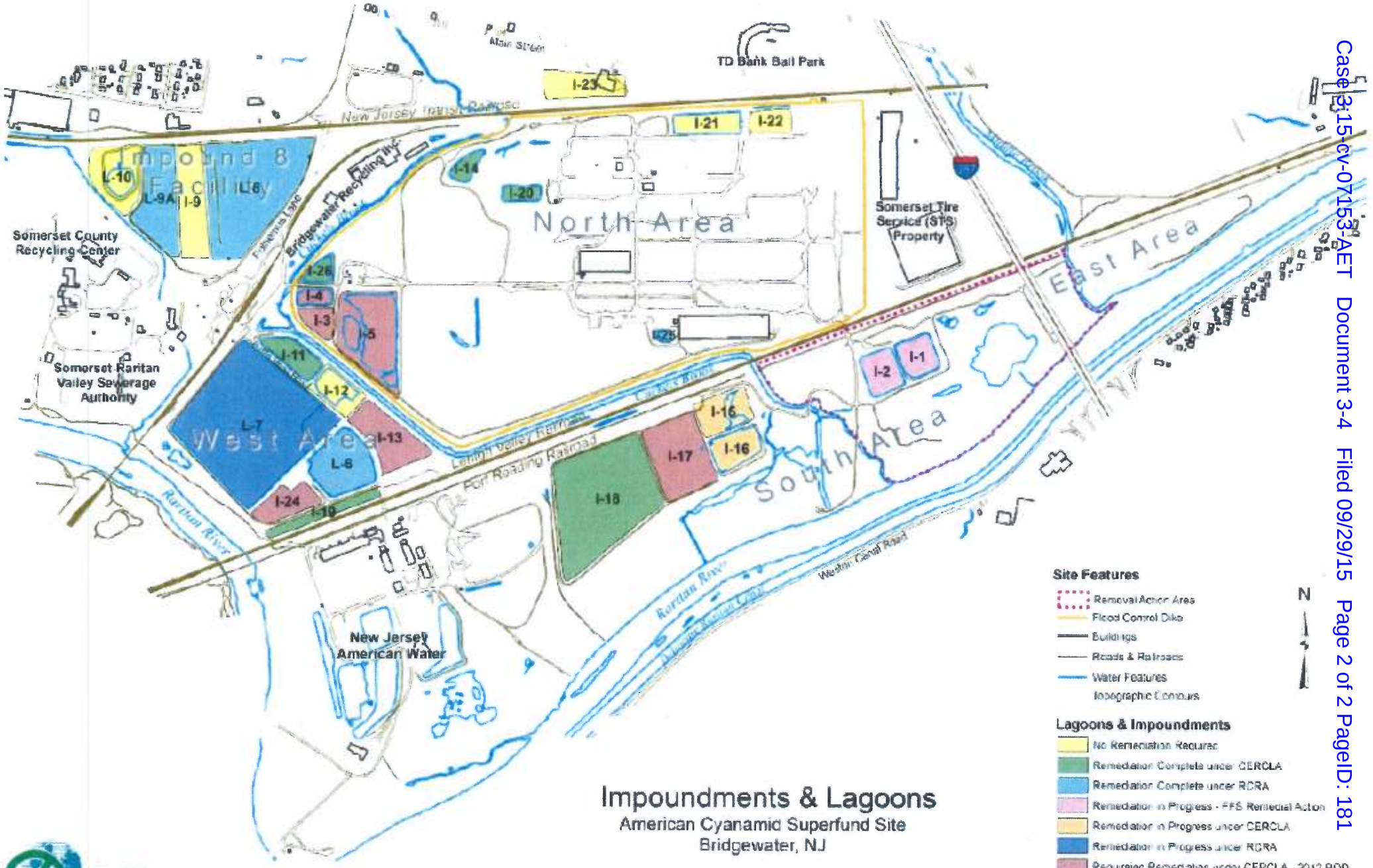
B. Certification of Completion of the Work

3. Within ninety (90) days after Settling Defendant concludes that all phases of the Work for Impoundments 15 and 16, other than any remaining activities required under Section VII (Remedy Review) of the Consent Decree, have been fully performed, Settling Defendant shall schedule and conduct a pre-certification inspection to be attended by Settling Defendant and EPA. If, after the pre-certification inspection, Settling Defendant still believes that the Work for this component has been fully performed,

Settling Defendant shall submit a written report by a registered professional engineer stating that the Work for this component has been completed in full satisfaction of the requirements of the Consent Decree. The report shall contain the statement set forth in Paragraph 49.a of the Consent Decree, signed by a responsible corporate official of Settling Defendant or Settling Defendant's Project Coordinator. If, after review of the written report, EPA, after reasonable opportunity for review and comment by the State, determines that any portion of the Work for Impoundments 15 and 16 has not been completed in accordance with the Consent Decree, EPA will notify Settling Defendant in writing of the activities that must be undertaken by Settling Defendant pursuant to the Consent Decree to complete the Work, provided, however, that EPA may only require Settling Defendant to perform such activities pursuant to this Paragraph to the extent that such activities are consistent with the Scope of the Remedial Action with respect to Impoundments 15 and 16. EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the SOW or require Settling Defendant to submit a schedule to EPA for approval pursuant to Section XI (EPA Approval of Plans and Other Deliverables). Settling Defendant shall perform all activities described in the notice in accordance with the specifications and schedules established therein, subject to their right to invoke the dispute resolution procedures set forth in Section XIX (Dispute Resolution).

4. If EPA concludes, based on the initial or any subsequent request for Certification of Completion of the Work by Settling Defendant and after a reasonable opportunity for review and comment by the State, that the Work for this component has been performed in accordance with the Consent Decree, EPA will so notify Settling Defendant in writing.

Appendix C



Impoundments & Lagoons

American Cyanamid Superfund Site
Bridgewater, NJ

Golder Associates

PDI Work Plan 2013

Appendix D

Svenska Handelsbanken

New York Branch

CERCLA Financial Assurance Sample Letter of Credit for Use in Connection with Settlements

IRREVOCABLE STANDBY LETTER OF CREDIT NUMBER: S15XXX

ISSUANCE DATE: [insert date]

EXPIRATION DATE: [insert date]

MAXIMUM AMOUNT: $193,000,000.00

APPLICANT:
Wyeth Holdings LLC
(formerly known as American Cyanamid Company)
c/o Merrill E. Fliederbaum, Esq.
Assistant General Counsel, Pfizer Inc.
235 East 42nd Street
New York, New York 10017

BENEFICIARY:
U.S. Environmental Protection Agency Region 2
c/o Director, Emergency and Remedial Response Division
290 Broadway, 19th Floor
New York, NY 10007
Phone: 212-637-4390

Dear Sir or Madam:

We hereby establish our Irrevocable Standby Letter of Credit No. S15XXX in your favor, at the request and for the account of Wyeth Holdings LLC (formerly known as American Cyanamid Company), c/o Merrill E. Fliederbaum, Esq., Assistant General Counsel, Pfizer Inc., (the "Applicant") in the amount of $ 193,000,000.00 (the "Maximum Amount"). We hereby authorize you, the United States Environmental Protection Agency (the "Beneficiary"), to draw at sight on Issuing Institution: Svenska Handelsbanken, New York Branch, 875 Third Avenue, 4th Floor, New York, New York 10022-7218, an aggregate amount equal to the Maximum Amount upon presentation of:

(1) Your sight draft, bearing reference to this Letter of Credit No. S15XXX (which may, without limitation, be presented in the form attached hereto as Exhibit A); and

(2) Your signed statement reading as follows:

"I certify that the amount of the draft is payable pursuant to that certain Consent Decree, dated **[insert date]**, civil action number **[insert number]**, between the United States and [**insert settling party**], entered into by the parties thereto in accordance with the authority of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9601-9675, relating to the American Cyanamid Superfund Site, Operable Unit 4."

Svenska Handelsbanken

New York Branch

Letter of Credit No. S15XXX
Page Two

This letter of credit is effective as of **[insert date]** and shall expire on **[insert date]**, but such expiration date shall be automatically extended for a period of one year on **[insert date]**, and on each successive expiration date, unless, at least 120 days before the current expiration date, we notify both you and the Applicant by certified mail that we have decided not to extend this letter of credit beyond the current expiration date. In the event you are so notified, any unused portion of the credit shall immediately thereupon be available to you upon presentation of your sight draft for a period of at least 120 days after the date of receipt by both you and the Applicant of such notification, as shown on signed return receipts.

All notifications, requests, and demands required or permitted hereunder shall be given in writing, identify the site, and provide a contact person (and contact information).

Multiple and partial draws on this Letter of Credit are expressly permitted, up to an aggregate amount not to exceed the Maximum Amount. Whenever this Letter of Credit is drawn on, under, and in compliance with the terms hereof, we shall duly honor such draft upon presentation to us, and we shall deposit the amount of the draft in immediately available funds directly into such account or accounts as may be specified in accordance with your instructions.

All banking and other charges under this Letter of Credit are for the account of the Applicant.

This Letter of Credit is subject to the most recent edition of the Uniform Customs and Practice for Documentary Credits, published and copyrighted by the International Chamber of Commerce.

Very Truly Yours,
Svenska Handelsbanken, New York Branch

By: _____
Authorized Signature

_____
Printed Name

_____
Title

By: _____
Authorized Signature

_____
Printed Name

_____
Title

Pfizer US Envir Prot S193M 7 8 15.dft

875 Third Avenue, New York, NY 10022-7218
Telephone: (212) 326-5142 Telefax: (212) 326-2725

ORIGINAL

Svenska Handelsbanken

New York Branch

Exhibit A - Form of Sight Draft

SIGHT DRAFT

TO: Svenska Handelsbanken, New York Branch
875 Third Avenue, 4th Floor
New York, New York 10022-7218

RE: Letter of Credit No. S15XXX

DATE: **[insert date on which draw is made]**

TIME: **[insert time of day at which draw is made]**

This draft is drawn under your Irrevocable Standby Letter of Credit No. S15XXX. I certify that the amount of the draft is payable pursuant to that certain Consent Decree, dated **[insert date]**, civil action number **[insert number]**, between the United States and **[insert settling parties]**, entered into by the parties thereto in accordance with the authority of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9601-9675, relating to the American Cyanamid Superfund Site, Operable Unit 4. Pay to the order of the United States Environmental Protection Agency, in immediately available funds, the amount of $**[insert dollar amount of draw]** or, if no amount certain is specified, the total balance remaining available under such Irrevocable Standby Letter of Credit.

Pay such amount as is specified in the immediately preceding paragraph by Fedwire EFT, referencing Site/Spill ID Number 022H and DJ Number **[insert number]**. The Fedwire EFT payment must be sent as follows:

Federal Reserve Bank of New York
ABA = 021030004
Account = 68010727
SWIFT address = FRNYUS33
33 Liberty Street
New York NY 10045
Field Tag 4200 of the Fedwire message should read [D 68010727 Environmental Protection Agency]"]

The total amount paid shall be deposited by EPA in the American Cyanamid Superfund Site Special Account to be retained and used to conduct or finance response actions at or in connection with the Site, or to be transferred by EPA to the EPA Hazardous Substance Superfund.

This Sight Draft has been duly executed by the undersigned, an authorized representative or agent of the United States Environmental Protection Agency, whose signature hereupon constitutes an endorsement.

By [signature]: _____
Printed name: _____
Title: _____
Address: _____
Contact information: _____

875 Third Avenue, New York, NY 10022-7218
Telephone: (212) 326-5142 Telefax: (212) 326-2725

ORIGINAL

Appendix E

EPA/ROD/R02-96/289
1996

EPA Superfund
Record of Decision:

AMERICAN CYANAMID CO
EPA ID: NJD002173276
OU 02
BOUND BROOK, NJ
07/12/1996

SUPERFUND RECORD OF DECISION
FOR GROUP II IMPOUNDMENTS (15, 16, 17 AND 18)

AMERICAN CYANAMID SITE
AMERICAN HOME PRODUCTS CORPORATION
BRIDGEWATER TOWNSHIP, SOMERSET COUNTY
NEW JERSEY

<IMG SRC 0296289>

Prepared by: N.J. Department of Environmental Protection
Site Remediation Program
Bureau of Federal Case Management
July 1996

TABLE OF CONTENTS

RECORD OF DECISION
GROUP II IMPOUNDMENTS AT AMERICAN CYANAMID SITE
AMERICAN HOME PRODUCTS CORPORATION
BRIDGEWATER TOWNSHIP, SOMERSET COUNTY

DECLARATION STATEMENT

RECORD OF DECISION
GROUP II IMPOUNDMENTS AT AMERICAN CYANAMID SITE
AMERICAN HOME PRODUCTS CORPORATION
BRIDGEWATER TOWNSHIP, SOMERSET COUNTY

SITE NAME AND LOCATION

Group II Impoundments (15, 16, 17 and 18) at the American Cyanamid Site
Bridgewater Township, Somerset County, New Jersey

STATEMENT OF BASIS AND PURPOSE

This decision document, prepared by the New Jersey Department of Environmental Protection (NJDEP) as lead agency, presents the selected remedy for the Group II Impoundments (15, 16, 17 and 18) at the American Cyanamid Site. The selected remedy was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Re-authorization Act of 1986 (SARA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision document explains the factual and legal basis for selecting the remedy for the Group II Impoundments at this site and is based on the administrative record. The attached index identifies the items that comprise the administrative record.

The United States Environmental Protection Agency (USEPA), support agency for this site, concurs with the selected remedy and has provided a concurrence letter to that effect which is attached to the responsiveness summary section of this document.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to human health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

This ROD addresses only Group II Impoundments consisting of four on-site surface Impoundments 15, 16, 17 and 18. The selected remedy is: 1) Impoundments 15 and 16--Consolidation of Impoundment 16 into Impoundment 15, Capping and Ground Water Monitoring; 2) Impoundment 17--Solidification with Consolidation into the on-site Impoundment 8 Waste Management Facility; and, 3) Impoundment 18--No Further Action with Ground Water Monitoring.

The major components of the selected remedy are listed below.

1. Impoundments 15 and 16:

- Excavation of the material in Impoundment 16;
- Consolidation of the excavated material into Impoundment 15;
- Construction of a cap (synthetic liner); and,
- Ground water monitoring.

2. Impoundment 17:

- Excavation of the material of Impoundment 17 and mixing with cement-like material (process may be reversed); and,
- Placement of the solidified material into the impoundment 8 Facility.

3. Impoundment 18:

- Construction of a fence;
- Maintenance of natural vegetation; and,
- Ground water monitoring.

DECLARATION OF STATUTORY DETERMINATIONS

The remedy, as described above, for the Group II Impoundments has been selected based on the results of the Impoundments Characterization Program, Baseline Endangerment Assessment and the Corrective Measure Study/Feasibility Study (CMS/FS) for Group II Impoundments, which have shown the remedy to be protective of human health and the environment. The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site.

Because this remedy will result in hazardous substances remaining on the site, a review will be conducted pursuant to CERCLA every five (5) years after the commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Final site-wide remediation including all impoundments, soils and round water will comply with the applicable or relevant and appropriate requirements (ARARs) including compliance with the State New Jersey 10-6 risk level.

<IMG SRC 0296289A>

_____ _____

Signature Date

Richard J. Gimello, Assistant Commissioner

DECISION SUMMARY

RECORD OF DECISION
GROUP II IMPOUNDMENTS AT AMERICAN CYANAMID SITE
AMERICAN HOME PRODUCTS CORPORATION
BRIDGEWATER TOWNSHIP, SOMERSET COUNTY

1. SITE DESCRIPTION, BACKGROUND AND HISTORY

American Cyanamid Company's (Cyanamid's) Bound Brook facility is located in north-central New Jersey in the southeastern section of Bridgewater Township, Somerset County. The facility encompasses approximately 575 acres and is bounded by Route 28 to the north, the Raritan River to the south, Interstate 287 and the Somerset Tire Service property to the east, and Foothill Road and the Raritan River to the west. A site map identifying important features of the site with a highlight of the Group II Impoundments is attached (Figure 1).

Throughout its more than 75-year manufacturing history, numerous organic and inorganic chemical raw materials were used at the Cyanamid facility to produce products including rubber chemicals, pharmaceuticals, dyes, pigments, chemical intermediates, and petroleum-based products. Currently, only pharmaceuticals are being manufactured at the site.

Preliminary investigation work efforts completed by Cyanamid in 1981 verified that approximately one-half of the site never supported manufacturing, waste storage, or waste disposal activities and that contamination source areas are confined primarily to the main plant area (including the production area and West Yard) and the on-site waste storage impoundments. Most of the wastes generated from past manufacturing operations were stored in the on-site surface impoundments, while general plant wastes, debris, and other materials were primarily disposed of on the ground at various locations in the West Yard. The impoundments and contaminated soils are the primary focus of current remedial efforts because they constitute sources contributing to ground water contamination.

While a total of 27 impoundments exist at the Cyanamid facility, 16 of these were determined through investigative efforts to be potentially contributing to ground water contamination and are covered by this Superfund cleanup program. These 16 impoundments include Impoundments 1, 2, 3, 4, 5, 11, 13, 14, 15, 16, 17, 18, 19, 20, 24 & 26. The other 11 impoundments (Impoundments 6, 7, 8, 9, 9A, 10, 12, 21, 22, 23 & 25) were either never used (Impoundments 9, 10, and 12), contain only river silt from the facility's former river water treatment plant (Impoundments 22 and 23), contain emergency fire water (Impoundment 21), have been closed with NJDEP approval (Impoundment 25, in 1988) or are being closed in accordance with approved Resource Conservation and Recovery Act (RCRA) closure plans (Impoundments 6, 7, 8 and 9A). Impoundments 6, 7, 8 and 9A ar being closed under RCRA because they were classified under RCRA as Treatment/Storage/Disposal (TSD) facilities. Closure procedures under RCRA were implemented for Impoundments 6, 7, 8 and 9A after the use of Impoundments 6 and 7 was discontinued in 1984 and interim TSD status expired. Impoundment 9A has been closed in-place. The 16 impoundments being addressed under this Superfund cleanup program were never given interim status as TSD facilities under RCRA. The 15 impoundments potentially contributing to ground water contamination were used for storing by-products of rubber chemical production, dye production, and coal tar distillation as well as for disposal of general plant waste and demolition debris. These 16 impoundments contain a total of approximately 877,000 tons of waste material.

On June 8, 1981, Cyanamid filed a general notification of release of hazardous substances with the USEPA. In December 1982 the entire Cyanamid facility was listed on the National Priorities List (NPL) of Superfund sites.

Cyanamid and the NJDEP entered into an Administrative Consent Order (ACO) in May 1988 to address the 16 on-site impoundments, site-wide contaminated soils, and ground water. In addition to the regulatory requirements established under the ACO, a New Jersey Pollutant Discharge Elimination System/Discharge to Ground Water (NJPDES/DGW) permit number 0002313 was also issued. This permit, which was issued to Cyanamid in 1987, required that Cyanamid conduct extensive ground water monitoring on a quarterly basis and continue pumping three bedrock production wells, at a minimum rate of 650,000 gallons per day, to contain ground water

contamination within the production area and West Yard area of the site.

In May 1994, Cyanamid and NJDEP executed an ACO Amendment (1994 ACO Amendment) which incorporated the existing site-wide ground water pumping and monitoring requirements of the NJPDES/DGW permit, including the ground water monitoring requirements for the on-site Impoundment 8 facility (Impoundment 8 Facility). The 1994 ACO amendments supplement the 1988 ACO. The RCRA operating permit (the NJDEP NJPDES/DGW permit issued under the state's federally authorized program) for the Impoundment 8 Facility was not renewed. The current NJPDES/DGW permit includes only closure and post-closure requirements for the Impoundment 8 Facility. Site-wide ground water monitoring will continue to be performed pursuant to the requirements of the 1994 ACO Amendment. In accordance with the 1994 ACO Amendment, Cyanamid will continue to pump, at a minimum, 650,000 gallons per day from the newly installed production wells, PW2 and PW3, located in the main plant area. Former production wells PW16, PW17, and PW18 located on the Hill Property have been converted into monitoring wells.

In November 1988, USEPA issued the HSWA Permit that, in conjunction with the operating permit issued by NJDEP, constitutes the RCRA permit for the Cyanamid facility. The HSWA Permit was modified (effective March 4, 1994) to incorporate the selected remedy for the Group I Impoundments (11, 13, 19 and 24). The HSWA Permit is consistent with the ACO, the NJPDES permit and the 1994 ACO Amendment.

In December 1994, American Home Products corporation purchased American Cyanamid Company and assumed full responsibility for environmental remediation as required under the ACO for the site.

There are two ground water aquifer systems that underlie the site: a shallow overburden aquifer system (flow direction to the south towards the Raritan River) and a deeper, semi-confined bedrock aquifer system (flow direction towards the north, influenced by pumping). Any ground water in the area of the Group II Impoundments that is not captured by the ongoing pumping system flows to the Raritan River. A previous study (Lawler, Matuskey, & Skelley, 1983) concluded that the Cyanamid facility did not have a significant impact on water quality in the Raritan River upstream of the Calco Dam and above the Cuckolds Brook discharge to the river.

A Natural Resource Assessment (NRA) completed by American Cyanamid is being evaluated by the NJDEP Office of Natural Resource Damage (ONRD) with support from Federal Natural Resource Trustees. The NRA consists of the following: a Wetlands Assessment (using state and federal guidance); a Cultural Resources Survey (Stage IA and 1B); a Floodplain Assessment; an Endangered Species Assessment; and, an assessment of the Raritan River and Cuckolds Brook. Based on its evaluation of the NRA, the ONRD, in consultation with the Federal Trustees, will determine any impacts to natural resources related to the American Cyanamid site. It this determination indicates any impacts to natural resources from the American Cyanamid site, the ONRD, in consultation with the Federal Trustees, will establish appropriate requirements for mitigation and will negotiate financial settlement with American Home Products for any damage to the natural resources.

2. ONGOING AND COMPLETED REMEDIAL PROGRAMS

American Home Products has completed, or is conducting, several remedial programs at the site. Completed programs include: removal of pumpable tars (3.1 million gallons) from Impoundment 2 for off-site use as a supplemental fuel (1986-1987); removal of pumpable tars from Impoundment 1 (1960s); a berm stability evaluation program (1989); and a remedial investigation of the Hill Property. Each of the ongoing programs is discussed briefly below.

Impoundments 4 & 5 Fuel Blending Program

American Cyanamid has performed an interim remedial measure on Impoundments 4 and 5 by pumping/removing the tars, blending and/or containerizing them on-site and shipping them off-site for use as a supplemental fuel in a cement kiln process. These Impoundments contained approximately 5,000,000 gallons of pumpable tars, that when blended together, produced the supplemental fuel product. A blending process was designed and installed for heating and blending these tars for loading into tank wagons. Operation began in July 1991 and through October 1994 approximately 3,800,000 gallons of tars were successfully removed, blended and shipped off-site from these impoundments. This system has been shut down since October 1994 after removal of all

pumpable material. An evaluation of an alternative approach to removing any residual tars, by excavation and shipment in sealed roll-off boxes for off-site blending to produce a fuel product, will be made during the next several months. After all material having a supplemental fuel value is recovered, the residuals will be addressed as part of the Group III Impoundments CMS/FS.

On-site Impoundment 8 Facility Program

This program involves closure and post-closure of four (4) on-site impoundments (Impoundments 6, 7, 8 & 9A) and the construction of a waste consolidation facility (Impoundment 8 facility). These construction, closure and post-closure activities are being conducted in accordance with the May 1994 ACO. Half of the state-of-the-art Impoundment 8 facility has been constructed (western half) and includes a triple liner, leachate detection and collection system and ground water monitoring system. American Cyanamid has completed sludge processing and has removed the old liner as of November 1994 from the old Impoundment 8 (eastern half). Most of the waste from Impoundment 7 has been removed, dewatered, solidified, and consolidated into the western half of the Impoundment 8 facility. Waste from Impoundment 6 will be solidified and consolidated into the eastern half of the impoundment 8 facility. The construction of this eastern half of the Impoundment 8 facility will also include a multi-liner (4-liner) system, leachate detection and collection and ground water monitoring system. This activity has been initiated and is expected to be completed by the spring of 1996. After retrofitting the eastern half of Impoundment 8, consolidation of the Impoundment 6 sludges into this half of Impoundment 8 will begin. This activity is expected to require approximately 15 months to complete. After completion of the Impoundment 6 consolidation, remediation of the remaining Group I Impoundments (11, 13 and 24) and other impoundments involving consolidation into the eastern half of Impoundment 8 will begin. This project will continue for the next several years. The May 1994 ACO as well as the RCRA and HSWA Permits allows the Impoundment 8 facility to receive other on-site solidified/stabilized waste materials, if compatible with the Impoundment 8 liner system. Impoundment 9A has been closed in-place by installing a double synthetic liner capping system (60-mil High Density Polyethylene).

Surface Soils Remedial/Removal Action Program

The 1992 Surface Soils Remedial/Removal Action (SSR/RA) Program was completed in December 1992 addressing areas of surface soil contamination that posed a potential risk to worker health and safety. The program included excavation and off-site disposal of Polychlorinated Biphenyl (PCB)-contaminated soils, excavation and disposal of Polyaromatic Hydrocarbon (PAH)-contaminated soil in the on-site RCRA permitted facility, and capping of another PAH-contaminated area (in the West Yard Area near Impoundment 14), as well as placement of a geotextile, soil and vegetative cover over a chromium-contaminated area. These areas, except for one PAH Area (Area 11), will be revisited as part of the site-wide soil remediation program. PAH Area 11 was determined to be clean based on post-excavation sampling results that indicated no surface contamination and based on the Soil Remedial Investigation data that indicated no subsurface contamination above the applicable State Cleanup Criteria.

Impoundments 11, 13, 19 and 24 (Group I)

Remediation of the Group I Impoundments, consisting of solidification and consolidation into the Impoundment 8 facility, has been initiated in accordance with the September 1993 Record of Decision, May 1994 Remedial Design Report as well as July and September 1994 Impoundment 19 Remedial Action Plan for the Group I Impoundments. To date, the remediation of Impoundment 19 has been completed.

Bedrock Ground Water Pumping/Control System Program

For the past 60 years, Cyanamid has withdrawn water from the on-site bedrock production wells for use as non-contact cooling water in the production operations. Cyanamid's present average withdrawal of over 650,000 gallons per day results in ground water flow inward from the perimeter of the site towards the pumping wells. This system effectively contains the majority of the ground water contamination within the production area and West Yard area on the site. Recovered ground water is used as non-contact cooling water on-site before discharge to the adjacent Somerset-Raritan Valley Sewerage Authority (SRVSA) wastewater facility for subsequent treatment. Any ground water not captured by the production well pumping system flows to the Raritan River. A previous study (Lawler, Matuskley, & Skelley, 1983) concluded that the Cyanamid

facility did not have a significant impact on water quality in the Raritan River. Further study of the Raritan River/Cuckolds Brook water quality was conducted as part of the NRA. The NRA is currently under evaluation, as stated earlier.

3. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The following documents were made available to the public for review:

- Impoundment Characterization Program Final Report (ICPFR);
- Technology Evaluation Work Plan for Group I Impoundments;
- Baseline Site-Wide Endangerment Assessment Report;
- Group II Impoundments CMS/FS Report; and
- Proposed Plan for the Group II Impoundments.

These documents are part of the administrative record and are located in an information repository maintained at the NJDEP Docket Room in Trenton, New Jersey, at the Somerset County Public Library and at the Bridgewater Township Municipal Complex. The notice of availability for these documents was published in the Courier News on January 10, 1996. A public comment period on the documents was held from January 10, 1996 to February 24, 1996. A briefing with the Bridgewater Township Officials and a public meeting were held on February 22, 1996. At this meeting, representatives from NJDEP answered questions about the results of investigations and risk assessment and the preferred remedy under consideration for Group II Impoundments. A response to the comments received during the public comment period and the public meeting is included in the Responsiveness Summary, which is attached to the ROD. A complete background on community involvement throughout the remedial process included in the Responsiveness Summary.

4. SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION WITHIN SITE STRATEGY

This ROD addresses the remediation of the Group II Impoundments only. Remediation of the remaining group of impoundments (Group III) will be addressed in a separate CMS/FS which was submitted in April 1996. A Remedial Investigation of the site-wide soils was completed in 1992. A Feasibility Study addressing the site-wide soils will be initiated after completion of the remediation of the 16 on-site impoundments. Final remediation for site-wide ground water contamination will be addressed after completion of the remediation of site-wide soils.

Due to practical limitations, all 16 of the Superfund/CMS impoundments cannot be remediated concurrently. Therefore, they have been grouped into three impoundment groups according to waste type, nature of contaminants, and geographical location on the site. This concept allows this complex site to be subdivided into discrete, more manageable units. The impoundment groups are as follows:

Group I - Impoundments 11, 13, 19 & 24
Group II - Impoundments 15, 16, 17 & 18
Group III - Impoundments 1, 2, 3, 4, 5, 14, 20 & 26

Remediation of the Group I Impoundments, consisting of solidification and consolidation into the Impoundment 8 facility, has been initiated in accordance with the September 1993 Record of Decision, May 1994 Remedial Design Report as well as July and September 1994 Impoundment 19 Remedial Action Plan for the Group I Impoundments. To date, remediation of Impoundment 19 has been completed.

Impoundments 1 and 2 were initially part of the Group II Impoundments. However, these two impoundments contain RCRA-classified hazardous waste while the other impoundments in Group II do not contain RCRA-classified hazardous waste. While all of the impoundments do contain CERCLA hazardous substances, the required treatment standards for the different classification of wastes and substances vary. At the time the original treatability studies were performed for the Group II Impoundments, the regulatory treatment standards for some RCRA-classified hazardous waste were not yet regulatory requirements. However, as of September 1994, such treatment standards became regulatory requirements. American Home Products evaluated

the existing treatability study data for Impoundments 1 and 2 and could not meet these treatment requirements. As such, American Home Products is performing supplemental treatability studies for the RCRA-classified hazardous waste in Impoundments 1 and 2. In order that the remedial process proceed for the remaining Group II Impoundments, without waiting for completion of the supplemental studies for Impoundments 1 and 2, NJDEP has shifted Impoundments 1 and 2 into Group III. The CMS/FS for the Group III Impoundments, incorporating the results of the supplemental treatability studies for Impoundments 1 and 2, was completed in April 1996.

5. CHARACTERIZATION OF GROUP II IMPOUNDMENTS

The Group II Impoundments were characterized as reported in the January 1990 ICPFR. A summery of the analytical results of the contents of the Group II Impoundments is provided in Table 1. The locations of the impoundments are indicated as the shaded areas on Figure 1. An overview of the characterization of the Group II Impoundments follows:

Impoundment 15

Impoundment 15 has a surface area of approximately 2.8 acres. Its surface is devoid of topsoil and vegetation, and is sloped from the southwest to the northeast corner. This impoundment contains a homogeneous material composed of greater than 99 percent iron oxide (or magnetite). The iron oxide ranges from approximately 6 to 9 feet in depth and occupies a volume of approximately 29,500 cubic yards. Impurities in the iron oxide include trace organics, metals, stones and dirt. The detected predominant volatile organic contaminants of concern range in average concentration from 0.002 to 0.069 parts per million (ppm) and are Acetone, Benzene, Methylene Chloride and total Xylenes. The predominant semivolatile organic contaminants of concern range in average concentration from 0.092 to 17 ppm and are 4-Chloroaniline, N-nitrosodiphenylamine, Anthracene, Naphthalene and Phenanthrene. The predominant inorganic contaminants of concern range in average concentration from 55 to 4,490 ppm and include Arsenic, Copper, Lead and Zinc. Polychlorinated Biphenyl (PCB-1254) was also detected in the range of 0.9 to 3 ppm. The contents of Impoundment 15 are not classified as RCRA hazardous wastes.

Impoundment 16

Impoundment 16 has a surface area of approximately 3.0 acres. Its surface is devoid of topsoil and vegetation and has been graded in the southeast corner to facilitate drainage of precipitation. This impoundment contains a homogeneous material composed of greater than 99 percent iron oxide. The iron oxide ranges from approximately 5 to 10 feet in depth and occupies a volume of approximately 38,000 cubic yards. Impurities in the iron oxide include trace organics, metals, stones and dirt. The detected predominant volatile organic contaminants of concern range in average concentration from 0.002 to 0.073 ppm and are Acetone, Benzene, Methylene Chloride and total Xylenes. The predominant semivolatile organic contaminants of concern range in average concentration from 0.046 to 6 ppm and are 4-Chloroaniline, N-nitrosodiphenylamine, Anthracene, Naphthalene, Phenanthrene and Pyrene. The predominant inorganic contaminants of concern range in average concentration from 20 to 2,620 ppm and include Arsenic, Copper, Lead and Zinc. PCB-1254 was also detected in the range of 1.5 to 6 ppm. The contents of Impoundment 16 are not classified as RCRA hazardous wastes.

Impoundment 17

Impoundment 17 has a surface area of approximately 6.2 acres. It's surface supports vegetation consisting primarily of small bushes. Impoundment 17 contains approximately 67,000 cubic yards of homogeneous primary wastewater treatment sludge with a depth of approximately 8 feet. The predominant volatile organic contaminants of concern detected in impoundment 17 range in average concentration from 1 to 16 ppm and are Acetone, Chlorobenzene, Ethylbenzene, Toluene and total Xylenes. The Predominant semivolatile organic contaminants of concern detected in Impoundment 17 range in average concentration from 17 to 70 ppm and are 1,2,4-Trichlorobenzene, Benzo(a)anthracene, Bis(2-ethyl hexyl)phthalate, Naphthalene and N-Nitrosodiphenylamine. The predominant inorganic contaminants of concern detected in Impoundment 17 range in average concentrating from 100 to 3,500 ppm and are Chromium, Copper, Lead, Nickel and Zinc. The contents of Impoundment 17 are not classified as RCRA hazardous wastes.

Impoundment 18

Impoundment 18 has an estimated surface area of 15.4 acres and is densely vegetated by a variety of well-established trees and undergrowth. Impoundment 18 contains approximately 217,000 cubic yards of homogeneous primary wastewater sludge to a depth of about 9 feet. The predominant volatile organic contaminants of concern detected in Impoundment 18 range in average concentration from 1 to 2.5 ppm and are Acetone and Chlorobenzene. The detected predominant semivolatile organic contaminants of concern range in average concentration from 26 to 780 ppm and are 2-Methylnaphthalene, 4-Chloroaniline, Acenaphthalene, Benzo(a)anthracene, Bis(2-ethyl hexyl)phthalate, Naphthalene, Fluorene and Phenanthrene. The detected predominant inorganic contaminants of concern have a range of average concentrations from approximately 180 to 2,200 ppm and are Arsenic, Chromium, Copper, Lead and Zinc. The contents of Impoundment 18 are not classified as RCRA hazardous wastes.

6. SUMMARY OF EXISTING SITE RISK

Based upon the results of the ICPFR, the Baseline EA was completed to estimate the risks associated with current site conditions. The Baseline EA estimates the human health and ecological risks presented by the contamination at the site if no remedial actions were taken. The results of the Baseline EA were reported in March 1992.

Human Health Risk Assessment

A four-step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: Hazard Identification--identifies the contaminants of concern at the site based on several factors such as toxicity, frequency of occurrence and concentration. Exposure Assessment- estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed. Toxicity Assessment--determines the types of adverse health effects associated with chemical exposures and the relationship between magnitude of exposure (dose) and severity of adverse effects (response). Risk Characterization--summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative (e.g., one-in-a-million excess cancer risk) assessment of site-related risks.

As a first step in the Baseline EA, contaminants of concern were selected that would be representative of site risks. The contaminant selection criteria was based primarily on frequency of detection, the availability of toxicity criteria, and numerical threshold criteria. The Baseline EA identified a total of 55 contaminants of concern for the Cyanamid site. Of these 55 contaminants, those that were detected most frequently or in the highest concentrations within the Group II Impoundments are Acetone, Benzene, Carbon Disulfide, Chlorobenzene, Ethylbenzene, Methylene Chloride, Toluene, total Xylenes, Acenaphthalene, Benzo(a)Anthracene, Bis(2-Ethyl Hexyl)Phthalate, 4-Chloroanaline, 1,2-Dichlorobenzene, 1,4-Dichlorobenzene, Fluorene, 2-Methylnaphthalene, Naphthalene, Nitrobenzene, N-Nitrosodiphenylamine, Phenanthrene, 1,2,4-Trichlorobenzene, Arsenic, Cadmium, Chromium, Cooper, Lead, Mercury, Nickel, Selenium and Zinc. Of these contaminants of concern, only Benzene, Bis(2-Ethyl Hexyl)Phthalate, Methylene Chloride, N-Nitrosodiphenylamine, Arsenic, Cadmium, Chromium, Nickel and Lead are known or suspected carcinogens according to the USEPA Carcinogen Assessment Group (CAG) classification system.

Using the Baseline EA evaluation for exposure pathways for on-site and off-site human receptors, a number of significant exposure pathways were identified and evaluated quantitatively to determine the risk levels presented by existing site conditions.

Exposure to contaminated ground water was not identified as a significant exposure pathway at the present time because American Home Products pumps 650,000 gallons per day of contaminated ground water from on-site production wells that control the ground water contamination in the production area and west yard area of the site. Ground water not being captured by the production well pumping flows to the Raritan River at a point that is not being used as a drinking water source. Therefore, a ground water exposure pathway does not exist at the present time. A summary of the analytical results of ground water down gradient of Impoundments 15, 16, 17 and 18 is provided in Table 2.

Summary of Human Health Risks

Through an assessment of exposure pathways for the 55 contaminants of concern, specific health risk levels were calculated or each significant exposure pathway to enable a quantitative evaluation of health risks for human receptors.

Current federal guidelines for acceptable exposures are individual lifetime excess carcinogenic risk in the approximate range of 1 x 10-4 to 1 x 10-6. This can be interpreted to mean that an individual may have a one in 10,000 to a one in 1,000,000 increased chance of developing cancer as a result of a site-related exposure to a carcinogen under specific exposure conditions. Current federal guidelines for acceptable exposures for non-carcinogenic risk are maximum Hazard Index of 1.0. The Hazard Index is defined as the sum of the Hazard Quotients for all contaminants of concern within a particular exposure pathway that have a similar mechanism of action or end point. A Hazard Quotient greater than 1.0 indicates that the exposure level exceeds the protective level for that particular chemical.

New Jersey Public Law P.L. 1993, c. 139 (NJSA 58:10B) has set an acceptable cancer risk from a human carcinogen at 1 x 10-6 (one-in one-million) and an acceptable non-carcinogenic risk at the Hazard Index for any given effect to a value not to exceed 1.0. These established acceptable risk values are for any particular contaminant and not for the cumulative effects of more than one contaminant at a site.

A quantitative analysis of the risks associated with the Group II Impoundments was conducted in the Baseline EA to evaluate risks associated with exposure to impoundment solids through incidental ingestion, dermal contact, and inhalation as a result of unauthorized operation of off-road recreational vehicles (ORVs) on Impoundments 15, 16, 17 and 18. While direct access to these impoundments by standard vehicles is not possible, ORVs may gain access via a dirt trail from a private road.

Exposure levels were conservatively estimated based on current NJDEP and USEPA guidance methodologies. The estimated exposure levels were then compared to critical toxicity values to quantify the risks. Summary of site-wide risk characterization is included in Table 3.

The Baseline EA concluded that exposure to the Group II Impoundments' contents would not result in a significant impact to human health and the environment; however, a cumulative Hazard Index of 1.15 and a carcinogenic value of 1.19 x 10-6 via exposure to impoundments' solids (through incidental ingestion, dermal contact and inhalation) to on-site trespassers were conservatively estimated. Both of these values slightly exceed the limits established by NJDEP for Hazard Index and carcinogenic risk. The carcinogenic risk value is within the acceptable range established by USEPA while the Hazard Index risk value slightly exceeds the established value. Implementation of the selected remedy for Impoundments 15, 16, 17 and 18 will insure that the exceeded risk values are below the acceptable limits.

A quantitative analysis of the risks associated with future use of site ground water was not conducted. However, with the exception of Impoundment 18, there is a potential future risk to human health and the environment if the Group II Impoundments are not remediated. The Group II Impoundments (except Impoundment 18) are a continuous source of ground water contamination, which eventually discharges into the Raritan River. The ground water in the vicinity of the site is classified as a source of drinking water but it is not used as drinking water. Although there is a pumping program to control migration of contaminated ground water by recovering 650,000 gallons of contaminated ground water per day, the population around the site could potentially be exposed to contaminated ground water under a future use scenario. Further, the Group II Impoundments pose potential risks to trespassers that exceed acceptable risk levels established by NJDEP. Finally, the Group II Impoundments (except Impoundment 18) may pose an ecological risk at the site if left unremedied. For these reasons, remediation of the Group II Impoundments (except Impoundment 18) is warranted. Final site-wide remediation will insure that there are no unacceptable risks to human health and the environment.

Qualitative Ecological Risk Assessment

In the Ecological Assessment, a reasonable maximum environmental exposure is evaluated utilizing a four step process for assessing site-related ecological risks. These steps are: Problem Formulation--development of the objectives and scope of the ecological assessment; description of the site and ecosystems that may be

impacted; identification of contaminants of concern. Exposure Assessment--identification of potential ecological receptors and exposure pathways; quantitative evaluation of exposure pathways; fate and transport mechanisms for contaminants. Ecological Effects Assessment--literature reviews, field studies, and toxicity tests, linking contaminant concentrations to effects on ecological receptors. Risk Characterization--measurement or estimation of both current and future adverse effects.

The results of the site-wide habitat survey and direct field observations were compared to the Natural Heritage Data Base (NJDEP, 1991). This assessment concluded that the on-site habitat does not support threatened or endangered species.

As stated earlier, a Natural Resource Assessment (NRA) completed by American Cyanamid is being evaluated by the NJDEP Office of Natural Resource Damage (ONRD) with support from the Federal Natural Resource Trustees. The NRA consists of the following: a Wetlands Assessment (using state and federal guidance); a Cultural Resources Survey (Stage IA and IB); a Floodplain Assessment; an Endangered Species Assessment; and, an assessment of the Raritan River and Cuckolds Brook. Based on its evaluation of the NRA, the ONRD, in consultation with the Federal Trustees, will determine any impacts to natural resources related to the American Cyanamid site. If this determination indicates any impacts to natural resources from the American Cyanamid site, the ONRD, in consultation with the Federal Trustees, will establish appropriate requirements for mitigation and will negotiate a financial settlement with American Home Products for any damage to the natural resources. The findings of the NRA along with any requirements for mitigation will be incorporated into the Remedial Design of the Group II Impoundments.

Because Impoundment 18 is heavily vegetated, a qualitative ecological assessment was performed. Impoundment 18 has been characterized as a successional floral community comprised predominantly of facultative upland and obligate species (Tree of Heaven, Eastern Cottonwood, Sycamore, Princess Tree, Eastern Red Cedar, Big-Tooth Aspen, Black Cherry, Dwarf Sumac, Staghorn Sumac, Red Maple, Gray Birch and Silver Maple). A natural balance exists between the vegetation and the surface cover of Impoundment 18 that restricts the release of contaminants to the surface. Because of this, Impoundment 18 is considered to be of high ecological value.

7. SCOPE AND ROLE OF ACTION

With the exception of Impoundment 18, there is a potential future risk to human health and the environment if the Group II Impoundments are not remediated. The Group II Impoundments (except Impoundment 18) are a continuous source of ground water contamination, which eventually discharges into the Raritan River. The ground water in the vicinity of the site is classified as a source of drinking water. Although there is a pumping program to control migration of contaminated ground water by recovering 650,000 gallons of contaminated ground water per day, the population around the site could potentially be exposed to contaminated ground water under a future use scenario. Further, the Group II Impoundments pose potential risks to trespassers that exceed acceptable risk levels established by NJDEP. Finally, the Group II Impoundments (except Impoundment 18) may pose an ecological risk at the site if left unremedied. For these reasons, remediation of the Group II Impoundments (except Impoundment 18) is warranted. Final site-wide remediation will insure that there are no unacceptable risks to human health and the environment.

This ROD addresses the remediation of the Group II Impoundments only.

8. REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment; they take into account the contaminant(s) of concern, the exposure route(s), receptor(s), and acceptable contaminant level(s) for each exposure route. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs).

The remedial action objectives for the Group II Impoundments are as follows:

1. Eliminate and/or control source(s) of contamination;

2. Eliminate the potential for incidental ingestion, dermal contact and inhalation of impoundments' solids; and,
3. Contribute to compliance with ground water ARARs.

9. SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected site remedy be: protective of human health and the environment; be cost-effective; comply with other statutory laws; and, utilize permanent solutions, alternative treatment technologies, and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

The CMS/FS report includes a preliminary screening of a potentially applicable technologies, followed by elimination of inappropriate or infeasible. alternatives and identification of applicable technologies based solely on technical feasibility. The remaining technologies were then developed into remedial alternatives and evaluated in detail by comparing them to the CERCLA evaluation criteria.

Based on the similarities in chemical and physical characteristics of the waste materials contained in Impoundments 15 and 16 (iron oxide), and Impoundments 17 and 18 (primary wastewater treatment sludge), these two groups were evaluated separately in the detailed and comparative analysis of remedial alternatives. The unique characteristics of the two distinct waste types (primary wastewater treatment sludge and iron oxide) prevented a single evaluation of remedial alternatives for all four Group II Impoundments. The preferred remedial alternatives presented in the Group II CMS/FS Report and the Proposed Plan and the selected alternatives presented in this ROD include a combination of remedial actions that will address all of the Group II Impoundments.

The remedial alternatives evaluated included the following:

1. No-action/Limited Action;
2. In-Place Containment;
3. Solidification; and,
4. Recycling.

Several points should be noted about each of the alternatives evaluated. First, all remedial alternatives will require ground water monitoring as a component. For the alternatives that involve leaving the contaminants in place, such monitoring would be required on a long-term basis, while for the alternatives that involve removal of the contaminants, the monitoring would only be required until it can be confirmed that the removal has been effective.

With respect to costs, the total cost for each alternative reflects both capital cost to implement and operation and maintenance costs over a period ranging from 5 to 30 years. The costs of all alternatives for the Group II Impoundments included in this ROD are different than the May 1994 CMS/FS report. The costs specified in the 1994 CMS/FS report were obtained in 1993 and are now outdated in light of the current market conditions. The costs were revised in October 1995 by American Home Products Corporation and the revised costs are reflected in this ROD.

Finally, with regard to the time to implement each alternative, the estimated time frames provided reflect both the time to design and construct the remediation system. However, several of the alternatives include consolidation of treated residuals in the on-site Impoundment 8 facility. Consolidation of these treated residuals in Impoundment 8 will be implemented after completion of consolidation of treated materials of Impoundments 6, 11, 19 and 24, currently scheduled to be completed in 1997.

A brief description of each of the remedial alternatives is provided below:

Note: The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with other alternatives.

Impoundments 15 and 16

Alternative 1--No Action (or Limited Action)

- impoundments remain in-place in current condition;
- establishment of institutional controls (environmental restrictions) and improvements in physical site access controls (additional fencing); and,
- short-term ground water monitoring.

Total Cost: $ 300,000
Time to Implement: 1 month

Alternative 2--In place Containment

Note: Impoundment 15 is able to accommodate its content as well as Impoundment 16's contents because Impoundment 15 is not completely full.

- consolidation of Impoundment 16 contents into Impoundment 15;
- capping with a synthetic liner, drainage layer, soil cover, and vegetation;
- backfilling and reseeding; and,
- short-term ground water monitoring.

Total Cost: $ 2,700,000
Time to Implement: 1 year

Alternative 3--Solidification

Note: Impoundment 15 is able to accommodate its content as well as Impoundment 16's contents because Impoundment 15 is not completely full.

- in-situ solidification of the contents of both impoundments;
- consolidation of solidified Impoundment 16 iron oxide into Impoundment 15;
- capping of the solidified material with a soil cover and vegetation;
- backfilling and natural revegetation of former Impoundment 16 area; and,
- short-term ground water monitoring.

Total Cost: $ 8,600,000
Time to Implement: 2 years

Alternative 4--Recycling

- excavation of iron oxide;
- transport and reuse of the iron oxide at an off-site recycling facility;
- backfilling, regrading and natural revegetation of former impoundment areas; and,
- short-term ground water monitoring.

Total Cost: $ 8,100,000
Time to Implement: Dependent on users and contract agreements

Impoundments 17 and 18

Impoundments 17 and 18 are adjacent, have similar characteristics and exist within the same type of hydrogeologic regime. However, Impoundment 17 appears to be impacting the quality of ground water due to the absence of a confining clay layer. Impoundment 18 does not appear to be impacting the quality of ground water due to the presence of a clay layer and has a high ecological value (see ecological assessment section). Therefore, different remedial alternatives were considered for the remediation of Impoundments 17 and 18.

Alternative 1--No Action (or Limited Action)

- Impoundments remain in-place in current condition;
- establishment of institutional controls (environmental restrictions) and improvements in physical site access controls (fencing); and,
- long-term ground water monitoring.

Total Cost: $ 300,000
Time to Implement: 3 months

Alternative 2--Solidification of Impoundment 17 with Placement into Impoundment 8 facility; No Action/Limited Action for Impoundment 18

- clearing and grubbing of Impoundment 17;
- solidification of Impoundment 17 wastewater treatment sludge;
- placement of solidified material into the Impoundment 8 facility;
- backfilling of former Impoundment 17 and natural ecological succession of the area;
- Impoundment 18 remains in place with fence installation around the perimeter;
- periodic selective removal of large trees on Impoundment 18 to prevent potential disturbance of the clay layer; and,
- long-term ground water monitoring.

Total Cost: $ 13,500,000
Time to Implement: 1.5 years (Impoundment 17)

Alternative 2A--Solidification of Impoundment 17 with Placement into Impoundment 8 facility; Capping of Impoundment 18

- clearing and grubbing of both Impoundments;
- solidification of Impoundment 17 sludge;
- placement of solidified material into the Impoundment 8 facility;
- backfilling of former Impoundment 17 and natural ecological succession of the area;
- capping of Impoundment 18 with filter fabric, Low Density Poly Ethylene (LDPE) liner, fill, topsoil and vegetation;
- fence installation around Impoundment 18 perimeter; and,
- short-term ground water monitoring.

Total Cost: $ 15,700,000
Time to Implement: 1.5 years

Alternative 3--Solidification and Consolidation: 17 into 18; Strengthen and Cap Impoundment 18

- clearing, grubbing and strength improvement (e.g., addition of cement) of the Impoundment 18 surface;
- excavation of Impoundment 17 sludge, strength improvement and consolidation of material into Impoundment 18;
- capping of consolidated unit;
- backfilling of former Impoundment 17 and natural succession of the area; and,
- short-term ground water monitoring.

Total Cost: $ 14,100,000
Time to Implement: 4.5 years

Alternative 3A--In-situ solidification of Impoundment 18; Solidification of Impoundment 17 and Placement in Impoundment 18, with cap

- clearing, grubbing and in-situ solidification of Impoundment 18;
- solidification of Impoundment 17 sludge;
- consolidation of solidified Impoundment 17 material into Impoundment 18;
- capping of consolidated unit;
- backfilling of former Impoundment 17 and natural revegetation of the area; and,
- short-term ground water monitoring.

Total Cost: $ 35,300,000
Time to Implement: 3 years

Alternative 4--Solidification of Impoundment 18 and placement into Impoundment 8 facility

This alternative does not include Impoundment 17.

- clearing and grubbing of Impoundment 18 surface;
- excavation of Impoundment 18 wastewater treatment sludge;
- consolidation of solidified material into Impoundment 8 facility;
- backfilling of former Impoundment 18 and natural revegetation of area; and,
- short-term ground water monitoring.

Total Cost: $ 41,700,000
Time to Implement: 2 years

This alternative is significantly different from all of the alternatives previously evaluated for Impoundments 17 and 18. As such, this alternative was evaluated for Impoundment 18 only to satisfy the CERCLA/NCP requirements. A similar option for Impoundment 17 is included as Alternative 2A.

10. EVALUATION OF REMEDIAL ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative was assessed against the nine CERCLA evaluation criteria for each of the two types of impoundments containing wastes with similar chemical and physical characteristics (i.e., iron oxide in Impoundments 15 and 16 and primary wastewater treatment sludge in Impoundments 17 and 18). New Jersey Public Law P.L. 1993, c. 139 (NJSA 58:10B) establishes that the NJDEP cannot require a permanent remedy, unless the cost of implementing a non-permanent remedy is 50 % or more than the cost of implementing a permanent remedy. The NCP/CERCLA criteria are more stringent than the NJSA 58:10B requirements concerning the cost of implementing a permanent remedy. Therefore, the more stringent NCP/CERCLA criteria are employed for this Superfund site.

A summary of the comparative analysis is provided below:

Impoundments 15 and 16

- Overall protection of human health and the environment: addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls or institutional controls.

Alternative 1 would not achieve this criterion because it would not eliminate the potential for inhalation of dust. Alternatives 2 and 3 would protect human health and the environment by eliminating the potential for direct contact with the iron oxide and by minimizing the potential for releases of contaminants to the ground water. Alternative 4 would achieve overall protection of human health and the environment by removal of the iron oxide material from the site. Alternative 2 and 3 would achieve this criterion better than Alternative 1. This criterion is best achieved by Alternative 4 among all alternatives.

- Compliance with applicable or relevant and appropriate requirements (ARARs): addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of federal and state environmental statutes and other requirements or provides grounds for invoking a waiver.

Alternative 1 would not trigger ARARs. Alternatives 2, 3 and 4 would not trigger RCRA Hazardous Waste Regulations or Land Disposal Restrictions (LDRs) since the iron oxide is not a RCRA Hazardous Waste. Air emissions ARARs would be achieved through the use of foam sprayers or controlling operation rates. Alternative 1 would not contribute to achieving site-wide ground water ARARs. Alternatives 2, 3 and 4 would contribute in achieving site-wide ground water ARARs by containment (Alternative 2), solidification and consolidation (Alternative 3) and, recycling (Alternative 4). Ground water monitoring is an ARAR under the State requirements and under the RCRA program (40 CFR 264.97).

Location-specific ARARs consist of wetlands, cultural resources and flood plains. The NRA, currently under evaluation, will determine the compliance of the site-wide remediation program with location specific ARARs. Based on the preliminary findings, location-specific ARARs would not be triggered for Impoundments 15 and 16 because the proposed remedial actions would not impact the natural resources. Compliance with the Group II Impoundments location-specific ARARs will be further evaluated as part of the Remedial Design process. Alternative 3 achieves this criterion better than Alternative 2. This criterion is best achieved by Alternative 4 among all alternatives.

- 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 cleanup goals have been met.

Alternative 1 would not achieve this criterion at all because it does not address the potential for dust generation or direct contact exposure. Alternatives 2 and 3 equally meet this criterion by containing the material. Alternative 3 would provide better long-term effectiveness than Alternative 2 because Alternative 3 provides some level of treatment for inorganics while Alternative 2 relies on containment. Alternative 4 is the most effective in the long-term because it does not require long-term maintenance of a cap or containment structure.

- Reduction of toxicity, mobility, or volume: through treatment is the anticipated performance of the treatment technologies a remedy may employ. This criterion is not applicable to Alternatives 1 and 2 because they do not involve treatment or recycling. Alternative 3 would decrease the mobility of contaminants by binding them in a solidified matrix while only slightly increasing the volume of waste material. Alternative 4 would result in removal of the iron oxide from the site for reuse, thereby eliminating concerns with reducing toxicity, mobility and volume of contaminants. Alternative 3 achieves this criterion better than Alternatives 1 and 2. Alternative 4 would achieve this criterion better than all other alternatives.

- Short-term effectiveness: addresses the period of time needed to achieve protection from any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

Alternative 1 would not result in short-term impacts to human health or the environment because no remedial action would be taken. The other alternatives might require that workers use personal protective equipment to reduce the potential for inhalation of dust particles generated during excavation. The time required to implement the alternatives would be the shortest for Alternative 1 (one month), slightly longer for Alternatives 2 and 3 (1-2 years), and dependent on potential users for Alternative 4. Alternatives 2 and 3 achieve this criterion equally. The relative degree of achievement of this criterion by Alternative 4 could not be determined. Also, the implementation time could not be determined due to inability to identify a recycling vendor.

- Implementability: is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

Alternative 1 would be the simplest alternative to implement from a technical standpoint because it would involve no construction or operation (other than fence installation). The operations associated with Alternatives 2, 3 and 4 employ well-established, readily available construction methods and are all considered technically and administratively feasible. Alternative 4 is not likely to be implementable because a recycling vendor has not been found despite many years of pursuing this alternative. Alternatives 2 and 3 achieve this criterion equally. The relative degree of achievement of this criterion by Alternative 4 could not be determined. Also, the implementability could not be determined due to inability to identify a recycling vendor.

- Cost: includes estimated capital and operation and maintenance costs and net present worth costs.

The total cost for Alternative 1 is $300,000; Alternative 2, $2,700,000; Alternative 3, $8,600,000; and, Alternative 4, $8,100,000.

- USEPA concurrence: indicates whether, the federal regulatory agency concur, oppose, or have no comment on the selected remedy.

USEPA concurs with the selected remedy.

- Community acceptance: assessment of the public comments received on the ICPFR, Baseline EA report, CMS/FS report, Proposed Plan and the draft modified HSWA permit.

Community concerns/comments received during the public comment period and the public meeting are included in the Responsiveness Summary, together with NJDEP responses, which is part of this ROD. The community group CRISIS, which has received a Technical Assistance Grant (TAG) from USEPA, requested that NJDEP change its preferred alternative for Impoundments 15 and 16 to Alternative 3. NJDEP's response is included in the Responsiveness Summary.

Impoundments 17 and 18

- Overall protection of human health and the environment

Alternative 1 would fail to remedy the adverse impact that Impoundment 17 is having on ground water quality, since it offers no control of potential releases of contaminants to shallow ground water. All of the other alternatives would be protective of human health and the environment since they all involve removal of the source of ground water contamination (Impoundment 17). All of the alternatives will provide for adequate protection of human health for Impoundment 18. However, except for Alternatives 1 and 2, the work would require the clearing and grubbing of generally healthy ecosystems (i.e., trees, plants, shrubs) at Impoundment 18. Only Alternatives 1 and 2 protect the ecosystems that Impoundment 18 underlies. Alternatives 2 and 2A would provide an additional level of protection over Alternatives 3 and 3A by placing the solidified Impoundment 17 sludge into the Impoundment 8 facility. Alternative 4 would eliminate the potential for future adverse impacts to ground water from Impoundment 18. Alternative 2A achieves this criterion better than Alternative 2 because it includes capping of Impoundment 18.

Alternative 3A achieves this criterion better than Alternative 3 because it includes in-situ solidification of Impoundment 18.

- Compliance with ARARs

All of the remedial alternatives except Alternative 1 would contribute to achieving the compliance with site-wide ground water ARARs by solidification and consolidation of the material (Impoundment 17). Ground water ARARs have not been exceeded for Impoundment 18. Alternative 2 would provide confirmation of ground water ARARs compliance for Impoundment 18 through routine ground water monitoring. RCRA LDRs are not ARARs for Impoundment 17 and 18 because the materials in these impoundments are not hazardous wastes. Ground water monitoring is an ARAR under State requirements and under the RCRA program (40 CFR 264.97). Except for Alternative 1, all other alternatives would require that air emissions ARARs be met during excavation and treatment operations. This would be achieved by the installation of air emission control measures (such as a carbon absorber), if necessary. Location specific ARARs consist of wetlands, cultural resources and flood plains. The NRA, currently under evaluation, will determine the compliance of the site-wide remediation program with location specific ARARs. Based on the preliminary findings, location specific ARARs would not be triggered for Impoundments 17 and 18 because the proposed remedial actions would not impact the natural resources. Compliance with the Group II Impoundments location specific ARARs will be further evaluated as part of the Remedial Design process. Alternative 2A achieves this criterion better than Alternative 2 because it includes capping of Impoundment 18, minimizing infiltration of rain water. Alternative 3A achieves this criterion better than Alternative 3 because it includes in-situ solidification of Impoundment 18, minimizing leachability of contaminants to ground water.

- Long-term effectiveness and permanence

Alternative 1 would not remedy the current or future adverse impact of Impoundment 17 on ground water quality. Alternatives 2, 2A, 3 and 3A would achieve this criterion by removing and treating the source of ground water contamination (Impoundment 17). Alternative 4 would achieve this criterion by solidification and consolidation of Impoundment 18 material into the Impoundment 8 facility. All alternatives, except Alternative 1, would meet this criterion by removal/containment/consolidation of the contamination sources (Impoundment 17) and by long-term maintenance and ground water monitoring (Impoundment 18). Alternative 2A achieves this criterion better than Alternative 2 because it includes capping of Impoundment 18, minimizing infiltration of rain water. Alternative 3A achieves this criterion better than Alternative 3 because it includes in-situ solidification of Impoundment 18, minimizing leachability of contaminants to ground water.

! Reduction of toxicity, mobility, or volume through treatment

This criterion is not applicable to Alternative 1 because it does not involve treatment or recycling. Alternatives 2A, 3, and 3A would reduce the mobility of contaminants in the Impoundment 17 sludge through solidification. Alternatives 2, 2A, 3, 3A and 4 would decrease the mobility of both organic and inorganic contaminants by binding them in a solidified matrix while slightly increasing the volume of waste material. Alternative 4 would provide further reduction in mobility of the Impoundment 18 material by solidification and consolidation. Alternative 2A achieves this criterion better than Alternative 2 because it includes capping of Impoundment 18, minimizing infiltration of rain water. Alternative 3A achieves this criterion better than Alternative 3 because it includes in-situ solidification of Impoundment 18, minimizing leachability of contaminants to ground water.

! Short-term effectiveness

Alternative 1 would not have any short-term adverse impact because it does not involve any excavation and treatment. Alternatives 2, 2A, 3, 3A and 4 would achieve protection of human health and the environment in a relatively short period of time and would result in minimal short-term impacts associated with its implementation. Alternatives 2, 2A and 3 would provide better short-term effectiveness over Alternatives 3A (more time to perform in-situ solidification of Impoundment 18) and 4 (more time to excavate and solidify large volume of Impoundment 18) because they can be implemented in a shorter time resulting in less short-term impacts.

! Implementability

Alternative 1 would be the simplest alternative to implement from a technical standpoint because it would involve to construction or operation (other than fence installation). The operations associated with Alternatives 2, 2A, 3, 3A and 4 would employ well established, readily available construction methods and are all considered technically and administratively feasible. Alternatives 2, 2A and 3 would achieve this criterion better than Alternatives 3A (involves in-situ solidification of Impoundment 18) and 4 (involves excavation and solidification of a large volume of Impoundment 18) because they can be implemented in a shorter time.

! Cost

The total cost for Alternative 1 is $300,000; Alternative 2, $13,500,000; Alternative 2A, $15,700,000; Alternative 3, $14,100,000; Alternative 3A, $35,300,000, and, Alternative 4, $41,700,000.

! USEPA concurrence

USEPA concurs with the selected remedy.

! Community acceptance

Community concerns/comments received during the public comment period and the public meeting are included in the responsiveness summary, together with NJDEP responses, which is part of this ROD. The community group CRISIS supports NJDEP's preferred alternative Impoundments 17 and 18.

11. SELECTED REMEDY FOR GROUP II IMPOUNDMENTS

Based upon an evaluation of the various alternatives and after consideration of public comments, NJDEP and USEPA have selected the following alternatives for the Group II Impoundments:

Consolidation of the iron oxide from Impoundment 16 into Impoundment 15 with capping (synthetic liner) of the consolidated material (Alternative 2); solidification of the wastewater treatment sludge in Impoundment 17 with placement of the solidified material into the Impoundment 8 facility, and no-action/limited action (fencing, institutional controls and ground water monitoring) for Impoundment 18 (Alternative 2 for Impoundments 17 and 18). The selected remedy (involving excavation) includes removal of six (6) inches of underlying soils and any other obviously contaminated material after removal of the contents of the impoundments and post-excavation evaluation/sampling of the underlying soils. If the results are above the NJDEP Soil Cleanup Criteria, the underlying soils will be removed/remediated. The selected alternatives also include a ground water monitoring program and an air emission control measure (such as a carbon absorber), if necessary.

The in-place containment alternative for Impoundments 15 an 16 would involve the consolidation of Impoundment 16 into Impoundment 5, and the capping of the entire consolidated unit. The ground water monitoring program would be implemented within six months of signing the ROD on a quarterly basis for the first five years by using monitor wells hydrologically down gradient of Impoundments 15 and 16 to assess potential influences of residual contaminants on ground water quality, surface water quality in the Raritan River and associated ecosystems. Based on the results of the first five years monitoring data, frequency and duration of further ground water monitoring will be determined. Ground water monitoring would be performed for contaminants of concern (as determined by prior chemical analyses) associated with Impoundments 15 and 16. Appropriate monitor well locations will be determined during a Remedial Design. Additional monitor wells will be installed if necessary. If, after five years of ground water monitoring (after completion of the remediation of Impoundments 15 and 16), it is determined that the ground water ARARs are exceeded in the selected down gradient monitor wells, a need for further remedial actions for Impoundments 15 and 16 will be evaluated.

Solidification of the sludge from Impoundment 17 would involve either excavating the sludge from the impoundment, mixing it with cement-like materials (most likely in a mixing unit) or pre-excavation solidification. This would be followed by consolidation of the solidified sludge in the Impoundment 8 facility. The ability to control air emissions would be used as criteria during the Remedial Design phase to determine whether ex-situ solidification process or pre-excavation reagent mixing solidification process should be implemented. The No-Action/Limited Action (fencing and institutional controls) alternative for Impoundment 18 would involve continued natural revegetation of the area with periodic (5 to 10 year basis) harvesting of the larger trees to ensure that tree roots do not breach the silt and clay layer beneath the impoundment. The ground water monitoring program would be implemented within six months of signing the ROD on a quarterly basis for the first five years by using monitor wells (including Monitor Well CCC) hydrologically down gradient of Impoundments 17 and 18 to assess potential influences of residual contaminants on ground water quality, surface water quality in the Raritan River and associated ecosystems. Based on the results of the first five years monitoring data, the frequency and duration of further ground water monitoring will be determined. Ground water monitoring would be performed for contaminants of concern (as determine by prior chemical analyses) associated with Impoundments 17 and 18. Appropriate monitor well locations will be determined during the Remedial Design. Additional monitor wells will be installed if necessary. If, after five years of ground water monitoring (after completion of the remediation of Impoundments 17), it is determined that the ground water ARARs are exceeded in the selected down gradient monitor wells, a need for further remedial actions for Impoundment 18 will be evaluated.

These selected alternatives satisfy the remedial action objectives and the requirements of: CERCLA, as amended by SARA; the National Contingency Plan, RCRA, as amended by HSWA; and, the ACO, including the NJDEP Ground Water Quality Standards. Because these remedies would result in hazardous substances remaining on the site, a review would be conducted every five years after implementation of this remedy to ensure that the remedy continues to provide adequate protection of human health and the environment.

Rationale for Selected Remedy for Group II Impoundments

The in-place containment alternative for Impoundments 15 and 16 would eliminate nuisance dust from the impoundments and the potential for direct exposure to the iron oxide, in addition to reducing the area requiring a cover and maintenance. Moreover, this alternative would contribute to improving site-wide ground water quality by reducing rain water infiltration to ground water by installing a cap. This alternative would serve two purposes simultaneously: protecting human health and the environment and leaving the option open for recycling of the iron oxide material if such a user is found in the future. (If a user is found in the future, the material can easily be accessed and removed by opening a cap.)

Solidification of the wastewater treatment sludge in Impoundment 17 would chemically and physically bind the inorganic contaminants in the sludge into a solid matrix, greatly reducing the potential for migration of contaminants. Consolidation of the solidified sludge into the Impoundment 8 facility would further reduce the mobility of any residual contaminants by reducing the potential for infiltration of water and by collection and treatment of any leachate that is generated.

No-action/limited action for Impoundment 18 would be appropriate based on the ground water quality data and the aquifer hydrogeologic characteristics that demonstrate that Impoundment 18 is effectively isolated from the environment and that it is not a source of ground water contain nation in its present condition. Studies also support the determination that the silt and clay confining layer beneath Impoundment 18 is continuous and that it is of sufficiently low permeability to prevent the leaching of contaminants to ground water. If, after remediation of Impoundment 17 (Impoundment 17 is a major contributor of ground water contamination in this area), ground water ARARs in down gradient monitor wells are exceeded in the future, further remediation of Impoundment 18 will be required.

The on-site Impoundment 8 facility is a multi-lined RCRA waste management facility and has a leachate detection and collection system a well as a ground water monitoring system that would cumulatively provide adequate and appropriate protection of human health and the environment. The compatibility study demonstrated that the residuals from the solidified Impoundment 17 sludge would be compatible with the Impoundment 8 facility liner. Adequate capacity for the solidified waste materials is available in the Impoundment 8 facility.

12. STATUTORY DETERMINATIONS

Under their legal authorities, NJDEP's and USEPA's primary responsibility at Superfund sites is to undertake remedial actions that achieve adequate protection of human health and the environment. In addition, section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that when complete, the selected remedial action for this site must comply with applicable or relevant and appropriate environmental standards established under State and Federal environmental laws unless a statutory waiver is justified. The selected remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as their principal element.

The selected remedy for the Group II Impoundments is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site. Because this remedy will result in hazardous substances remaining on the site, a review will be conducted every five (5) years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

13. DOCUMENTATION OF SIGNIFICANT CHANGES

There is no change from the Preferred Remedy described in the Proposed Plan and the Selected Remedy described in this ROD.

GLOSSARY

RECORD OF DECISION
GROUP II IMPOUNDMENTS AT AMERICAN CYANAMID SITE
AMERICAN HOME PRODUCTS CORPORATION
BRIDGEWATER TOWNSHIP, SOMERSET COUNTY

This glossary defines the technical terms used in this ROD. The terms and abbreviations contained in this glossary are often defined in the context of hazardous waste management, and apply specifically to work performed under the Superfund program. Therefore, these terms may have other meanings when used in a different context.

Administrative Consent Order: A legal and enforceable agreement between NJDEP and potentially responsible parties (PRPs). Under the terms of the Order, the PRPs agree to perform or pay for site studies or cleanup work. It may also describe the oversight rules, responsibilities, and enforcement options that the government may exercise in the event of non-compliance by the PRPs. This Order is signed by the PRPs and the state government; it does not require approval by a judge.

ARAR: Applicable or relevant, and appropriate requirements.
Berm: A ledge, wall or a mound of earth used to prevent the migration of contaminants.

Cap: A layer of material, such as clay or a synthetic material, used to prevent rainwater from penetrating wastes and spreading contaminated materials. The surface of the cap is generally mounded for sloped so water will drain off.

CERCLA: Comprehensive Environmental, Response, Compensation and Liability Act of 1980, 42 U.S.C. § 9601 et.seq., as amended, commonly known as Superfund.

Closure: The process by which a landfill stops accepting wastes and is shut down under federal and state guidelines that provide protection for human health and the environment.

Grubbing: Clearing the ground of roots and stumps by digging them up.

HSWA: Hazardous and Solid Waste Amendments.

NJDEP: New Jersey Department of Environmental Protection.

NCP: National Contingency Plan, 40 CFR part 300.

PPM: Parts per million.

RCRA: Resource Conservation and Recovery Act of 1976 as amended.

RCRA Cap: A multi-layer material cap (see definition of "cap" above) which incorporates several impermeable covers to assure absolute integrity. Geomembrane liners, filter fabrics, clay, sand and selected layers of fill materials are used to reach maximum reasonable impermeability.

SARA: Superfund Amendments and Reauthorization Act.

USEPA: United States Environmental Protection Agency.

Volatile Organic Compounds (VOCs): VOCs are produced as secondary petrochemicals. They include light alcohols, acetone, trichloroethylene, perchloroethylene, dichioroethylene, benzene, vinyl chloride, toluene, and methylene chloride. These potentially toxic chemicals are used as solvents, degreasors, paints, thinners, and fuels. Because of their volatile nature, they readily evaporate into the air, increasing the potential exposure to humans. Due to their low water solubility, environmental persistence, and wide-spread industrial use, they are commonly found in soil and ground water.
Wetland: An area that is regularly saturated by surface or ground water and, under normal circumstances, capable of supporting vegetation typically adapted for life in saturated soil conditions.

ADMINISTRATIVE RECORD INDEX

RECORD OF DECISION
GROUP II IMPOUNDMENTS AT AMERICAN CYANAMID SITE
AMERICAN HOME PRODUCTS CORPORATION
BRIDGEWATER TOWNSHIP, SOMERSET COUNTY

1. Lagoon 1 & 2 Characterization Report, O'Brien & Gere, October 1982.
2. Phase IV Report Source Assessment and Remedy Program, O'Brien & Gere, February 1983.
3. Monitoring Groundwater Impact on the Raritan River Report, Lawler, Matusky, & Skelly (LMS), October 1983.
4. Source Assessment and Remedy Program Final Report, O'Brien & Gere, December 1984.
5. Sludge Solidification Report for Lagoon 20, IT Corporation, November 1986.
6. Final Report on Continuous Monitoring Assessment Program for Lagoons 6,7,13,19, and 24, Camp Dresser & Mckee (CDM), March 1983.
7. Ground water investigation and site-wide ground water model results, CDM 1985.
8. Continued assessment of ground water at Impoundments 17 and 19, CDM 1986.
9. New Jersey Pollutant Discharge Elimination System-Discharge to Ground Water (NJPDES/DGW) permit # NJ0002313, effective October 30, 1987.
10. Modification to the existing NJPDES/DGW permit # NJ0002313 issued on November 07, 1987 for the closure of Impoundment 8 facility (Impoundments 6,7,8 and 9A) under the authority of RCRA delegated to the New Jersey Department of Environmental Protection (NJDEP) from USEPA.
11. Continued assessment of ground water at Impoundments 6,7,13,19 and 24, CDM 1988.
12. NJDEP Approval Letter for "No Action" Closure of lagoon 23, May 1988.
13. Administrative Consent Order (ACO) Signed by Cyanamid and NJDEP, May 1988.
14. Quality Assurance/Quality Control (QA/QC) Plan Submitted for Impoundment Characterization Program by Cyanamid, Blasland, Bouck & Lee (BB&L), September 1988.
15. Hazardous and Solid Waste Amendments (HSWA) permit I.D. # NJD0002173276 issued by USEPA on November 8, 1988.
16. Impoundment Characterization Program Sampling and Analysis Work Plan, BB&L, November 1988.
17. NJDEP Approval Letter for QA/QC Program for Impoundment Characterization, December 1988.
18. Berm Failure Prevention Plan, BB&L, February 1989.
19. Impoundments 11,20, and 26 Resource Conservation and Recovery Act (RCRA) Facility Investigation Work Plan, BB&L, February 1989.
20. NJDEP Community Relations Plan, February 1989.
21. NJDEP Approval Letter for Berm Failure Prevention Plan, March 1989.
22. NJDEP Approval Letter for Impoundments 11,20, and 26 RCRA Facility Investigation Work Plan, August 1989.
23. Impoundment Characterization Program Final Report, BB&L, January 1990.
24. NJDEP Approval Letter for Implementation of Fuel Blending Program as Interim Remedial Action For Lagoons 4 and 5, August 1990.
25. NJDEP Approval Letter for Impoundment Characterization Program Final Report, October 1990.
26. Impoundment Corrective Measure Study/Feasibility Study (CMS/FS) Work Plan, (BB&L), October 1990.
27. NJDEP Air Permit for Lagoon 4 & 5 Fuel Blending Program, October 1990.
28. NJDEP Stream Encroachment Permit for Lagoon 4 & 5, March 1991.
29. Amended Hill Property Remedial Investigation Report (RI), BB&L, March 1991.
30. NJDEP/USEPA Approval for Hill Property RI, April 1991.
31. NJDEP RCRA Permit Application Approval For Lagoons 4 & 5, June 1991.
32. Technology Evaluation Work Plan (TEWP) for Group I Impoundments, BB&L, July 1991.
33. NJDEP/USEPA Review and Concurrence Letter for TEWP-I, September 1991.
34. TEWP for Group II Impoundments, BB&L, December 1991.
35. NJDEP/USEPA Review and Concurrence Letter for TEWP-II, January 1992.
36. Amended Baseline Site-Wide Endangerment Assessment Report (Including Hill Property), BB&L, March 1992.
37. NJDEP/USEPA Approval Letter for Baseline Site-Wide Endangerment Assessment Report, April 1992.
38. Amended Soils RI/FS Work Plan, BB&L, May 1992.

39. Surface Soils Remedial/Removal Action (SSR/RA) Plan, BB&L, July 21, 1992.
40. A Work Plan for Coal Pile Removal to Impoundment Facility, Cyanamid, August 13, 1992.
41. Hazardous Waste Site Safety and Health Program, Cyanamid, August 31, 1992 (prepared on 07/20/88).
42. CMS/FS report for Group I Impoundments, BB&L, October 1992.
43. NJDEP/USEPA approval letter for Group I Impoundments CMS/FS report, October 29, 1992.
44. Relocation of Production Wells from Hill Property to Manufacturing Area, Ground Water Modeling Report, CDM, October 1992.
45. Surface Soil Removal/Remedial Action Final Report, BB&L, March 5, 1993.
46. Superfund Proposed Plan for Group I Impoundments, June 30, 1993.
47. Draft Modified HSWA permit I.D # NJD002173276, June 30, 1993.
48. Transcript for August 5, 1993 Public Meeting/Hearing for the Group I Impoundments (11, 13, 19 & 24) Proposed Plan and Draft Modified HSWA Permit.
49. Record of Decision for Group I Impoundments (11, 13, 19 and 24), NJDEP, September 28, 1993.
50. Phase IA Cultural Resource Reconnaissance Report, The Cultural Resource Consulting Group, Revised September 1993.
51. Final HSWA Modified Permit for Group I Impoundments (11, 13, 19 and 24), USEPA, March 4, 1994.
52. Addendum to Final Design Report-Impoundment 8 East Liner Design Modifications, March 1994, BB&L.
53. Amendment to the 1988 ACO, NJDEP, May 4, 1994.
54. Group II Impoundments (1, 2, 15, 16, 17 & 18) CMS/FS Report, BB&L, May 1994.
55. Group I Impoundments (11, 13, 19 and 24) Remedial Design Report, BB&L, May 1994.
56. Final Renewed NJPDES/DGW Permit dated July 15, 1984, NJDEP, Effective September 1, 1994.
57. Remedial Action Plan for Impoundment 19, ENSR and BB&L, July 1994.
58. NJDEP Approval for Group II Impoundments (1, 2, 15, 16, 17 and 18), July 19, 1994.
59. September 16, 1994 Modifications to Remedial Action Plan for Impoundment 19, American Cyanamid.
60. Final Summary Report for Startup of Production Wells PW-2 and PW-3, CDM, August 1994.
61. Impoundment 7 Closure Status Report, BB&L, December 1994.
62. Superfund Update, December 1994, NJDEP.
63. January 30, 1995 letter from American Home Products (AHP) indicating that it has assumed full responsibility for the site remediation as required by the ACO.
64. Petition for Designation of Impoundment 8 a Corrective Action Management Unit (CAMU), February 21, 1995, AHP.
65. Lagoon 8 Closure Certification Report, BB&L, May 1995.
66. NJDEP letter dated May 3, 1995 to Walt Sodie of CRISIS including legal opinion (dated April 25, 1995) from the Deputy Attorney General's office concerning removal of Group II Impoundments (15, 16, 17 and 18) from Flood Hazard Area.
67. USEPA's response to AHP dated May 18, 1995 for CAMU Petition.
68. AHP's response to USEPA dated June 29, 1995 for May 18, 1995 letter concerning CAMU Petition.
69. October 20, 1995 letter from AHP including revised cost estimates for remediation of the Group II Impoundments (15, 16, 17 and 18).
70. Impoundment 19 Closure Certification Report, O'Brien & Gere, November 1995.
71. Superfund Proposed Plan for Group II Impoundments (15, 16, 17 & 18) and Hill Property Soils, NJDEP, January 1996.
72. Transcript for February 22, 1996 Public Meeting concerning the Proposed Plan for Group II Impoundments (15, 16, 17 and 18) and Hill Property Soils.
73. March 27, 1996 Letter from OB&G concerning the supporting information for the Classification Exception Area at the Hill Property.
74. 5/10/96 Letter from AHP concerning Security Signs for Off Road Vehicles.

Appendix F

EPA/ESD/R02-99/096
1999

EPA Superfund
Explanation of Significant Differences:

AMERICAN CYANAMID CO
EPA ID: NJD002173276
OU 02
BOUND BROOK, NJ
11/30/1998

State of New Jersey
Department of Environmental Protection

Christine Todd Whitman
Governor

Robert C. Shinn, Jr.
Commissioner

Site Remediation Program
Floor 6E, PO Box 028, 401 East State Street
Trenton,NJ 08625-0028
Phone: (609) 292-1250/Fax: (609) 633-2360/Email: RGIMELLO@DEP.STATE.NJ.US

Mr. Richard Caspe
USEPA Region 2, Floor 19
290 Broadway
New York, NY 10007-1866

Dear Mr. Caspe:

RE: American Cyanamid Site
American Home Products Corporation
Bridgewater Township, Somerset County

Enclosed please find a copy of the final Explanation of Significant Difference (ESD) for Impoundments 15 and 16 (part of Group II Impoundments) for information purposes. The purpose of this Explanation of Significant Difference (ESD) is to explain a modification to the remedy selected in the Record of Decision (ROD) dated 12 JUL 1996 for the American Cyanamid site located in Bridgewater Township, Somerset County, New Jersey. This ESD is required pursuant to § 107(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and § 300.435(c)(2)(I) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

The New Jersey Department of Environmental Protection Agency (NJDEP) is the lead agency overseeing cleanup at this site. The United States Environmental Protection Agency (USEPA) acts as the support agency.

Recycling of the iron oxide material in Impoundments I5 and 16 was evaluated as a remedial alternative in the July 1996 ROD. But it could not be selected as a remedy in the ROD because a recycling vendor had not been identified at that time. The responsible party, American Home Products Corporation (AHPC), has now identified a vendor which can recycle this iron oxide material. These circumstances gave rise to the need for this ESD.

The NCP, § 300.435(c)(2)(i), states that an Explanation of Significant Difference (ESD) would be sufficient when the difference in the remedial action significantly changes but does not alter the remedy selected in the ROD with respect to scope, performance or cost. Recycling of the material of Impoundments 15 and 16 was evaluated in detail as a remedial alternative in the Corrective Measure Study/Feasibility Study (CMS/FS) and was carried through in the proposed plan and the ROD. The July 1996 ROD included the following sentence in the "Rational for Selected Remedy for Group II Impoundments" section: "The selected alternative would serve two purposes simultaneously; protecting human health and the environment and leaving the option open for recycling of the iron oxide material if such a user is found in the future."

The community was afforded an opportunity to comment on the recycling alternative together with other alternatives during the comment period of the original proposed plan. The community, including CRISIS (the local environmental group) and the Township of Bridgewater, preferred recycling then and still prefer it now. Copy of correspondence from CRISIS and the Township of Bridgewater, which indicate their support for the current proposal of recycling is enclosed. This correspondence also indicates that the community does not prefer another public comment period and public meeting on the current recycling proposal.

The above information clearly demonstrates that the current proposal of recycling does not fundamentally differ than the remedial alternatives considered and selected in the ROD. Based on this, NJDEP has determined that the ESD will be sufficient for the current proposal of recycling of the material of Impoundments 15 and 16.

The referenced site is a non-fund-financed (privately funded by responsible party) state-lead enforcement site under state law. In accordance with the NCP, §300.515(e)(2)(ii), USEPA's concurrence is not a prerequisite to a state's selecting a remedy at such sites. Further, the July 1996 ROD for the Group II Impoundments was signed by NJDEP. As such, NJDEP is moving forwarding issuing the ESD.

Sincerely,

Richard J. Gimello, Assistant Commissioner
Site Remediation Program

Enclosure

EXPLANATION OF SIGNIFICANT DIFFERENCE
IMPOUNDMENTS 15 AND 16 (PART OF GROUP II IMPOUNDMENTS)

AMERICAN CYANAMID SITE
AMERICAN HOME PRODUCTS CORPORATION
BRIDGEWATER TOWNSHIP, SOMERSET COUNTY
NEW JERSEY

New Jersey Department of Environmental Protection
Site Remediation Program
Bureau of Federal Case Management
November 1998

INTRODUCTION

The purpose of this Explanation of Significant Difference (ESD) is to explain modification to the remedy selected in the Record of Decision (ROD) dated 12 JUL 1996 for the American Cyanamid site located in Bridgewater Township, Somerset County, New Jersey. This ESD is required pursuant to § 107(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and § 300.435(c)(2)(I) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

The New Jersey Department of Environmental Protection (NJDEP) is the lead government agency, overseeing cleanup at this site. The United States Environmental Protection Agency (USEPA) acts as the support agency.

Recycling of the iron oxide material of Impoundments 15 and 16 was evaluated as a remedial alternative in the July 1996 ROD. It was not selected as a remedy in the ROD because a recycling vendor had not been identified at that time. The responsible party, American Home Products Corporation (AHPC), has now identified a vendor, which can recycle this iron oxide material. These circumstances gave rise to the need for this ESD.

This ESD will become part of the administrative record file. The ESD and other supporting documents are available for review as follows:

Bridgewater Town Hall
700 Garrestson Road
Bridgewater, NJ 08807
Phone: (908) 725-6300
Hours: Monday - Friday 8:30 AM to 4:00 PM

NJDEP
401 East State Street, CN 413
Trenton, NJ 08625
Phone: (609) 984-3081
Hours: Monday - Friday 8:30 AM to 4:00 PM

Somerset County Library
North Bridge Street & Vogt Drive
Bridgewater, NJ 08807
Phone: (908) 526-4016
Hours: Monday - Thursday 9:00 AM to 9:00.PM
Friday - Saturday 9:00 AM to 5:00 PM

SITE HISTORY AND CONTAMINATION PROBLEMS

The site has been used for numerous chemical and pharmaceutical manufacturing operations for over 75 years. Currently, only pharmaceuticals are being manufactured at the plant. Past manufacturing and disposal activities at the site had resulted in a number of areas used for waste storage and disposal as well as areas of soil and ground water contamination. The site is listed on the National Priorities List (NPL). Site

cleanup activities are being addressed under a May 1988 (Amended May 1994) Administrative Consent Order (ACO) between Cyanamid and NJDEP. American Home Products Corporation purchased American Cyanamid Company in 1994 and has assumed full responsibility for environmental remediation at the site. Requirements of CERCLA, as amended by the Superfund Amendment and Re-authorization Act (SARA) as well as the Resource Conservation and Recovery Act (RCRA) and Hazardous and Solid Waste Amendments for corrective actions are included in the ACO and are being addressed for overall site cleanup. The Hazardous and Solid Waste Amendment (HSWA) permit and numerous Air Pollution Control permits have also been issued to the site.

A Remedial Investigation of the site-wide soils was completed in 1992. A Feasibility Study addressing the site-wide soils will be initiated after completion of the remediation of the 16 on-site impoundments. Site-wide ground water contamination will be addressed after completion of the remediation of site-wide soils. Potential contamination in surface water, sediment and associated wetlands related to the Cuckolds Brook and Raritan River is being independently (and simultaneously with this program) addressed under the Natural Resource Assessment investigation program. Depending upon the outcome of this investigation additional study and/or restoration work may be required.

Due to practical limitations, all 16 of the Superfund impoundments cannot be remediated concurrently. Therefore, they have been grouped into three impoundment groups according to waste type, nature of contaminants, and geographical location on the site. This concept allows this complex site to be subdivided into discrete, more manageable units. The impoundment groups are as follows:

Group I - Impoundments 11, 13, 19, and 24
Group II - Impoundments 15,16,17, and 18
Group III - Impoundments 1, 2, 3, 4, 5, 14, 20, and 26

Completed Programs:

American Home Products Corporation has completed, or is conducting, several remedial programs at the site. Completed programs include: removal of pumpable tars from impoundments 1, 2, 3 and 4 for offsite use as a supplemental fuel (1986-1987); a berm stability evaluation program; and a surface soil removal/remedial program. Each of the ongoing programs is discussed briefly below.

On-going Programs

On-site Impoundment 8 Facility Program

This program involves closure and post-closure of four on-site impoundments (Impoundments 6, 7, 8, and 9A) and the construction of a waste consolidation facility (Impoundment 8 facility). These construction, closure, and post-closure activities are being conducted in accordance with the May 1994 ACO. Construction of Cell 1 of the state-of-the-art Impound 8 facility was completed in May 1991. The design includes a triple liner, leachate detection and collection system and ground water monitoring system. A cross section of the Impound 8 facility is provided (Figure 2). Sludge from old Impoundment 8 was removed, dewatered, solidified, and consolidated into Cell 1 from August 1991 to November 1994. Also during this time period, most of the waste from Impoundment 7 was removed, dewatered, solidified, and consolidated into Cell 1. The solidified sludge from Impoundment 19 was placed in

Cell 1. Construction of Cell 2 of the Impound 8 facility was completed in August 1996. The design of this cell includes a double composite liner system, leachate detection and collection system, and a ground water monitoring system. Solidified sludge from the remediation of Impoundment 11 was placed in Cell 2 between September 1996 and April 1997. Waste from Impoundment 6 is currently being solidified and consolidated into Cell 2. This activity is expected to be completed in the summer of 1999. Cells 3 and 4 of the Impound 8 facility are scheduled for construction following the remediation of Impoundment 6. The design of these cells will be similar to Cells 1 and 2. After completion of the cell construction, remediation of the remaining impoundments involving consolidation into the Impound 8 facility will begin. Impoundment 9A has been closed in-place by installing a double synthetic liner capping system (60-mil High Density Polyethylene).

Hill Property Remedial Investigation/ROD

The Hill Property is approximately 140 acres in area, bounded to the south by the Central Railroad of New Jersey (CRNJ) railroad tracks, to the east by Interstate Highway 287, to the north by Route 28 (Union Avenue), and to the west by Foothill Road (Figure 1). The Hill property is bisected by Main Street and encompasses a small traffic circle where Van Horne Avenue and Main Street intersect. Although physically separated from the main plant of the site the Hill property portion is part of the overall site, which consisted of a research laboratory and administrative buildings. The March 1991 Hill Property Remedial Investigation Report and comparison of contaminant levels in soils to NJDEP Soil Cleanup Criteria have indicated that levels of contaminants in soils at the Hill Property are below the applicable NJDEP Soil Cleanup Criteria (both residential and non-residential) and/or background and/or Impact to Ground Water Criteria. The March 1992 Baseline Site-Wide Endangerment Assessment Report (Hill Property Quantitative Risk Assessment, Appendix VII) established that there is no current or future unacceptable risks to human health and the environment associated with the Hill Property. Based on this finding, no remedial actions are required for the Hill Property soils.

In July of 1996, a no further action ROD was issued by the NJDEP for the Hill Property portion of the site. The ROD includes provisions for a Classification Exception Area (CEA) covering the ground water beneath the Hill Property. This ground water is monitored at five bedrock wells (former production wells PW-16, PW-17, PW-18, as well as wells UU and MJ). Low levels of some organic compounds were observed in these wells at the time of issuing of the ROD/CEA. Monitoring of these wells is required, in accordance with the ACO Amendment and the ROD/CEA, until it is observed that the monitoring results are below criteria for two consecutive quarters (NJAC 7:26E-6.3). NJDEP approved a request to terminate monitoring for wells PW17, PW18, UU and MJ on February 18, 1998 based on the information submitted in the January 1998 Hill Property Ground Water Quality Assessment report. Monitoring of well PW16 will continue until such time that the monitoring data meet the conditions discussed above in this section.

Bedrock Ground Water Pumping/Control System Program

For the past 60 years, Cyanamid has withdrawn water from the on-site bedrock production wells for use as non-contact cooling water in the production operations. Cyanamid's present average withdrawal of over 650,000 gallons per day results in ground water flow inward from the perimeter of the site towards the pumping wells. This system effectively contains the majority of the groundwater contamination within the production area and West Yard area on the site. Recovered ground water is used as non-contact cooling

water on-site before discharge to the adjacent Somerset-Raritan Valley Sewerage Authority (SRVSA) wastewater facility for subsequent treatment. Any ground water not captured by the production well pumping system flows to the Raritan River. A previous study (Lawler, Matuskey, and Skelley, 1983) concluded that the Cyanamid facility did not have a significant impact on water quality in the Raritan River. Further study of the Raritan River/Cuckolds Brook water quality was conducted as part of the Natural Resource Assessment (NRA). The NRA is currently under evaluation.

Impoundments 11, 13, 19, and 24 (Group I)

Remediation of the Group I Impoundments, consisting of solidification and consolidation into the Impoundment 8 facility, has been initiated in accordance with the September 1993 ROD, May 1994 Remedial Design Report as well as the July and September 1994 Impoundment 19 Remedial Action Plans and the August 1996 Impoundment 11 I Remedial Action Plan. To date, remediation of Impoundments 19 and 11 has been completed. Remediation of Impoundments 13 and 24 will be initiated after completion of the remediation of the Group II and III Impoundments.

Impoundments 15, 16, 17, and 18 (Group II)

Remediation of the Group II Impoundments has been initiated in accordance with the July 1996 ROD, the March 1997 Remedial Design Report, and the October 1997 Remedial Action Plan (Impoundment 18). The selected remedial alternatives for those impoundments are as follows:

Impoundments 15 and 16: Consolidation of the material from Impoundment 16 into Impoundment 15 followed by covering with a synthetically lined cap. These impoundments are the focus of this ESD.

Impoundment 17: Solidification and consolidation into the Impound 8 facility. Remediation of Impoundment 17 will be initiated after completion of the remediation of the Group III Impoundments (because of the high concentrations of detected contaminants in the Group III Impoundments).

Impoundment 18: Security fencing, berm improvements and maintenance of natural vegetative cover. To date, the closure of Impoundment 18 has been completed.

Group III Impoundments (1, 2, 3, 4, 5, 14, 20 & 26)

A ROD was signed on 8 October 1998 as follows:

1. Category A material (High BTU tar of Impoundments 1 and 2):
! Low-Temperature Thermal Treatment (LTTT) and placement of treated material in Impoundment 8;
2. Category B (Low BTU tar of Impoundments {4, 5 (wet), 14, and 20}:
! Biotreatment and placement of treated material in Impoundment 8
3. Category C (remaining tar material of Impoundment 3):
! LTTT and placement of treated material in Impoundment 8:
Category D (non-hazardous material of Impoundments 5

A remedial design is underway for these impoundments.

Characterization of Impoundments 15 and 16

Impoundments 15 and 16 were characterized as reported in the January 1990 Impoundment Characterization Program Final Report (ICPFR). A summary of the analytical results of the contents of Impoundments 15 and 16 is provided in Table 1. The location of the site and the impoundments is indicated on Figure 1. An overview of the characterization of Impoundments 15 and 16 follows:

Impoundment 15

Impoundment 15 has a surface area of approximately 2.8 acres. Its surface is devoid of topsoil and vegetation, and is sloped from the southwest to the northeast corner. This impoundment contains a homogeneous material composed of greater than 99 percent iron oxide (or magnetite). The iron oxide ranges from approximately 6 to 9 feet in depth and occupies a volume of approximately 29,500 cubic yards. Impurities in the iron oxide include trace organics, metals, stones and dirt. The detected predominant volatile organic contaminants of concern range in average concentration from 0.002 to 0.069 parts per million (ppm) and are Acetone, Benzene, Methylene Chloride and total Xylenes. The predominant semivolatile organic contaminants of concern range in average concentration from 0.092 to 17 ppm and are 4-Chloroaniline, N-nitroso-diphenylamine, Anthracene, Naphthalene and Phenanthrene. The predominant inorganic contaminants of concern range in average concentration from 55 to 4,490 ppm and include Arsenic, Copper, Lead and Zinc. Polychlorinated Biphenyl (PCB-1254) was. also detected in the range of 0.9 to 3 ppm. The contents of Impoundment 15 are not classified as RCRA hazardous wastes.

Impoundment 16

Impoundment 16 has a surface area of approximately 3.0 acres. Its surface is devoid of topsoil and vegetation and has been graded in the southeast corner to facilitate drainage of precipitation. This impoundment contains a homogeneous material composed of greater than 99 percent iron oxide. The iron oxide ranges from approximately 5 to 10 feet in depth and occupies a volume of approximately 38,000 cubic yards. Impurities in the iron oxide include trace organics, metals, stones and dirt. The detected predominant volatile organic contaminants of concern range in average concentration from 0.002 to 0.073 ppm and are Acetone, Benzene, Methylene Chloride and total Xylenes. The predominant semivolatile organic contaminants of concern range in average concentration from 0.046 to 6 ppm and are 4-Chloroaniline, N-nitrosodiphenylamine, Anthracene, Naphthalene, Phenanthrene and Pyrene. The predominant inorganic contaminants of concern range in average concentration from 20 to 2,620 ppm and include Arsenic, Copper, Lead and Zinc. PCB-1254 was also detected in the range of 1.5 to 6 ppm. The contents of Impoundment 16 are not classified as RCRA hazardous wastes.

SELECTED REMEDY FOR IMPOUNDMENTS 15 AND 16 AS DESCRIBED IN JULY 1996 ROD

Consolidation of the iron oxide from Impoundment 16 into Impoundment 15 with capping (synthetic liner) of the consolidated material. The selected remedy (involving excavation) includes removal of six (6) inches of underlying soils and any other obviously contaminated material after removal of the contents of the impoundments and post-excavation evaluation/sampling of the underlying soils. If the results are above the NJDEP Soil Cleanup Criteria, the underlying soils will be removed/remediated. The selected remedy also includes a ground water monitoring program and an air emission control measure (such as a carbon absorber), if necessary.

DESCRIPTION OF SIGNIFICANT DIFFERENCES AND THE BASIS FOR THOSE DIFFERENCES

***Description*:** The responsible party, American Home Products Corporation (AHPC), has identified (16 OCT 1998 letter) a vendor, which can recycle the iron oxide material of Impoundments 15 and 16 and use it in their product. The recycling vendor uses 8 million pounds of iron oxide per year and Impoundments 15 and 16 contain approximately 160 million pounds of iron oxide. Thus, at the current rate it would take 20 years to use all of the material in the impoundments. However, this vendor is experiencing 15% growth per year so the time frame could be less. This arrangement allows for beneficial re-use of the material and the eventual removal of the material from the site. If at some point, the recycling vendor is not able to continue to use 8 million pound per year, AHPC would have the right to terminate the contract and would then proceed to consolidate and cap the remaining material in place.

Basis: Recycling/re-use of iron oxide would eliminate long-term maintenance of the impoundments and is beneficial to the environment. Consolidating and capping the material in-place as selected originally in the ROD, while cost-effective and not detrimental to the environment, will still require long-term maintenance and monitoring and provides no benefit to the environment.

MODIFIED REMEDY

Recycling/Re-use of the iron oxide material of Impoundments 15 and 16 as follows:

- Excavation of iron oxide;
- Transport and reuse of the iron oxide at an off-site recycling facility;
- Backfilling, regrading and natural revegetation of former impoundment areas; and,
- Ground water monitoring.

Total Cost: $8,100,000
Time to Implement: 20 years

EVALUATION OF MODIFIED REMEDY USING CERCLA CRITERIA

Threshold Criteria:

1. **Overall protection of human health and the environment** addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls or institutional controls.

- The modified remedy would achieve overall protection of human health and the environment by removal of the iron oxide material from the site.

2. **Compliance with applicable or relevant and appropriate requirements (ARARs)** addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of federal and state environmental statutes and other requirements or provides grounds for invoking a waiver.

- The modified remedy would not trigger chemical specific ARARs such as RCRA Hazardous Waste

Regulations or Land Disposal Restriction (LRDs) since the iron oxide is not a RCRA Hazardous Waste. The modified remedy would contribute in achieving site-wide ground water ARARs by removal and recycling of iron oxide material. Ground water monitoring is an ARAR under the State requirements and under the RCRA program (40 CFR 264.97). Location-specific ARARs consist of wetlands, cultural resources and flood plains. Based on the preliminary findings, location-specific ARARS, except for flood plain requirements, would not be triggered for Impoundments 15 and 16 because the proposed remedial actions would not impact those natural resources. Requirements for the flood plain will be evaluated and satisfied (through permit equivalency) during remedial design phase. Action-specific ARARs include the 1988 ACO, NJDEP Technical Requirements for Site Remediation, Occupational Safety and Health Administration (OSHA) regulations, and Department of Transportation (DOT) transport requirements. These ARARs would be met by specifying and monitoring activities so that they are in compliance with the substantive requirements of these regulatory programs.

Primary Balancing Criteria.

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 cleanup goals have been met.

! The modified remedy achieves this criterion by removal of iron oxide material from the site resulting in no long-term maintenance. The modified remedy also achieves permanence by re-use of the iron oxide material.

4. **Reduction of toxicity, mobility, or volume:** through treatment is the anticipated performance of the treatment technologies a remedy may employ.

! The modified remedy would result in removal of the iron oxide from the site for reuse, thereby eliminating concerns with reducing toxicity, mobility and volume of contaminants.

5. **Short-term effectiveness:** addresses the period of time needed to achieve protection from any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

! The modified remedy would not result in short-term impacts because the excavation and transportation activities would be carried out in accordance with the regulatory standards protective of human health and the environment. However, it might require that workers use personal protective equipment to reduce the potential for inhalation of dust particles generated during excavation.

6. **Implementability:** is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

! The operations associated with the modified remedy employ well-established, readily available construction methods and are all considered technically and administratively feasible. The modified remedy is now implementable because a recycling vendor has been identified.

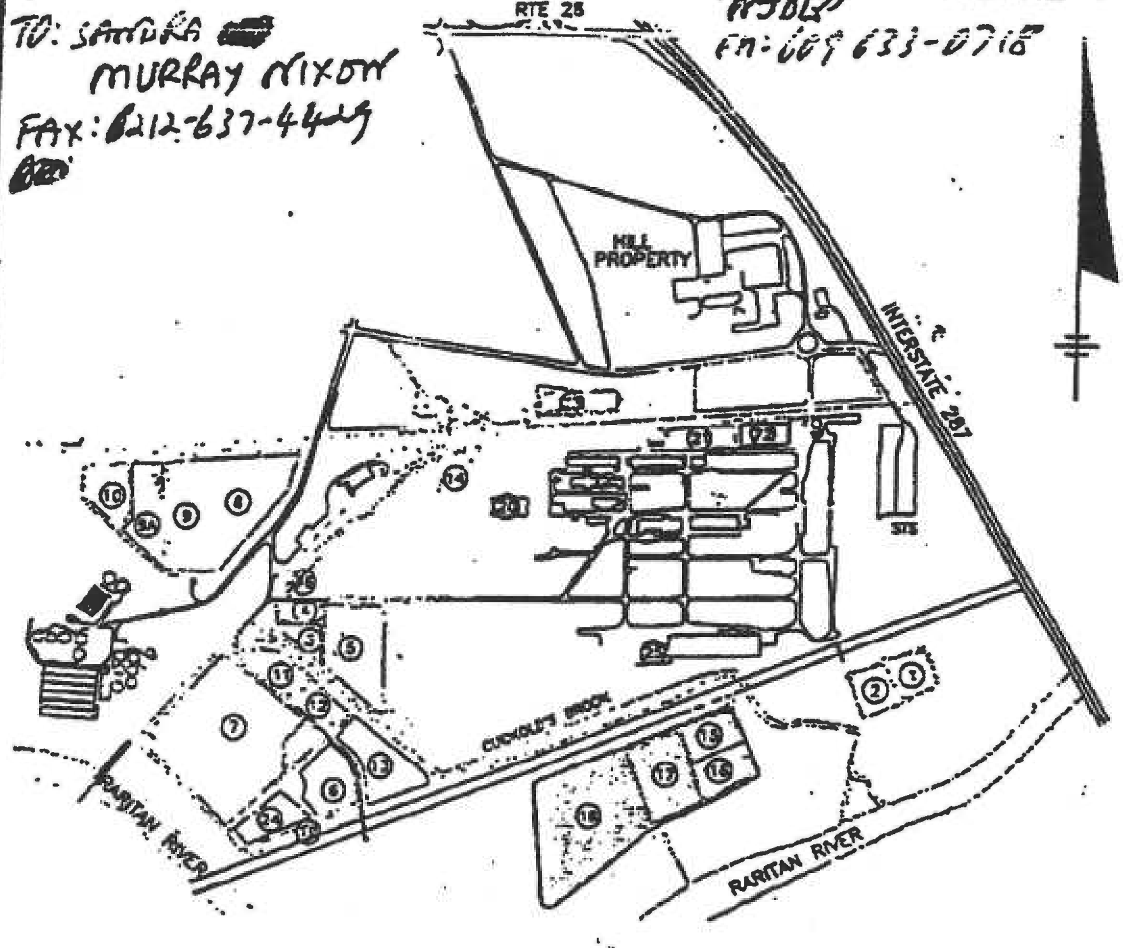
IMP-15 [illegible] ATTACH Total Pages [illegible] BRIDGE[illegible]

Date: [illegible]

FR: Tidiyesh Shah
NJDEP
FAX: 609 633-0718

TO: Sandra [redacted]
Murray Nixon
FAX: 212-637-4429
[redacted]

FIGURE 1



AMERICAN CYANAMID COMPANY
BOUND BROOK, NEW JERSEY

GROUP II IMPOUNDMENTS

N.T.S.

FILE NO. 5772.010

TABLE 1 (Cont'd)
AMERICAN CYANAMID COMPANY
BOUND BROOK, NEW JERSEY
GROUP II IMPOUNDMENTS
DATABASE SUMMARY FOR CONTAMINANT CONCENTRATIONS

2 OF 2

mg/kg	Impoundment 15				Impoundment 16				Impoundment 17				Impoundment 18			
	Min	Max	Mean	Detects	Min	Max	Mean	Detects	Min	Max	Mean	Detects	Min	Max	Mean	Detects
Inorganics																
Aluminum	154	288	222.50	6 of 6	104.00	299.00	216.00	6 of 6	47,600.00	118,000.00	88,333.33	12 of 12	26,200.00	123,000.00	88,025.00	20 of 20
Antimony	7.70	20.40	12.72	6 of 6	7.00	18.90	10.63	6 of 6	30.70	49.70	42.90	3 of 12	6.10	58.00	32.21	20 of 20
Arsenic	54.00	70.80	60.13	6 of 6	52.00	63.00	60.00	6 of 6	27.90	108.00	71.12	12 of 12	27.30	522	170.82	20 of 20
Barium	4.70	6.30	5.50	6 of 6	4.80	7.20	5.72	6 of 6	3,830.00	15,500.00	7,891.67	12 of 12	1,280.00	14,100.00	7,449.50	20 of 20
Beryllium					6.90	7.90	7.40	2 of 6	2.20	2.20	2.20	1 of 12	0.82	1.80	1.28	10 of 20
Cadmium									1.60	5.70	3.98	11 of 12	2.00	10.00	4.53	20 of 20
Calcium	14.40	153	45.32	6 of 6	20.90	74.50	38.38	6 of 6	12,200.00	80,300.00	33,276.00	12 of 12	9,540.00	103,000.00	28,202.50	20 of 20
Chromium	531	1210	766.17	6 of 6	479.00	1,070.00	782.50	6 of 6	915.00	18,700.00	3,418.75	12 of 12	408.00	2,000.00	1,066.05	20 of 20
Cobalt	37.70	46.30	42.07	6 of 6	32.00	47.40	37.42	6 of 6	9.60	24.10	15.00	12 of 12	5.90	32.00	15.07	20 of 20
Copper	1030	4,490.00	1,871.67	6 of 6	1,040.00	2,820.00	1,771.67	6 of 6	1,210.00	3,640.00	2,497.50	12 of 12	634.00	3,810.00	2,088.40	20 of 20
Cyanide									6.00	20.70	14.05	10 of 12	4.10	48.70	11.61	18 of 20
Iron	380,000.00	567,000.00	469,833.33	6 of 6	437,000.00	490,000.00	467,333.33	6 of 6	24,400.00	65,100.00	40,358.33	12 of 12	23,700.00	262,000.00	90,580.00	20 of 20
Lead	104	220	162	6 of 6	18.70	174.00	97.83	6 of 6	1,300.00	3,010.00	2,358.33	12 of 12	586.00	3,320.00	2,085.50	20 of 20
Magnesium	10.50	10.50	10.50	1 of 6					10,800.00	110,000.00	58,083.33	12 of 12	3,230.00	112,000.00	72,580.50	20 of 20
Manganese	1,290.00	1,740.00	1,500.00	6 of 6	1,180.00	1,930.00	1,596.33	6 of 6	895.00	1,900.00	1,196.08	12 of 12	107.00	1,850.00	953.10	20 of 20
Mercury									20.10	101.00	76.10	12 of 12	35.20	254.00	125.32	20 of 20
Nickel	781	1,690.00	1,168.17	6 of 6	707.00	1,130.00	898.00	6 of 6	66.30	145.00	98.32	12 of 12	46.80	358.00	102.08	20 of 20
Potassium					161.00	161.00	161.00	1 of 6	698.00	935.00	815.50	2 of 12	445.00	1,500.00	700.13	15 of 20
Selenium													0.50	0.90	0.66	9 of 20
Silver																
Sodium	81	846	205.13	6 of 6	58.50	82.00	73.74	5 of 6	196.00	1,080.00	543.33	12 of 12	180.00	818.00	334.00	20 of 20
Vanadium	10.30	10.30	10.30	1 of 6					61.00	113.00	83.98	12 of 12	30.70	173.00	70.65	20 of 20
Zinc	64.90	688	244.82	6 of 6	75.40	489.00	152.27	6 of 6	1,480.00	3,750.00	2,631.67	12 of 12	382.00	4,380.00	2,298.70	20 of 20

Note: Mean calculations derived using sum of detected concentrations / number of detections
Items left blank indicate that contaminants were not detected

TABLE 1
AMERICAN CYANAMID COMPANY
BOUND BROOK, NEW JERSEY
GROUP II IMPOUNDMENTS
DATABASE SUMMARY FOR CONTAMINANT CONCENTRATIONS

	Impoundment 15				Impoundment 16				Impoundment 17				Impoundment 18			
mg/kg	Min	Max	Mean	Detects	Min	Max	Mean	Detects	Min	Max	Mean	Detects	Min	Max	Mean	Detects
Volatiles																
2-Butanone																
2-Hexanone																
4-Methyl-2-Pentanone	0.009	0.010	0.010	2 of 6	0.004	0.005	0.005	2 of 6	2.000	2.000	2.000	1 of 12	0.048	0.048	0.048	1 of 20
Acetone	0.017	0.031	0.048	6 of 6	0.018	0.140	0.063	6 of 6	0.047	8.000	1.722	11 of 12	0.014	15.000	1.067	18 of 20
Benzene	0.002	0.009	0.005	5 of 6	0.003	0.018	0.009	4 of 6	0.004	1.100	0.471	9 of 12	0.006	0.430	0.118	5 of 20
Carbon Disulfide	0.002	0.002	0.002	1 of 6	0.008	0.022	0.016	2 of 6					0.010	0.010	0.010	1 of 20
Bromoform									0.320	0.320	0.320	1 of 12				
Chlorobenzene									0.008	17.000	0.782	6 of 12	0.070	4.100	0.623	3 of 20
Chloroethane									0.073	0.075	0.074	1 of 12				
Ethylbenzene	0.002	0.003	0.003	2 of 6	0.002	0.008	0.004	3 of 6	0.330	6.000	2.567	6 of 12	0.140	0.500	0.260	3 of 20
Methylene Chloride	0.004	0.005	0.005	3 of 6	0.004	0.011	0.007	4 of 6	0.033	3.600	0.783	5 of 12	0.018	0.260	0.101	4 of 20
Toluene	0.002	0.008	0.004	4 of 6	0.004	0.018	0.007	3 of 6	0.004	3.400	1.078	6 of 12	0.011	0.011	0.011	1 of 20
Xylenes (total)	0.008	0.008	0.008	3 of 6	0.005	0.170	0.073	3 of 6	0.020	28.000	15.566	7 of 12	0.019	1.000	0.63	4 of 20
Base/Neutral Compounds																
1,2,4-trichlorobenzene																
1,2-dichlorobenzene									4.000	160.000	67.491	11 of 12	2.300	19.000	7.641	5 of 20
2-chloronaphthalene									3.800	5.000	4.400	2 of 12	8.400	11.000	10.700	2 of 20
2-methylnaphthalene									2.300	100.000	33.843	7 of 12	3.900	3.900	3.900	1 of 20
4-chloroaniline	0.200	0.200	0.200	1 of 6	0.048	0.073	0.056	3 of 6	4.700	25.000	11.686	7 of 12	3.900	450.000	119.715	4 of 20
N-nitrosodiphenylamine	0.280	17.000	5.097	6 of 6	0.670	6.100	3.570	6 of 6					780.000	780.000	780.000	1 of 20
acenaphthene									12.000	190.000	82.500	12 of 12	15.000	27.000	19.333	3 of 20
anthracene	0.092	0.092	0.092	1 of 6					3.000	14.000	8.643	7 of 12	9.000	210.000	77.200	5 of 20
benzo(a)anthracene													11.000	30.000	20.250	4 of 20
bis(2-ethyl hexyl) phthalate	0.310	2.100	0.935	6 of 6	0.230	0.630	0.467	6 of 6	15.000	41.000	28.600	5 of 12	11.000	66.000	30.615	11 of 20
chrysene									6.900	34.000	18.792	12 of 12	7.500	81.000	25.815	10 of 20
di-n-octyl phthalate													34.000	34.000	34.000	1 of 20
dibenzofuran													18.000	18.000	18.000	1
fluoranthene	0.062	0.420	0.183	4 of 6	0.110	0.200	0.170	5 of 6	3.200	15.000	7.171	7 of 12	13.000	120.000	60.938	4 of 20
fluorene													18.000	37.000	23.818	6 of 20
naphthalene	0.110	0.490	0.247	3 of 6	0.060	0.200	0.111	5 of 6	3.300	300.000	63.675	12 of 12	130.000	140.000	135.000	2 of 20
nitrobenzene													2.000	810.000	160.053	16 of 20
phenanthrene	0.120	1.500	0.470	5 of 6	0.150	0.400	0.313	5 of 6	4.900	15.000	9.833	6 of 12	1.700	1.700	1.700	1 of 20
pyrene					0.110	0.190	0.153	4 of 6					4.300	190.000	59.383	6 of 20
													12.000	28.000	23.000	6 of 20
PCB's																
Aroclor-1242																
Aroclor-1248									8.500	15.000	11.048	10 of 12				
Aroclor-1254	0.900	3.000	1.700	5 of 6	1.500	6.200	3.683	6 of 6					3.900	3.900	3.900	1 of 20

Note: Mean calculations derived using sum of detected concentrations / number of detections
Items left blank indicate that contaminants were not detected

THE TOWNSHIP OF BRIDGEWATER
100 GARRETSON ROAD / BRIDGEWATER, N.J. 08807
908/725-6300 / FAX # 908/707-1235

MAILING ADDRESS
P.O. BOX 6300
BRIDGEWATER, NJ 0880

November 4, 1998

Mr. Haiyesh Shah
New Jersey Department of Environmental Protection
Bureau of Federal Case Management
Division of Responsible Party Site Remediation
401 East State Street, Fifth Floor West
CN 028
Trenton, New Jersey 08625-0028

NOV - 5 1998

RE: American Cyanamid Site
Proposed Recycling Option
Impoundments 15 and 16

Dear Haiyseh:

Please be advised the Health Department has reviewed the proposal to recycle approximately 160 million pounds of iron oxide material currently located in Impoundments 15 and 16 at the American Cyanamid site. As a result the Health Department has no objections to the proposed plan. Furthermore, the Department recommends actions be taken to expedite all approvals necessary to implement the beneficial reuse of these materials.

It is suggested a work plan be constructed and provided for review prior to the initiation of all on-site activities. This plan should include information on the aspects of dust control, transportation of materials, and necessary environmental monitoring during reclamation procedures.

Thank you for the opportunity to comment on this matter.

Sincerely,

Chris O. Poulsen
Environmental Health Specialist

DEC 03 1998 16:11 FR NJ SUB CTRL OFF 1 609 633 1439 TO 912126374429 P.04/05

TO: Jeff Catanzarita
EPA-Superfund
Fax: 212-637-4429
PH: 212-637-4409
FR: Haiyesh Shah NJDEP
PH: 609 633 0718

CRISIS
Fax Memo
11/2/98

TO: **Haiyesh Shah**

FAX NO. 609/633-1454

FROM: Walt Sodie
Phone: 609/799-1553; Fax No. 609/716-1705

Number of pages, including this onc -1

RE: American Home Products (AHP) (American Cyanamid) Superfund Site
Recycling of iron oxide in Impoundments 15 and 16
Reference AHP letter to you of 10/16/98

Per discussions you have had with our Technical Advisor, Tom Germine, CRISIS has no objection to the timetable, for recycling this material, as outlinod in the above-captioned AHP letter.

Further, CR1SIS sees no need for holding a public hearing on this issue.

If you require any further action from CRISIS, please contact me.

Walter M. Sodie

Walter M. Sodie
Executive Director

Appendix G

REVISED FINAL REPORT

Remedial Action Plan
Impoundments 15 and 16 Closure
Bound Brook, New Jersey Site

American Home Products Corporation
Madison, New Jersey

July 1999

O'BRIEN & GERE
ENGINEERS, INC.

State of New Jersey

Christine Todd Whitman
Governor

Department of Environmental Protection

Robert C. Shinn, Jr.
Commissioner

Bureau of Case Management
Floor 5 West, PO Box 028, 401 East State Street
Trenton, NJ 08625-0028
Phone: (609) 633-0718/Fax: (609) 633-1439 or 1454/Email: HSHAH@DEP.STATE.NJ.US

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
NO. Z394321560

AUG 24 1999

Mr. Thomas Donohue
American Home Products Corporation
Department of Environment & Safety
1 Campus Drive
Parsippany, NJ 07054

Dear Mr. Donohue:

Re: American Cyanamid Site
American Home Products Corporation
Bridgewater Township, Somerset County

The New Jersey Department of Environmental Protection (NJDEP), the United States Environmental Protection Agency (USEPA), the Bridgewater Township Health Department and CRISIS have reviewed the revised Remedial Action (RAP) Plan for Impoundments 15 & 16 dated July 1999 (received 1Aug99) prepared by O'Brien & Gere. The revised RAP satisfactorily addresses our comments and is approved. Please send a copy of this RAP to the two public repositories (CRSIS already has copy) and send me copies of return receipts.

If you have any questions, please contact me.

Sincerely,

Haiyesh Shah

Haiyesh Shah

C: Mr. Jeff Catanzarita, USEPA-CERCLA
Mr. Chris Poulsen, Bridgewater Township Health Department
Mr. Walt Sodie, CRISIS

O'BRIEN & GERE
ENGINEERS, INC.

July 30, 1999

Mr. Haiyesh Shah
Case Manager
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Federal Case Management
Division of Responsible Party Site Remediation
401 East State Street, 5th Floor West
CN 028
Trenton, NJ 08625-0028

Re: American Cyanamid Company
Bound Brook, NJ Site
Impoundments 15 and 16 Closure Program
Revised Remedial Action Plan (RAP)

File: 5772/22888 - Task 5 #5

Dear Mr. Shah:

On behalf of American Home Products Corporation (AHPC), enclosed is the revised Remedial Action Plan (RAP) for the Impoundments 15 and 16 Closure program at the American Cyanamid Company Bound Brook, New Jersey site. This RAP (July 1999), which supersedes the RAP submitted to the NJDEP on March 30, 1999, has been revised to incorporate the comments provided in your approval letter dated May 13, 1999 (received May 25, 1999). Provided below is a summary of the NJDEP's comments and the associated responses.

NJDEP Comment No. 1:
Section 2.3.1, Page 2-2: Provide approximate size and location of the proposed staging area. This area must have under-liners and tarp covers to prevent leaching and fugitive emissions, respectively.

Response to Comment No. 1:
The staging areas described in the RAP are for material and equipment used for the excavation and loading activities; no iron oxide material will be staged outside the limits of the impoundments/excavation limits. No revisions to this section of the RAP are necessary.

NJDEP Comment No. 2:
Section 2.3.2., Page 2-2: Proposed transfer/disposal of remediation water to the Somerset-Raritan Valley Sewage Authority (SRVSA) will require prior approval/permit from the SRVSA.

Response to Comment No. 2:
If disposal of remediation water to the Somerset-Raritan Valley Sewerage Authority (SRVSA) is required, prior approval/permit(s) will be obtained from SRVSA. This section of the RAP has been revised accordingly.

O'Brien & Gere Engineers, Inc., an O'Brien & Gere company
Raritan Plaza I / Edison, NJ 08837
(732) 225-7380 / FAX (732) 225-7931 • http:// www.obg.com
... and offices in major U.S. cities

NJDEP Comment No. 3:
Section 2.3.2, Page 2-2: Specify operational measures to prevent dust/fugitive air emissions generated during excavation, handling and transportation activities.

Response to Comment No. 3:
Preventative operational measures will be included in the Contract Documents, such as: installation of the loading ramp as far away as possible from the downwind property line, controlled excavation procedures and limited disturbance areas to minimize dust/emissions, application of water if material is dry, *etc.* This section of the RAP has been revised accordingly.

NJDEP Comment No. 4:
Section 2.3.3, Page 2-3: All rail cars filled with material (either awaiting transportation at the site or leaving the site) must be securely covered to eliminate fugitive air emission.

Response to Comment No. 4:
All rail cars filled with material (either awaiting transportation at the site or leaving the site) will be securely covered to eliminate fugitive air emissions. This section of the RAP has been revised accordingly.

NJDEP Comment No. 5:
Section 2.3.4, Page 2-3: If the proposed recycling firm does not have an exclusive contract for the material recycling, then an active and/or passive search for additional vendors may assist in the acceleration of the removal/recycling process.

Response to Comment No. 5:
Comment noted. No revisions to this section of the RAP are necessary.

NJDEP Comment No. 6:
Section 2.4, Page 2-4: Provide an evaluation of any impacts from the proposed activity to ecological receptors (i.e., wetlands).

Response to Comment No. 6:
The Impoundments 15 and 16 Closure program has been designed to minimize any impacts to ecological receptors (*i.e.*, wetlands). AHPC has prepared and applied for a Soil Erosion and Sedimentation Control Plan Certification to prevent the migration of material from the impoundments' limits/excavation area, a Stream Encroachment Permit to prevent any unauthorized encroachments of the delineated floodplain, and a Freshwater Wetlands Transition Area Waiver (Special Activity General Permit #4) and Statewide General Permit #10 to protect the adjacent wetlands and transition area (see Section 2.6 of the RAP). Specifically, the loading ramp has been designed in accordance with the requirements of N.J.A.C. 7:7A-9.1 (General Permit #10) to minimize the disturbance caused by crossing the adjacent wetland. This section of the RAP has been revised accordingly.

NJDEP Comment No. 7:
Section 2.4.2, Pages 2-5 & 2-6: Include reason(s) for using only metals as the analytical parameter for well 16MW2.

Response to Comment No. 7:
The March 1997 Group II Remedial Design Report (approved by the NJDEP in a letter dated April 24, 1997) identified the ground water compliance monitoring component of the approved Group II remedial program. In conjunction with the monitoring of other down gradient Group II monitoring wells (CCC-R, EEE-R and AAA) as part of the Site Wide Ground Water Monitoring Program, monitoring well 16MW2 is to be sampled quarterly and analyzed for Administrative Consent Order metals. No revisions to this section of the RAP are necessary.

NJDEP Comment No. 8:
Section 2.5: Note that a regional storm water control project (Middlebrook Regional Project) has been proposed in this section of Bridgewater Township. We suggest possible conversion of the remediated Impoundments 15 and 16 for storm water control/flood control purposes due to the total surface area that will be available, their proximity to the Raritan River and their location in the flood plain.

Response to Comment No. 8:
Once the Impoundments are completely remediated, AHPC will evaluate potential storm water/flood control options at that time, as suggested by the NJDEP. No revisions to this section of the RAP are necessary.

NJDEP Comment No. 9:
Section 3.4: In addition to the proposed sampling, representative samples must be collected from the sidewalls.

Response to Comment No. 9:
This section of the RAP has been revised accordingly.

NJDEP Comment No. 10:
Section 3.4: Because of the proposed duration of the project the RAP must reflect that field sampling procedures must be conducted with the most recent NJDEP Field Sampling Procedures Manual.

Response to Comment No. 10:
This section of the RAP has been revised accordingly.

NJDEP Comment No. 11:
Section 3.4: Ground water in the vicinity of Impoundments 15 and 16 has been affected by both organic and inorganic contaminants. It is possible that ground water infiltration may occur during the removal of material from these Impoundments. In this event, representative water samples must be collected and analyzed for both organic and inorganic contaminants.

Response to Comment No. 11:
Management of ground water during removal activities is discussed in Section 2.3.2 and monitoring of ground water before, during, and after removal activities, is discussed in Section 2.4.2. No revisions to this section of the RAP are necessary.

NJDEP Comment No. 12:
Section 3.4: Include a statement in this section that if post-remediation sampling and analysis results exceed the applicable standards/criteria, the soil will be addressed as part of the site-wide soil remediation program.

Response to Comment No. 12:
Post-excavation samples, which will be collected following removal of the iron oxide material plus 6 inches of underlying soil, will be used to document the conditions after the closure program. Remaining soil will be addressed at a later date as part of the site-wide soils program, as appropriate. This section of the RAP has been revised accordingly.

NJDEP Comment No. 13:
Section 3.4.1, Page 3-2: We prefer a one-time event (just prior to site restoration) to conduct post-remediation sampling for ease of data comparison for compliance purposes.

Response to Comment No. 13:
This section of the RAP has been revised to reflect a one-time event at each impoundment for post-excavation sampling as the preferred approach.

NJDEP Comment No. 14:
Appendix C, Page C1: Include iron to the list of compounds of interest in Table D-1.

Response to Comment No. 14:
This section of the RAP has been revised accordingly.

NJDEP Comment No. 15:
Appendix C, Page C2: Provide specific reference(s) for OSHA and NIOSH on which the proposed dust action level is based. Also provide the basis for the 6 parts per million action level for volatile organic compounds (VOC).

Response to Comment No. 15:
The dust action level is based on the composition of the total expected dust, as estimated by the maximum concentrations provided in Table C-1 of Appendix C. The action level is developed to minimize exceedences of the individual OSHA permissible exposure limit (PEL) for aluminum (15 mg/m^3), antimony (0.5 mg/m^3), arsenic (10 micrograms/m^3), barium (0.5 mg/m^3), chromium (0.5 mg/m^3), cobalt (0.1 mg/m^3), copper (1 mg/m^3), lead (50 micrograms/m^3), nickel (1 mg/m^3), vanadium (0.5 mg/m^3) and zinc oxide (5 mg/m^3). The VOC action level is calculated in the same manner. This section of the RAP has been revised accordingly.

NJDEP Comment No. 16:
Appendix C, Page C-2, Monitoring: The proposed 15-second interval sampling over a five-minute period must be directly comparable to VOC and particulate (dust) action levels. That is, the five-minute sampling period must be compared to the five-minute standard. Also, confirm that the 15-second interval is sufficient time for the PID to fully detect contaminants of interest.

Response to Comment No. 16:
The PID samples continuously. It will have responded to contaminants of concern when the readings begin. The 15-second intervals are for recording the values indicated by the PID. It allows time to read the meter and record the value and the associated time. The five minute monitoring period reflects an estimation of the length of the dust or VOC exposure. If the action levels are exceeded during the five minutes, for two consecutive events, corrective actions should be initiated. No revisions to this section of the RAP are necessary.

NJDEP Comment No. 17:
Appendix C, Page C-2, Location: At least three sites equally spaced in a 90-degree arc down-wind of the emission source area must be monitored.

Response to Comment No. 17:
This section of the RAP has been revised accordingly.

NJDEP Comment No. 18:
Appendix C, Page C-2, Results: Application of water and/or plastic sheeting must be used as preventative measures and not as corrective measures. That is, these preventive steps must be used in anticipation of, and during any excavation, handling and loading activities.

Response to Comment No. 18:
See Response to Comment No. 3 above. No revisions to this section of the RAP are necessary.

By carbon copy of this letter, a copy of this revised RAP is being provided to the USEPA, Bridgewater Township Health Department, and CRISIS.

Should you have any questions or require any additional information, please feel free to call me.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.

Angelo J. Caracciolo, III
Senior Project Associate

STP:dmc
I:\EDISON\PROJECTS\5772\22888\5_RPTS\552\DLTR004.WPD

cc: Mr. Jeff Catanzarita, USEPA-CERCLA
Mr. Chris Poulsen, Bridgewater Township Health Department
Mr. Walt Sodie, CRISIS
Mr. Steven J. Roland, O'Brien & Gere Engineers, Inc.

AMERICAN CYANAMID COMPANY, BOUND BROOK, NJ SITE

REMEDIAL ACTION PLAN

IMPOUNDMENTS 15 AND 16 CLOSURE

CERTIFICATION

N.J.A.C. 7:26C-1.2(B)

I certify under penalty of the law that the information provided in this document is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement which I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of any statute, I am personally liable for the penalties.

American Home Products Corporation

H.J. Hintz
Assistant Vice President
Environmental Affairs

7/29/99
Date

FRANCINE M. DASILVA
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires January 28, 2004

Notary:

Francine dasilva 7/29/99
Notary Public

5772\22888\5_rpts\552\1516rap\cert.100

AMERICAN CYANAMID COMPANY, BOUND BROOK, NJ SITE

REMEDIAL ACTION PLAN

IMPOUNDMENTS 15 AND 16 CLOSURE

CERTIFICATION

N.J.A.C. 7:26C-1.2(C)

I certify under penalty of the law that I have personally examined and am familiar with the information submitted herein and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement which I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of any statute, I am personally liable for the penalties.

American Cyanamid Company

Steven A. Tasher

S.A. Tasher
Vice President

July 28, 1999

Date

FRANCINE M. DASILVA
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires January 28, 2004

Notary:

Francine daSilva 7/29/99

Notary Public

5772\22888\5_rpts\552\1516rap\cert.101

5772/22888.452.552

Revised Final Report

Remedial Action Plan
Impoundments 15 and 16 Closure
Bound Brook, New Jersey Site

American Home Products Corporation
Madison, New Jersey

Steven J. Roland, P.E.
Executive Vice President

July 1999

O'BRIEN & GERE ENGINEERS, INC.

Raritan Plaza I
Edison, New Jersey 08837

This report was prepared by:

Steven T. Pernick

This report was reviewed by:

Angelo J. Caracciolo, III

Contents

Figures

Appendices

1. Introduction

1.1. Background

This Remedial Action Plan (RAP) has been prepared by O'Brien & Gere Engineers, Inc. (O'Brien & Gere) on behalf of American Home Products Corporation (AHPC) for the Impoundments 15 and 16 Closure program at the American Cyanamid Company (Cyanamid) site located in Bridgewater Township, Somerset County, New Jersey (Bound Brook site). Cyanamid has been a wholly-owned subsidiary of AHPC since November 1994.

In July 1996, the New Jersey Department of Environmental Protection (NJDEP) issued a Record of Decision (ROD) which presented the selected remedies for the Group II Impoundments (15, 16, 17 and 18). The ROD prescribed the following components for the Impoundments 15 and 16 selected remedy:

- Excavation of the material in Impoundment 16
- Consolidation of the excavated material into Impoundment 15
- Construction of a cap (synthetic liner)
- Ground water monitoring

Although consolidation and capping was presented as the selected remedy for Impoundments 15 and 16 in the ROD, recycling of the material was also identified in the ROD and the March 1997 Group II Remedial Design Report (RDR, O'Brien & Gere) as an alternate remedy which was still being pursued by AHPC. As discussed in the ROD, the recycling alternative was found to best achieve several of the evaluation criteria among all the alternatives, including overall protection of human health and the environment, compliance with ARARs, long-term effectiveness, and reduction of toxicity, mobility or volume. At that time, AHPC had not yet identified a recycling company with the ability to conduct this activity; nevertheless, the RDR presented the key design parameters and anticipated schedules for both remedies.

In a letter dated October 16, 1998 (Appendix A), AHPC advised the NJDEP that it had identified a potential recycling company and requested approval to enter into negotiations with this company to recycle the Impoundments 15 and 16 material over a period not to exceed 20 years. The NJDEP provided their approval (with no technical objections from the USEPA, CRISIS, or the Township of Bridgewater Health Department) in a letter dated November 19, 1998 (Appendix A). As of this date, it appears that these negotiations will be successful.

As a result of their approval of the recycling alternative, the NJDEP issued an Explanation of Significant Difference (ESD) for Impoundments 15 and 16 on November 24, 1998 (Appendix B). The purpose of the ESD is to explain the modification to the remedy selected in the ROD. The ESD is required pursuant to § 107(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and § 300.435(c)(2)(I) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

The ESD provides a description of the significant differences, the basis for those differences, and the modified remedy for the recycling/reuse of the material from Impoundments 15 and 16, including:

- Excavation of the material
- Transport and reuse at an off-site recycling facility
- Backfilling, regrading and natural revegetation
- Ground water monitoring.

1.2. Impoundment characterization

The Bound Brook site is located in north-central New Jersey in the southeastern section of Bridgewater Township, Somerset County (see Figure 1). The site is bounded by Route 28 to the north, the Raritan River to the south, Interstate 287 and Somerset Tire Service to the east, and Foothill Road and the Raritan River to the west.

Impoundments 15 and 16 are located in the southern portion of the site, immediately south of the Port Reading Railroad and the main plant flood control dike, and approximately 700 ft north of the Raritan River (see Figure 2). These impoundments were constructed in 1943 and were used until 1965 for the storage of iron oxide materials from Cyanamid's aniline production process. Impoundment 15 encompasses approximately 2.8 acres and contains approximately 27,000 yd^3 of iron oxide material, ranging in depth from 5 ft to 9 ft below the impoundment surface. Impoundment 16 encompasses approximately 3 acres and contains approximately 31,000 yd^3 of iron oxide material, ranging in depth from 5 ft to 10 ft below the impoundment surface.

Based on previous investigations, representative analyses detected the following constituents: acetone, benzene, xylene, naphthalene, phenanthrene, fluoranthene, pyrene, bis (2-ethylhexyl) phthalate, PCBs, antimony, arsenic, beryllium, chromium, copper and nickel. The material in Impoundments 15 and 16 is not classified as a RCRA hazardous waste.

Additional information regarding the chemical characterization of Impoundments 15 and 16 can be found in the RDR and the Impoundment Characterization Program Final Report (Blasland, Bouck & Lee, 1990).

1.3. Report scope and organization

This report was prepared to present the action plan for the recycling of the iron oxide material and the final closure of Impoundments 15 and 16. The presented action plan was prepared pursuant to, and in accordance with the requirements of, the ROD, the approved RDR, and the ESD. This report satisfies Paragraph II.D.26 of the 1988 Administrative Consent Order (ACO) for Impoundments 15 and 16. This report has been developed in general accordance with the *Remedial Design/Remediation Action Handbook* (USEPA, 1995). The remaining sections of this report are as follows:

- Section 2: a description of the remedial action program, including recycling and closure activities
- Section 3: a description of the construction quality assurance program, including final closure certification.

2. Remedial action program

2.1. General

As discussed in Section 1, the RDR presented key design parameters for both remedies (consolidation and capping, and recycling) for the closure of Impoundments 15 and 16. Based on the NJDEP's approval of the recycling alternative, AHPC is in the process of completing negotiations to enter into a Contract with a company to recycle the material from Impoundments 15 and 16. This section presents the implementation plan for the recycling activities, as well as final closure of Impoundments 15 and 16.

In accordance with AHPC's October 16, 1998 letter (Appendix A) and the NJDEP's ESD (Appendix B), AHPC will have the right to terminate the Contract with the recycling company if they are not able to take the minimum required annual quantity (see Section 2.3.4.). If this were to occur, AHPC would proceed to implement the original remedy selected in the ROD (consolidation and capping) or evaluate the placement of the remaining material in the Impound 8 Facility, in accordance with the approved RDR. In either case, this RAP would be revised accordingly.

2.2. Contract documents

To establish the contractual and technical requirements for completing the recycling activities, AHPC will be preparing and executing Contract Documents with the recycling company. The Contract Documents are anticipated to consist of the following: Work Conditions; Scope of Work; Agreement (Contract); General Provisions; Special Provisions; Materials and Performance (technical) Specifications; and Contract Drawings.

The Work Conditions and Scope of Work will contain descriptions of the work to be performed. The Contract will establish the contractual considerations, and will be entered into and executed by both parties. The General Provisions will contain typical construction conditions, while the Special Provisions will contain site-specific requirements and restrictions. The Specifications and Contract Drawings will provide technical guidance for performance of the work, as well as other project/site limitations and requirements.

2.3 Recycling activities

2.3.1. Site work

At the commencement of work activities, work areas, material/equipment staging areas, and decontamination areas will be established. The required soil erosion and sediment control (SESC) measures will also be installed, in accordance with the approved SESC Plan Certification. In addition, security measures (signs, fencing, gates, *etc.*) will be installed, as required.

It is anticipated that minor repairs (*i.e.*, addition of stabilization fabric and/or stone materials) will be made to the berms and access roads adjacent to Impoundments 15 and 16 to facilitate construction equipment access. To facilitate transportation of the materials by rail car, a previously abandoned rail spur will be reinstalled to provide access to the adjacent Port Reading Railroad.

2.3.2. Excavation

The limits of excavation (horizontal and vertical) in Impoundments 15 and 16 will be based on visual delineation of the iron oxide material (*i.e.*, the surrounding and underlying native material is easily distinguishable). As discussed in the RDR, the former "drying area," located to the east of Impoundments 15 and 16, contains additional iron oxide material which will also be excavated. Excavation activities will continue until the visually delineated iron oxide material is removed, plus an additional 6 inches of underlying soil. If bedrock is encountered, it will serve as the excavation limit.

Excavation will continue to 6 inches below the visually delineated material, regardless of ground water elevations. It is anticipated that dewatering will be required to facilitate excavation activities and to verify removal of the visually delineated material. Storm water which falls directly on the iron oxide and water used in decontamination of equipment will be managed in a similar fashion to ground water. Water management during excavation activities is anticipated to consist of sequenced excavation and grading, and localized sumping/pumping between Impoundments 15, 16, and the drying area. Water management during final material removal will be addressed similarly, if possible, or combined with the ground water extracted from the main plant production wells for ultimate disposal at the Somerset-Raritan Valley Sewerage Authority (SRVSA), subject to their prior approval and/or permit. Water which comes in contact with the iron oxide material will not be allowed to come in contact with the underlying soils once the 6 inches is removed.

Requirements for air emissions control during excavation activities will be incorporated into the Contract Documents. As discussed in Section 2.4.1. and Appendix C, an ambient air monitoring program will be in place during excavation and loading activities to evaluate downwind conditions. Preventative operational measures may include; installation of the loading ramp as far away as possible from the downwind property line, controlled excavation procedures and limited disturbance areas to minimize dust/emissions, application of water if material is dry, *etc.* Corrective actions may include; the application of water or plastic sheeting to reduce dust, reduction of the active excavation area, or cessation of operations.

2.3.3. Transportation

The iron oxide material excavated from Impoundments 15 and 16 will be transported to the off-site recycling facility via rail cars. As discussed above, a rail spur will be reinstalled to provide access to the adjacent Port Reading Railroad. In addition, a loading ramp (with decontamination capabilities) will be installed between Impoundment 15 and the rail spur. Excavation and loading activities will be performed periodically to coincide with the scheduled delivery of empty rail cars (see Section 2.3.4.).

The iron oxide material will be loaded into the rail cars with a front-end loader, or similar equipment. Rail cars filled with material (either awaiting transportation at the site or leaving the site) will be securely covered to eliminate fugitive air emissions. The rail cars will be containers suitable for transport of this material and decontaminated prior to leaving the loading area. Decontamination is anticipated to include dry removal and collection of iron oxide material from the exterior of the cars. Transportation documents will be prepared in accordance with USDOT requirements, and the rail transport company will have current permits, licenses, certificates or approvals, required by applicable local, state and federal regulations.

2.3.4. Recycling

As discussed in Section 2.1., AHPC is in the process of completing negotiations to enter into a Contract with a company to recycle the iron oxide material from Impoundments 15 and 16. As discussed in the ESD (Appendix B), this will allow for the beneficial reuse of the material and the eventual removal of the material from the site. AHPC's contract with the recycling company will require that they take the material at a minimum average rate of 8 million pounds (4,000 tons) per year, based on the recycling company's current requirements. Assuming that there is approximately 160 million pounds (80,000 tons) of iron oxide in Impoundments 15 and 16, it will take approximately 20 years to complete the removal program.

The recycling company currently accepts material only 6 months out of the year (April through September), based on seasonal storage requirements (outdoors in stockpiles) and difficulty in winter excavation. Therefore, the recycling company will need to remove approximately 4000 tons during those six months. Excavation, loading and transportation activities will also be performed according to this schedule. In an effort to minimize the amount of material stockpiled at the off-site recycling facility, the contract will also stipulate that material may only be taken from the Bound Brook site if it will be used within that current 6-month period (*i.e.*, cannot remain in a stockpile for another 6 months, within reason). As discussed in Section 2.1, if the recycling company is not able to take the minimum required annual quantity, or any of the iron oxide or 6 inches of underlying soil, AHPC would proceed to implement the consolidation and capping remedy, or place the material in the Impound 8 Facility.

AHPC will provide the NJDEP with periodic updates of estimated quantities of material removed for recycling in the Semi-Annual Progress Reports, currently submitted in May and November of each year. Documentation supporting the estimated quantities (*i.e.*, transportation documents) will also be provided.

2.4. Environmental monitoring program

An environmental monitoring program is to be implemented prior to, during, and after the Impoundments 15 and 16 Closure activities. The program will assess potential adverse off-site environmental impacts due to the closure activities, and assess ground water quality downgradient of the impoundments. Media for which environmental monitoring could be conducted include ground water, surface water, soil and air.

Section 2.3.2. described the activities in which ground water or surface water may be encountered in the excavation and specifies corrective and preventative actions to be conducted, if required, to prevent interference with the closure activities. No laboratory analysis of surface water or ground water collected in the excavation is required. Ground water in monitoring wells down gradient of Impoundments 15 and 16 will continue to be monitored to assess the impacts of the closure activities, as described in Section 2.4.2.

The Closure program has been designed to minimize impacts to ecological receptors (*i.e.*, wetlands). As discussed in Section 2.6, AHPC has prepared and applied for: a Soil Erosion and Sedimentation Control Plan Certification to prevent the migration of material from the impoundments' limits/excavation area; a Stream Encroachment Permit to prevent any unauthorized encroachments of the delineated floodplain; and a Freshwater Wetlands Transition Area Waiver (Special Activity General Permit #4) and

Wetlands Transition Area Waiver (Special Activity General Permit #4) and Statewide General Permit #10 to protect the adjacent wetlands and transition area. Specifically, the loading ramp has been designed in accordance with the requirements of N.J.A.C. 7:7A-9.1 (General Permit #10) to minimize the disturbance caused by crossing the adjacent wetland.

The only closure activity with the potential to impact off-site soils is the transportation of the iron oxide material to the off-site recycling facility; however, as described in Section 2.3.3., rail cars leaving the loading area will be decontaminated and covered. Therefore, the iron oxide material is not expected to impact off-site soils and this medium will not require monitoring. Additionally, the soil erosion and sedimentation control plan described in Section 2.6 will require the prevention of off-site migration of solids and sediments.

The closure activities to be conducted for the Impoundments 15 and 16 Closure program have the potential to impact air quality. Therefore, air monitoring will be conducted. A discussion of the ambient air monitoring program is presented below.

2.4.1. Ambient air monitoring

The two major components of the ambient air monitoring program to be conducted during closure activities are:

- a health and safety monitoring program
- a property boundary air emissions and odor monitoring program.

The health and safety air monitoring program will be conducted by the excavation and loading contractor. This program is intended to monitor the air in the breathing zone of workers in the immediate vicinity of the remedial activities. This monitoring will be used to determine the personal protective equipment requirements of individuals in the exclusion zone. A complete description of the health and safety air monitoring program will be specified in the contractor's Health and Safety Plan for the project.

The property boundary air emissions and odor monitoring program will be conducted by qualified personnel not affiliated with the excavation and loading contractor. This program is intended to monitor the ambient air downwind of the closure activities and is to be used to evaluate air quality at site boundaries. The monitoring program was developed in accordance with the August 24, 1994 NJDEP letter transmitting comments provided by CRISIS. This air monitoring program is described in Appendix C and includes monitoring criteria for air emissions and odors.

2.4.2. Ground water monitoring

As discussed in the RDR, the quarterly Site-Wide Ground Water Monitoring Program includes monitoring wells downgradient of Impoundments 15 and 16 (AAA and 16MW2). AHPC will continue to evaluate ground water quality downgradient of Impoundments 15 and 16 before, during, and after final closure, through continuation of the Site-Wide Ground Water Monitoring Program.

Downgradient monitoring well AAA will continue to be sampled and analyzed for Target Compound List (TCL) Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), Administrative Consent Order (ACO) metals, phenols and cyanide. Downgradient monitoring well 16MW2 will continue to be sampled and analyzed for ACO metals. The results of this monitoring will continue to be provided in the quarterly monitoring reports. In addition, the Certification Report discussed in Section 3.5. will contain a discussion regarding the results of the above monitoring program.

2.5. Site restoration

Site restoration activities will occur following removal of the iron oxide material, 6 inches of underlying soil, and collection of post-excavation samples. These activities will be intended to restore the excavated areas to a structurally sound condition and to promote natural drainage. Following grading and placement of backfill (if required), the area will either be allowed to naturally re-vegetate, or seeded to minimize erosion. A topographic survey will be performed by a New Jersey licensed Land Surveyor to document the final grade/contours.

2.6. Permits and approvals

Based upon a review of pertinent regulations and requirements for previous closure activities at the site, the following permits and approvals are anticipated to be required for the closure of Impoundments 15 and 16: Stream Encroachment Permit; Wetlands Transition Area Waiver (#4); Wetlands Statewide General Permit (#10); Soil Erosion and Sedimentation Control Plan Certification, and railroad use permit(s).

Stream Encroachment Permit: AHPC applied for a Stream Encroachment Permit from the NJDEP on June 8, 1999 because the closure activities will be performed in the 100-year floodplain of the Raritan River

Wetlands Transition Area Waiver: AHPC applied for a Wetlands Transition Area Waiver (anticipated to be a Special Activity General Permit #4) from the NJDEP on June 8, 1999 because the closure activities will be performed within a wetlands transition area (*i.e.*, within 150 ft of delineated wetlands)

Wetlands Statewide General Permit: AHPC applied for a Wetlands Statewide General Permit (#10) from the NJDEP on June 8, 1999 because the proposed loading ramp will be used to cross the adjacent freshwater wetland

Soil Erosion and Sedimentation Control Plan Certification: AHPC applied for a soil erosion and sedimentation control plan certification from the Somerset-Union Soil Conservation District on June 8, 1999 because the closure activities will disturb an area greater than the 5,000 ft^2 threshold

Railroad use permit(s): The rail transportation company will be obtaining the necessary permit(s) and approvals required from the Port Reading Railroad to access their tracks at an adjacent switching station, and any other required approvals to transport the material to the off-site recycling facility.

Applications for local permits (if required) will be completed and submitted by the excavation and loading contractor to the local agencies for their approval. As discussed in the RDR, it is not anticipated that an air permit will be required for the excavation and loading of the iron oxide material, based on the estimated emissions and a review of the regulations.

In that the above permits typically expire in 5 years following their effective date and since the anticipated duration for closure activities is estimated at 20 years, AHPC will obtain the required permit renewals, as necessary.

2.7. Health and safety

During the Impoundments 15 and 16 closure activities, the health and safety of the general public and site workers will take priority in all operations. The excavation and loading contractor will be responsible for taking measures at the site to protect the public and workers health and safety. The Contract Documents require the development of a site-specific Health and Safety Plan (HASP), in accordance with local, state and federal regulations, as well as the plant's Industrial Hygiene and Safety Standards.

Once the excavation and loading contractor's HASP is received and reviewed by AHPC, it will be provided to the NJDEP.

2.8. Schedule

A copy of the proposed project schedule for the Impoundments 15 and 16 Closure program is provided as Figure 3. The project schedule is based on the recycling company taking approximately 8 million pounds per year; accepting the material only 6 months out of the year (see Section 2.3.4.). If the removal rate should increase or decrease substantially, AHPC will provide the NJDEP with an updated schedule.

2.9. Cost estimate

As described in the ROD and the ESD, the cost estimate for the recycling and final closure of Impoundments 15 and 16 was $8,100,000, including capital costs, engineering and administration costs, and operation and maintenance costs (*i.e.*, ground water monitoring). Following completion of closure activities, actual incurred costs will be provided in the Certification Report discussed in Section 3.5.

3. Construction quality assurance program

3.1. General

The objective of the Impoundments 15 and 16 Closure program is to recycle the iron oxide material at an off-site recycling facility and to formally close the former impoundments. As discussed in Section 2.2., the Contract Documents for this program are being developed to include the technical requirements and/or restrictions contained in the various regulatory documents identified in Sections 1 and 2 of this report. The progress of the Impoundments 15 and 16 Closure program and the contractors' compliance with the Contract Documents will be monitored through multiple quality assurance methods conducted by AHPC. These methods are described in the following sections.

3.2. Extent of excavation

As discussed in Section 2.3.2., the iron oxide material is to be removed to the visually delineated interface, plus six inches of underlying soil. Topographic surveys will be performed by a New Jersey licensed Land Surveyor to document the final extent of excavation (iron oxide interface and 6 inches below). The determination that the iron oxide material has been removed will be based on visual observation and documentation developed during final excavation activities, including the surveys discussed above.

3.3. Construction observation

AHPC will have an authorized representative present to observe the contractors' operations, document the closure, and assess conformance with the Contract Documents. A bound field book and camera will be used to aid in documentation of the work. These activities will include site security, conducting the property boundary air monitoring program and observing odor and air emission control practices, verifying that the environmental permit requirements are satisfied, and observing other pertinent activities such as excavation, loading of rail cars, decontamination, and final site restoration.

3.4. Post-excavation sampling

Subsequent to the removal of the iron oxide material plus six inches of underlying soil, samples will be collected from the base of the impoundments and the sidewalls. Consistent with previous impoundment closures conducted at this site, post-excavation samples will be collected to document the characteristics of underlying soils and will not be used to determine the limits of excavation or further remediation requirements under this operable unit. Any remaining soil will be addressed at a later date as part of the site-wide soils program, as appropriate.

3.4.1. Sampling

Frequency and timing

- Samples will be collected at a frequency of 10 samples/acre. Sampling frequency is based on results of previously completed soil analysis, and other recent closures at the site

- Samples will either be collected during a one-time event at each impoundment, just prior to site restoration (preferred approach), or continuously during excavation operations should field conditions prohibit completion of excavation in a manner which would facilitate a one-time sampling event. As discussed in Section 2.3.2, neither the iron oxide material nor water which has come in contact with the iron oxide material will be allowed to contact areas which have been excavated and sampled.

Sampling locations

- A sampling grid will be established based on the above frequency to equally space the proposed post-excavation samples. One sample will be collected from within each of the established grid areas

- Samples will be collected of soil only; if bedrock is encountered, the sampling location within the sampling grid area will be relocated

- If ground water is encountered, the decision to collect samples below the ground water interface will be made in the field

- Samples will be identified as follows:

  "I15.XX.99 or I16.XX.99" - where XX denotes the grid area

- Actual sampling locations will be surveyed in the field (via hand taping or other means). A field map will be prepared to identify the specific sampling locations.

Methodology

- Sampling procedures will be conducted in accordance with the Technical Requirements for Site Remediation (N.J.A.C. 7:26E) and the NJDEP Field Sampling Procedures Manual (May 1992 or most current version)
- Samples will be collected with a decontaminated stainless steel or Teflon spatula, spoon, knife or trowel
- Samples will be collected from 0 to 6 inches below the bottom of the final excavation, except that those samples to be analyzed for VOCs will be collected from 6 to 12 inches below the bottom of the excavation
- Samples will be collected with dedicated decontaminated sampling equipment. One field blank will be prepared per acre sampled. One blind duplicate sample will also be collected
- No trip blanks are required, as samples will be a soil matrix
- Samples will be placed in laboratory-supplied containers
- Sample containers (once filled) will be taped and immediately placed in a cooler with a refrigerant medium and preserved at a temperature of 4°C
- Coolers will be properly packed and shipped to the laboratory
- A sample chain-of-custody will accompany each shipment.

3.4.2. Analysis

- Samples will be analyzed for TAL metals and polychlorinated biphenyls (PCBs), based on the identified constituents in the iron oxide material.
- Analysis will be conducted by a New Jersey certified laboratory using CLP methods
- The data deliverable format will be New Jersey Reduced.

3.4.3. Documentation

- A sample log form will be prepared and completed by the sampler for each sample, identifying pertinent information, including, but not limited to: sampling date, time, weather conditions, sample number and location, sampler's name, sample description, type of sampling equipment, and decontamination methods used.

3.5. Certification Report

An Impoundments 15 and 16 Closure Certification Report will be prepared to certify the closure of Impoundments 15 and 16 in accordance with this RAP and the Contract Documents. It will also contain a summary of the analytical data. The report will include a sampling location figure, sample logs, analytical data summary table, and the laboratory report. The summary table will identify the parameter, sample location, sample date, analysis date, MDL, comparable benchmark criteria, the result, and an exceedance "yes" or "no." Validation of the data will be completed in accordance with NJDEP Standard Operating Procedure (SOP) for TAL Inorganics (SOP No. 5.A.02) and TCL Organics (SOP No. 5.a.13).

DWG PATH: I:\EDISON\PROJECTS\5772\22888\DWGS\40.DWG-1

FIGURE 1

ADAPTED FROM: BOUND BROOK, NEW JERSEY U.S.G.S. 7.5 MIN. QUAD

AMERICAN HOME PRODUCTS CORP.
TASK 5.52 IMPOUNDMENT 15 & 16 CLOSURE
REMEDIAL ACTION PLAN
SITE LOCATION MAP

QUADRANGLE LOCATION

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 5 0 1 KILOMETER

FILE NO. 5772.22888-40

SCALE: 1:24000

JULY 1999

O'BRIEN & GERE ENGINEERS INC.

PLOT DATE: 7/19/99 EDISON BET