

UNITED STATES COURT FOR THE
SOUTHERN DISTRICT OF IOWA
DAVENPORT DIVISION

UNITED STATES OF AMERICA,

Plaintiff,

v.

ACC CHEMICAL COMPANY,
FOUR STAR OIL & GAS COMPANY,
GETTY CHEMICAL COMPANY,
PRIMERICA HOLDINGS, INC.,
SKELLY OIL COMPANY, QUANTUM
CHEMICAL CORPORATION,
EQUISTAR CHEMICALS, LP, and
CITY of CLINTON, IOWA,

Defendants.

Civ. No. 3-91-CV-10096

AMENDED CONSENT DECREE

WHEREAS, the United States of America (“United States”), on behalf of the Administrator of the United States Environmental Protection Agency (“EPA”), has filed a Complaint in this action pursuant to Sections 106 and 107 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, 42 U.S.C. §§ 9606 and 9607 (hereinafter “CERCLA”);

WHEREAS, the Complaint, inter alia, seeks to require the performance of certain remedial action at the Chemplex Site (the “Site”) in Clinton, Iowa, and to recover response costs that have been and will be incurred by the United States in connection with the Site;

WHEREAS, pursuant to Section 122 of CERCLA, 42 U.S.C. § 9622, the parties stipulate and agree to the making and entry of this Amended Consent Decree (also “Consent Decree” and “this Decree”) for a groundwater operable unit at the Site (the “Groundwater Operable Unit”), without any admission of liability for any purpose as to any matter arising out of the transactions or occurrences alleged in the Complaint;

WHEREAS, the parties recognize and the Court, by entering this Decree, finds that implementation of this Decree will expedite cleanup of the Site and avoid expensive and protracted litigation between the parties, and that entry of this Decree, therefore, is in the public interest;

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

I. JURISDICTION

1. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1311 and 1345 and 42 U.S.C. §§ 9606, 9607 and 9613(b). The Court also has personal jurisdiction over the parties. The Complaint states claims upon which, if the allegations were proved, relief might be granted. For purposes of this Decree and the underlying Complaint, the

parties agree not to challenge this Court's jurisdiction to enter, modify, enforce and/or terminate this Decree.

II. SITE DEFINITION AND HISTORY

2. The Chemplex Site, as defined more fully in Paragraph 33(o) of this Decree, is located generally in the East 1/2 of Section 19 and the West 1/4 of Section 20, Township 81 North, Range 6 East, Clinton County, Iowa, approximately five miles from the City of Clinton, Iowa (the "City").

3. Since 1968, a polyethylene manufacture plant at the Site has manufactured high and low density polyethylene from chemical stocks at the Site. Beginning in 1968, the City of Clinton owned the plant and the property on which it is located, and leased the plant and the property to various operators. Defendants ACC Chemical Company ("ACC") and Getty Chemical Company ("GCC") subsequently purchased the landfill portion of the property. Equistar Chemicals, L.P. ("Equistar"), the corporate successor to Defendant Quantum Chemical Corporation, purchased the rest of the property. The plant and the property were originally leased to Skelly Oil Company ("Skelly") and American Can Company ("American Can"), which operated the plant as an unincorporated joint venture under the name Chemplex Company. In 1977, Skelly and American Can restructured the joint venture so that two wholly-owned subsidiaries, Skelly Chemical Company ("SCC") and ACC, became the direct joint venture partners. In 1977, as part of a series of corporate transactions, Skelly Oil Company was merged into Getty Oil Company and subsequently dissolved. Getty Oil Company continued to exist as a separate corporate entity and, in 1989, changed its name to Four Star Oil & Gas Company. In 1978, SCC changed its name to Getty Chemical Company. ACC and GCC operated the plant as a joint venture under the name Chemplex Company until December 31, 1984.

4. On December 31, 1984, ACC and GCC sold their interests in the Chemplex joint venture and, with the exception of a landfill located in the western portion of the property (the “landfill” or the “Chemplex Landfill”), assigned their interests in the lease from the City to Northern Petrochemical Corporation (“Northern Petrochemical”). In 1987, American Can changed its name to Primerica Corporation and subsequently merged into Primerica Holdings, Inc. MRC Holdings, Inc. is the corporate successor to Primerica Holdings, Inc. for the Chemplex Site. ACC and GCC initially leased the landfill portion of the property from the City and subsequently purchased this portion of the property from the City. Quantum Chemical Corporation (“Quantum”), a former operator of the plant, is the corporate successor to Northern Petrochemical. Equistar, Quantum’s corporate successor, is the present plant operator. Equistar owns the plant and plant property, with the exception of the landfill.

5. Between 1965, when construction was begun at the facility, and 1970, when the second phase of construction was completed, construction debris was placed from time to time in the landfill in the western portion of the Site. Between 1968 and 1977, various waste materials from the polyethylene manufacturing plant were periodically disposed of in this landfill. Such waste materials included liquid hydrocarbons from the plant’s gas cracking unit, oil skimmings from the wastewater treatment plant, and scrap and off-specification polyethylene and miscellaneous debris, including drums and process wastes. Some of these wastes contained benzene, toluene, ethylbenzene, xylene, styrene, naphthalene, fluorine, phenanthrene, trichloroethylene, tetrachloroethylene and 1,2 dichloroethylene, which are hazardous substances pursuant to Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

6. Debutanized aromatic concentrate (“DAC”) is a co-product of the ethylene cracking process at the plant, which contains large percentages of benzene and lower

concentrations of other aromatic and semi-volatile compounds. The DAC area is located in the southeast portion of the Site and includes storage and truck loading areas where DAC is handled and stored. The DAC area also includes an unlined pit located northeast of the storage and truck loading areas (the “previous basin”), in which sludges were placed in 1974 during construction of the polishing basin which is part of the current on-site wastewater treatment plant. Sludges were removed from the previous basin in 1987.

7. Sampling and analyses have detected the presence of benzene, toluene, ethylbenzene, xylene, styrene, naphthalene, fluorine, phenanthrene, 1,2-dichloroethylene, trichloroethylene and tetrachloroethylene, which are hazardous substances pursuant to Section 101(14) of CERCLA, 42 U.S.C. § 9601(14), in the soil and groundwater underneath and adjoining the landfill and DAC areas of the Site.

8. By publication in the Federal Register on October 15, 1984, 49 Fed. Reg. 40320, EPA proposed the Chemplex Site for inclusion on the National Priorities List (“NPL”), pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605. The NPL is a statutory mechanism for identifying sites on the basis of potential hazard, for the purpose of determining priorities for Superfund-financed cleanup.

9. By publication in the Federal Register on October 4, 1989, 54 Fed. Reg. 41000, 41012, EPA proposed that the Chemplex Site remain on the proposed NPL.

10. By publication in the Federal Register on February 11, 1991, 56 Fed. Reg. 5598, 5603, EPA deleted the Site from the proposed NPL on the ground that it was subject to corrective action authorities under the Resource Conservation and Recovery Act, as amended (“RCRA”), 42 U.S.C. § 6901 et seq.

11. Equistar currently operates the manufacturing facility at the Site, and holds a permit under Section 3005(e) of RCRA, 42 U.S.C. § 6925(e).

12. Pursuant to Section 106(a) of CERCLA, 42 U.S.C. § 9606(a), and Section 3013 of RCRA, 42 U.S.C. § 6934, on September 18, 1987, EPA Region VII issued an Administrative Consent Order (EPA Docket No. VII-F-87-0012) (“the 1987 AOC”), in which certain of the Settling Defendants agreed to perform a Remedial Investigation and Feasibility Study (“RI/FS”) at the landfill and DAC areas at the Site.

13. The Administrative Consent Order was subsequently amended and the RI/FS for the landfill and DAC areas was completed in June 1989.

14. EPA determined that the RI/FS did not fully characterize the nature and extent of the contamination in the landfill and DAC areas and did not consider all the alternatives for remediation of groundwater in these areas. Because of these information gaps, EPA commenced a Focused Feasibility Study for the landfill and DAC areas, which was completed in July 1989.

15. Based on the RI/FS and the Focused Feasibility Study, on July 24, 1989, EPA published a proposed plan, pursuant to Section 117 of CERCLA, 42 U.S.C. § 9617, for groundwater remedial action at the landfill and DAC areas of the Site. EPA provided opportunity for public comment on the proposed plan. Comments were received and EPA prepared a summary of responses to the comments, which was included in the administrative record.

16. EPA’s initial decision on the remedial action for the Groundwater Operable Unit at the Site is embodied in a 1989 OU1 Record of Decision (“1989 OU1 ROD”), which was signed by the Regional Administrator, Region VII, on September 27, 1989. The September 27, 1989 OU1 ROD called for remediation of what were thought at the time to be two distinct plumes of contaminated groundwater in the landfill and DAC areas of the Site.

17. Certain of the Settling Defendants conducted an additional RI/FS and a Supplemental Remedial Design Investigation ("RDI") for the Site under the terms of a December 28, 1989 Administrative Order on Consent (Docket No. VII-F-90-0003) issued pursuant to Sections 104 and 122 of CERCLA, 42 U.S.C. §§ 9604 and 9622, and Section 3013 of RCRA, 42 U.S.C. § 6934. Also, Quantum conducted a RCRA facility investigation pursuant to a May 11, 1990 Administrative Order on Consent (Docket No. VII-90-H-0010), issued pursuant to Section 3008(h) of RCRA, 42 U.S.C. § 6928(h).

18. Data generated in the course of the RDI indicated that there were commingled plumes of contamination from a number of distinct source areas, including the landfill, the DAC area, the previous basin and the polishing basin area. In addition, significant zones of dense non-aqueous phase liquid ("DNAPL"), which is a long-term source of groundwater contamination, were determined to exist in the bedrock aquifer and to have penetrated into the fractured bedrock formation in an area just west of the landfill.

19. Based on this and other information, and pursuant to Section 117(c) of CERCLA, 42 U.S.C. § 9617(c) and Section 300.435(c)(2)(i)(A) of the National Contingency Plan, EPA issued a 1991 Explanation of Significant Differences ("1991 ESD"), which described and explained the reasons for the changes in the remedial action. The State of Iowa, through its Department of Natural Resources ("IDNR"), concurred with the remedy selected in the 1989 OU1 ROD and with the modifications set forth in the 1991 ESD. Copies of the 1989 OU1 ROD and the 1991 ESD are attached hereto as Appendices 1 and 2 and are incorporated by reference herein.

20. The remedy selected in the 1989 OU1 ROD, as modified by the 1991 ESD, encompasses remediation of all contaminated groundwater at the Site, and requires: (1)

institutional controls to restrict the use of contaminated groundwater; (2) extraction of groundwater by placement of wells in such locations and pumping at such rates as will remove the contaminated groundwater and capture and contain the plumes of contamination; (3) extraction and/or remediation of NAPL to the extent that such extraction or remediation is feasible and necessary to minimize future migration of contaminants, while at the same time minimizing the movement of NAPL deeper into the bedrock formation; (4) pretreatment of the extracted groundwater and disposal of pretreatment wastes; (5) treatment, disposal and/or recycling of the NAPL; (6) treatment of the extracted groundwater at the existing on-Site wastewater treatment plant or at a new facility constructed for this purpose; and (7) discharge of the treated groundwater to the Mississippi River in accordance with applicable National Pollutant Discharge Elimination System (“NPDES”) permit conditions.

21. In 1991 the United States lodged a Consent Decree in this action with the Settling Defendants (“the 1991 Consent Decree”). The 1991 Consent Decree required the Settling Defendants to implement the environmental remedy for the Site selected in the 1989 OU1 ROD, as modified by the 1991 ESD, and to reimburse the United States for certain Response Costs. Thereafter, the Settling Defendants, pursuant to the 1991 Consent Decree, implemented the remedy selected in the 1989 OU1 ROD as modified by the 1991 ESD.

22. Despite removing a large amount of chemical mass from the groundwater at the Site, the groundwater extraction and treatment system operated by certain of the Settling Defendants pursuant to the 1991 Consent Decree did not achieve the remedial action objective for OU1. In July 2007, certain of the Settling Defendants conducted a Final Focused Feasibility Study for OU1 of the Site (“FFFS”). The FFFS included a Technical Impracticability Evaluation Report. Based on the results of that report, EPA selected a different remedy for the Site.

23. In a letter dated April 9, 2008, and attached Statement of Additional Work (together, “the April 9, 2008 Additional Work Letter”), EPA approved the shutdown of the groundwater extraction treatment system, conditioned on the completion of four identified tasks set forth in the Statement of Additional Work. The April 9, 2008 Additional Work Letter is attached to this Consent Decree as Appendix 6.

24. In December of 2012, EPA issued an Amendment to the OU1 Record of Decision for the Site (“the 2012 ROD Amendment”). The 2012 ROD Amendment incorporated the Technical Impracticability (“TI”) Waiver and was consistent with the April 9, 2008, Additional Work Letter. The 2012 ROD Amendment is attached to this Consent Decree as Appendix 3.

25. The 2012 ROD Amendment selected, as stated in Section 4.01 of the ROD Amendment, “an enhanced exposure control remedy” to “replace” the groundwater extraction, pretreatment, treatment and discharge components of the remedy selected in the OU-1 ROD. The exposure control remedy includes the following components: (a) surface water and groundwater sampling and gauging using an expanded monitoring well network; (b) contingency measures if detected contaminant concentrations exceed certain trigger levels; (c) institutional controls consisting of environmental covenants and a City of Camanche ordinance governing use of and connection to the city municipal water system; (d) shutdown and decommissioning of the existing groundwater extraction and treatment system; (e) localized “hot-spot” treatment as appropriate; (f) extension of the City of Camanche municipal water line; and (g) establishment of a “Technical Impracticability Zone” (“TI Zone”) within which certain groundwater ARARs, including selected Maximum Contaminant Levels (“MCLs”) for drinking water, are subject to the TI Waiver. Section 4.1 of the 2012 ROD Amendment states that the extension of the City of Camanche municipal water line has been constructed and has reduced the potential for future

exposure to Site chemicals of concern at residences located downgradient of the Site. To date, the Settling Defendants have been implementing the remedy selected by EPA in the 2012 ROD Amendment.

26. Subsequent to the issuance of the 2012 ROD Amendment, the Settling Defendants developed the 2015 Remedial Action Work Plan (“the 2015 RAWP”). The 2015 RAWP sets forth requirements for the implementation of the enhanced exposure control remedy selected in the 2012 ROD Amendment, consistent with the April 9, 2008, Additional Work Letter. The 2015 RAWP is set forth in Appendices 5(a) – 5(e) of this Consent Decree.

27. The purpose of this Amended Consent Decree is to require the Settling Defendants to implement the enhanced exposure control remedy for OU1 of the Site, as set forth in the 2012 ROD Amendment, the April 9, 2008, Additional Work Letter, and the 2015 Remedial Action Work Plan.

28. In accordance with Section 121(f)(1)(F) of CERCLA, 42 U.S.C. § 9621(f)(1)(F), EPA has notified the State of Iowa and provided it with an opportunity to participate in the negotiation of this Amended Decree as a party to the settlement.

29. In accordance with Section 122(j)(1) of CERCLA, 42 U.S.C. § 9622(j)(1), EPA notified the Department of the Interior (“DOI”) of the negotiation of the prior and original iterations of this Consent Decree and encouraged it to participate in such negotiations with respect to release of hazardous substances that may have resulted in injury to natural resources under the trusteeship of DOI.

III. PARTIES BOUND

30. This Decree applies to and is binding upon the United States and upon ACC Chemical Company, Four Star Oil & Gas Company, Getty Chemical Company, MRC Holdings,

Inc. (as successor to Primerica Holdings, Inc. for the Chemplex Site), and Equistar Chemicals, LP, and their successors and assigns. Equistar Chemicals, LP is the corporate successor to Quantum Chemical Corporation.

31. Settling Defendants shall provide a copy of this Consent Decree, as entered, to each contractor and subcontractor retained to perform the Work required by this Decree and shall condition all such contracts and subcontracts on compliance with its terms. Settling Defendants, nonetheless, shall be responsible for ensuring that their contractors and subcontractors perform the Work contemplated herein in accordance with this Decree. With regard to the activities undertaken pursuant to this Decree, each contractor and subcontractor shall be deemed to be related by contract to the Settling Defendants within the meaning of Section 107(b)(3) of CERCLA, 42 U.S.C. § 9607(b)(3). Thus, as to acts or omissions of contractors or subcontractors, Settling Defendants shall not assert a defense based upon CERCLA Section 107(b)(3), 42 U.S.C. § 9607(b)(3).

32. In the event of conveyance of any portion of the Site owned by any of the Defendants, the restrictive covenants and access easements specified in Paragraphs 39 and 41 of this Decree shall run with the land and be binding upon all successors in title.

IV. DEFINITIONS

33. Unless otherwise expressly provided herein, terms used in this Decree which are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in the statute or regulations. Whenever the terms listed below are used in this Decree, the following definitions shall apply:

- (a) “2015 Remedial Action Work Plan” or “2015 RAWP” shall mean the document attached as Appendices 5(a) – 5(e) to this Amended Consent Decree which sets

forth the plans, specifications, and procedures for implementation of the Work to be performed in connection with the Groundwater Operable Unit at the Site, in accordance with the 2012 ROD Amendment. The 2015 RAWP consists of: (1) the Quality Assurance Project Plan for Performance Monitoring Evaluation Operable Unit No. 1 (“QAPP”) (attached hereto as Appendix 5(a)); (2) the Performance Monitoring Evaluation Plan for the Chemplex Site (“2015 PME Plan”) (attached hereto as Appendix 5(b)); (3) the May 29, 2015, Technical Memorandum for First Operable Unit Monitoring Well and Extraction Well Decommissioning (“the 2015 Well Decommissioning Technical Memo”) (attached hereto as Appendix 5(c)); (4) the Chemplex Site First Operable Unit Contingency Plan (attached hereto as Appendix 5(d)); and (5) the First Operable Unit Technical Memorandum: Hot Spot Evaluation Guidelines (attached hereto as Appendix 5(e)).

(b) “April 9, 2008, Additional Work Letter” shall mean the letter issued to the Settling Defendants by EPA dated April 9, 2008, and the Statement of Additional Work attached thereto, which are together attached hereto as Appendix 6.

(c) “CERCLA” shall mean the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601 et seq.

(d) “Groundwater Cleanup Standards” shall mean the cleanup standards set forth in Table 1-1 of the Performance Monitoring Evaluation Plan of the 2015 RAWP. The 2015 PME Plan is attached hereto as Appendix 5(b). For convenience, a copy of Table 1-1 from Appendix 5(b) is also attached hereto as Appendix 4.

(e) “Amended Consent Decree” “Consent Decree” or “Decree” shall mean this Amended Consent Decree and all appendices and attachments hereto.

(f) “Day” shall mean a calendar day unless expressly stated to be a working day. “Working day” shall mean a day other than a Saturday, Sunday or federal holiday. In computing any period of time under this Decree, where the last day would fall on a Saturday, Sunday or federal holiday, the period shall run until the end of the next working day.

(g) “Groundwater Operable Unit” refers to the groundwater remedial action at the Site, as set forth in the 1989 OU1 ROD, as modified by the 1991 Explanation of Significant Differences, and the 2012 ROD Amendment.

(h) “National Contingency Plan” or “NCP” means the National Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, including any amendments thereto. The NCP was amended as of April 9, 1990, 55 Fed. Reg. 8666 (March 8, 1990) and, as amended, is codified at 40 C.F.R. Part 300.

(i) “Owner/Operator Defendants” shall mean Equistar Chemicals, LP and the City of Clinton.

(j) “Remedial Action” shall mean those activities required to be performed under this Amended Consent Decree and pursuant to the 2012 ROD Amendment (attached hereto as Appendix 3), to implement the final plans and specifications set out in the 2015 RAWP (attached hereto as Appendices 5(a) – 5(e)), including any additional activities required under Sections VII (EPA Periodic Review), VIII (Additional Work to Attain Cleanup Standards), and XII (Endangerment and Future Response).

(k) “Remedial Design” shall mean those activities required to be performed under this Decree to develop the final plans and specifications for the Remedial Action.

(l) “Response Costs” shall mean all expenses and disbursements, direct and indirect, incurred or to be incurred by the United States (including EPA and the Department of Justice) for investigation, oversight, removal, remedial, administrative and enforcement activities with respect to the Site, including, without limitation: (1) past costs incurred prior to entry of this Decree; (2) oversight costs for overseeing and verifying the plans, work, reports and other items required pursuant to this Decree in connection with the Groundwater Operable Unit; and (3) other or future costs incurred with respect to the Groundwater Operable Unit after entry of this Decree, in connection with the periodic reviews undertaken by EPA pursuant to Section 121(c) of CERCLA, 42 U.S.C. 9621(c) (Section VII of this Decree), additional work to attain performance standards (Section VIII), access (Section X) and endangerment and emergency response (Section XII).

(m) “Settling Defendants” shall mean ACC Chemical Company, Four Star Oil & Gas Company, Getty Chemical Company, and MRC Holdings, Inc. (as successor to Primerica Holdings, Inc. for the Chemplex Site).

(n) “Site” shall mean the Chemplex Superfund Site, encompassing approximately 700 acres, located in the East 1/2 of Section 19 and the West 1/4 of Section 20, Township 81 North, Range 6 East, Clinton County, Iowa, approximately five miles from the City of Clinton, Iowa, and depicted generally on the map attached as Appendix 7.

(o) “Work” shall mean all activities required to be performed under this Amended Consent Decree, including all activities required to be performed pursuant to the 2015 RAWP (attached hereto as Appendices 5(a) – 5(e)), as well as any activities required pursuant to Sections VII (EPA Periodic Review), VIII (Additional Work to Attain Cleanup Standards), X (Access) and XII (Endangerment and Future Response).

V. GENERAL PROVISIONS

A. Objectives of the Parties

34. The objectives of the parties in entering into this Decree are to protect public health, welfare and the environment from release or threatened release of hazardous substances, pollutants and/or contaminants from the Site by development, design and implementation of remedial and monitoring programs for the Groundwater Operable Unit and the reimbursement of Response Costs incurred or to be incurred by the United States in this connection.

B. Commitment by Defendants

35. The Settling Defendants shall pay for and be responsible for performance of all Work required by this Decree, and shall reimburse the United States for Response Costs, as set forth more fully in Section XVII. Settling Defendants' obligations with respect to the Work and with respect to reimbursing the United States for Response Costs are joint and several. In the event of insolvency or other failure of any one or more Settling Defendants to implement the requirements of this Decree, the remaining Settling Defendants shall complete all such requirements.

36. The Owner/Operator Defendants are executing this Amended Consent Decree for the sole purpose of agreeing to the restrictive covenant and access easement provisions in Paragraphs 39 through 44 below, as well as the access provisions in Section X.

C. Compliance with Applicable Law

37. All activities performed by the Settling Defendants pursuant to this Decree shall be consistent with the 2012 ROD Amendment and the April 9, 2008, Additional Work Letter, and shall be in accordance with all legally applicable or relevant and appropriate requirements, as required by Section 121(d) of CERCLA, 42 U.S.C. § 9621(d), and the National Contingency

Plan. The United States has determined that the obligations and procedures in this Decree are consistent with its authority to establish appropriate remedial measures for the Site, and that the Remedial Action for the Groundwater Operable Unit embodied in the 2012 ROD Amendment is consistent with the National Contingency Plan, and is protective of human health and the environment.

D. Permits

38. Pursuant to Section 121(e) of CERCLA, 42 U.S.C. § 9621(e), no federal, state or local permit shall be required for any portion of the Work conducted entirely on-Site. As to any off-Site activities which require a federal, state or local permit or approval, Settling Defendants shall make timely application for and take all other actions necessary to obtain such permit(s) or approval(s). This Decree is not, and shall not be construed to be, a permit issued pursuant to any federal or state statute or regulation.

E. Restrictive Covenants and Access Easements

39. The Site currently includes property owned by Equistar. On August 21, 2001, Equistar recorded with the Recorder of Deeds, Clinton County, State of Iowa, a Notice of Environmental Cleanup, Access Easement, and Restrictive Covenants (“the Restrictive Covenants”). The Restrictive Covenants imposed: (a) restrictive covenants which run with their respective parcels and which prohibit the construction, installation, maintenance or use of certain wells on the described property; and (b) easements which run with their respective parcels and which reserve such access as may be necessary for Settling Defendants to implement their obligations under the 1991 CD and this Amended Consent Decree.

40. Pursuant to the 2012 ROD Amendment, Settling Defendants and Equistar have also recorded with the Recorder of Deeds, Clinton County, State of Iowa, an Environmental

Covenant. The purpose of the Environmental Covenant was to: (a) restrict the use of Site property so as to assure that contaminated groundwater will not be used in a manner inconsistent with the selected remedial action and that the Site property will not be used in a manner which may impair the integrity of the remedial or corrective actions; and (b) to grant access to conduct, maintain and monitor remedial and corrective actions related to the Site. By its terms, the Environmental Covenant imposed property use restrictions and easements which superseded those in the Restrictive Covenant.

41. Any portion of the Site which is owned by any of the Settling Defendants or the Owner/Operator Defendants during the life of this Amended Consent Decree may be freely conveyed, provided, however, that conveyance made by the deed or other instrument of conveyance shall be subject to the recorded Environmental Covenant referenced in the Paragraphs 39 and 40.

42. Settling Defendants and Owner/Operator Defendants may petition EPA to modify any Environmental Covenant, but only upon a showing that a proposed use will not endanger the public health or the environment, in light of the locale of the proposed well, the concentration of contaminants in the groundwater at such location, the proposed use of such water and/or the route of exposure from such use. If EPA determines that the proposed use will not endanger the public health or the environment, EPA shall join in an appropriate instrument, in a form suitable for recording, which modifies such restrictions, in whole or in part.

43. In the event of conveyance by a Settling Defendant or an Owner/Operator Defendant of an interest in property included in the Site, such Defendant shall notify EPA within 30 days after closing and shall provide EPA with a copy of the deed or other instrument of conveyance.

VI. PERFORMANCE OF THE WORK

A. Statement of Work as Described in the 2015 RAWP

44. Settling Defendants shall pay for and be responsible for performance of the Work for the Groundwater Operable Unit at the Site in the manner described in the 2015 RAWP, which is attached hereto as Appendices 5(a) – (e) and is incorporated by reference herein. Similarly, all plans and submittals required pursuant to this Decree shall be in accordance with the 2015 RAWP.

B. Selection of the Supervising Contractor

45. All aspects of the Work conducted by Settling Defendants pursuant to this Decree shall be under the direction and supervision of a qualified contractor with expertise in hydrogeology and experience in hazardous waste cleanup, who is familiar with applicable EPA Superfund Remedial Design and Remedial Action Guidances. Settling Defendants' selection of such supervising contractor shall be approved by EPA in accordance with the provisions in the following Paragraph.

46. Following approval of the Conceptual Design Report required pursuant to the 1989 AOC, Settling Defendants notified EPA of the identity and qualifications of their proposed supervising contractor.

47. If, at any time after entry of this Amended Consent Decree, Settling Defendants propose to change their supervising contractor, they shall promptly notify EPA. Within 21 days thereafter, EPA shall notify Settling Defendants of its approval or disapproval of the new proposed supervising contractor. In the event of EPA disapproval, Settling Defendants, within 21 days after receipt of such notice, shall submit a list to EPA of proposed contractors which would be acceptable to them. Within 21 days of receipt of such list, EPA shall notify Settling

Defendants of the contractors on the list which it approves. Settling Defendants may then select any approved contractor on the list and shall notify EPA of the contractor selected within seven days after receipt of the EPA notice. All notices required pursuant to this Paragraph shall be in writing. EPA approval of any new supervising contractor shall be obtained before such new supervising contractor performs any Work pursuant to this Decree.

C. Remedial Action

48. Settling Defendants shall perform groundwater and surface water monitoring in accordance with the 2015 RAWP and associated EPA-approved addenda, and shall implement and comply with all plans approved by EPA pursuant to this Paragraph, if any.

a. Within 120 Days of each sampling event conducted pursuant to this Consent Decree, Settling Defendants shall submit to EPA a Sampling Results Letter Report as provided for in the 2015 PME Plan (attached hereto as Appendix 5(b)).

b. At least thirty (30) Days prior to each Data Meeting, Settling Defendants shall submit to EPA for review and approval a PME Plan Addendum as provided for in the 2015 PME Plan.

c. At least thirty (30) Days prior to any planned well decommissioning event, Settling Defendants will submit to EPA for review and approval a draft Well Decommissioning Work Plan in accordance with the 2015 Well Decommissioning Technical Memo (attached hereto as Appendix 5(c)).

d. Within thirty (30) Days after completion of any well decommissioning event, Settling Defendants will submit to EPA a letter report describing the results of the well decommissioning event as provided for in the 2015 Well Decommissioning Technical Memo (attached hereto as Appendix 5(c)).

e. Upon the confirmation of any trigger level exceedances as described in the Chemplex Site First Operable Unit Contingency Plan (attached hereto as Appendix 5(d)), within the timeframe provided therein for such trigger, Settling Defendants shall, as appropriate, implement at least one or more of the following Groundwater or Surface Water Contingency Measures: increase sampling and/or monitoring, construct a contingency well cluster, provide private residences water treatment devices and/or vapor monitoring, erect signs and/or fencing relating to surface water access, or submit a Technical Memorandum evaluating the need for additional proposed contingency measures.

f. At least thirty (30) Days prior to any planned hot-spot treatment event, Settling Defendants will submit to EPA for review and approval a draft Hot-Spot Treatment Work Plan in accordance with the Hot Spot Guidelines Technical Memo (attached hereto as Appendix 5(e)).

g. Within thirty (30) Days after the receipt of all laboratory results related to a hot-spot treatment event, Settling Defendants will submit to EPA a letter report describing the results of the hot-spot treatment event as provided for in the Hot Spot Guidelines Technical Memo (attached hereto as Appendix 5(e)).

D. Cleanup Standards

49. The Remedial Action performed pursuant to this Decree must achieve the Groundwater Cleanup Standards.

50. It is understood and agreed by the Settling Defendants that nothing in this Decree, or in the approvals by EPA of the RD and/or RA Work Plans, 2015 RAWP, or other submittals required to be approved hereunder, shall constitute or be deemed a warranty or representation by

the United States that compliance with the approved plans or submittals will result in or achieve compliance with the Groundwater Cleanup Standards.

VII. EPA PERIODIC REVIEW

51. In accordance with Section 121(c) of CERCLA, 42 U.S.C. § 9621(c), EPA shall review the Groundwater Operable Unit Remedial Action at the Site at least every five years after initiation of such action to assure that human health and the environment are being protected by the activities being implemented. Settling Defendants shall conduct such studies, investigations, or other activities as EPA determines are necessary in order to conduct such reviews.

52. Settling Defendants and the public shall be provided the opportunity to comment on any additional activities proposed by EPA as a result of the review(s) conducted pursuant to the preceding Paragraph (including, without limitation, alteration(s) with respect to scope, performance or cost of the selected remedy), and to submit written comments for the record during the public comment period. After the comment period is closed, EPA Region 7's Superfund Division, shall determine in writing whether further response action is appropriate, in accordance with Section 121(c) of CERCLA, 42 U.S.C. § 9621(c). Such further response action is not included in the Work required by this Decree, provided, however, that nothing herein shall preclude EPA from requiring additional work pursuant to the provisions of Section VIII hereof.

VIII. ADDITIONAL WORK TO ATTAIN CLEANUP STANDARDS

53. In the event that either EPA or the Settling Defendants determine that additional or different response actions, beyond those set forth in the April 9, 2008, Additional Work Letter, the 2012 ROD Amendment, or the 2015 RAWP, are necessary to meet the Groundwater Cleanup Standards and are technically practicable and consistent with the remedy selection criteria in CERCLA and the NCP, notification of such additional or different response actions

shall be provided to the Project Coordinator for the Settling Defendants or the Remedial Project Manager for EPA, as the case may be. If Settling Defendants so determine, they shall also submit a detailed plan with specifications and schedules for the additional work to EPA, for approval in accordance with the procedures in Section XIII of this Decree.

54. Unless another time period is specified in the notice, within 30 days of receipt of EPA's notification that additional work is necessary, Settling Defendants shall submit a detailed plan with specifications and schedules for the additional work to EPA, for approval in accordance with the procedures in Section XIII of this Decree.

55. If Settling Defendants disagree with EPA's determination as to the need for and/or the extent of additional work, the technical practicability of the Work, or its consistency with CERCLA or the NCP, the parties shall attempt to resolve such disagreements informally. If the disagreement is not resolved informally, Settling Defendants may invoke the formal dispute resolution procedures in Section XIX of this Decree, provided, however, that Settling Defendants shall have 30 days following submission of their written notice to submit their Statement of Position and EPA shall have 30 days after receipt of Settling Defendants' Statement of Position to submit its Statement of Position. In the event Settling Defendants do not prevail in the dispute resolution process, their plan for the additional work shall be submitted within 60 days of receipt of the final determination in the dispute resolution process.

56. Upon EPA approval of plans submitted under Paragraphs 53, 54, or 55 of this Section, the standards, specifications and schedules for the additional work shall be incorporated automatically into the 2015 RAWP and shall be implemented by the Settling Defendants in accordance with such provisions.

IX. QUALITY ASSURANCE, SAMPLING AND DATA ANALYSIS

57. The Quality Assurance Project Plan attached to this Decree as Appendix 5(a) (“the 2015 QAPP”) is required to comply with EPA’s “Interim Guidelines and Specifications For Preparing Quality Assurance Project Plans” (QAM-005/80), “Data Quality Objective Guidance” (EPA/540/G87/003 and 004) and any additions and amendments to such guidances which are effective prior to entry of this Decree. Final or interim guidance issued subsequent to entry of this Decree relating to quality assurance, quality control and chain of custody procedures shall be followed to the extent practicable. Settling Defendants shall use the quality assurance, quality control and chain of custody procedures in the QAPP for all sample collection and analysis conducted pursuant to this Decree.

58. The 2015 QAPP designates a quality assurance official, independent of the supervising construction contractor, who shall supervise all quality assurance activities during the construction phases of the Remedial Design and Remedial Action.

59. Settling Defendants, in their contracts, shall ensure that EPA personnel and authorized representatives are permitted access to any laboratory utilized by them and/or their contractors in implementing this Decree. In addition, Settling Defendants shall ensure that such laboratories analyze sufficient numbers of the samples submitted by EPA for quality assurance/quality control monitoring consistent with the 2015 QAPP.

60. At the request of EPA, Settling Defendants shall allow EPA and/or its authorized representatives to split or take duplicates of any samples collected by Settling Defendants in the course of implementing this Decree, provided, however, that the samples requested by EPA shall not exceed 15 per cent of the total samples collected, with the further provision that EPA shall have the right to obtain at least one split or duplicate sample from each sampling event. Settling

Defendants shall notify EPA not less than 14 days in advance of any such sample collection activity, unless another time period is approved in advance by the EPA Remedial Project Manager. In addition, EPA shall have the right to take such additional samples as it may deem necessary.

X. ACCESS

61. EPA and its designated representatives shall have reasonable access at all times to the Site and to any property to which access is required for conducting activities authorized by or related to implementation of this Decree, including, without limitation: (a) monitoring the Work; (b) verifying any data or information submitted to EPA; (c) obtaining samples; (d) assessing the need for, planning or implementing additional response actions at or near the Site; and (e) inspecting and copying records, contracts or other documents related to or necessary to assess compliance with this Decree. EPA shall make reasonable efforts to provide advance notice to the Owner/Operator Defendants prior to entry on the Site.

62. To the extent that any area where the Work to be performed under this Decree may be owned or controlled by persons other than Settling Defendants, Settling Defendants shall use their best efforts to obtain access from such persons for themselves and for EPA and its designated representatives, as necessary to implement this Decree. With respect to property other than that owned by Owner/Operator Defendants, “best efforts” includes, but is not limited to, payment of reasonable consideration to obtain access. If, within 30 days of entry of this Decree, Settling Defendants are unable to obtain access (following exercise of their best efforts), they shall notify EPA of remaining inaccessible areas, if possible, within 60 days before such access is needed. The United States may thereafter exercise its statutory authorities to obtain access.

63. Notwithstanding any other provision of this Decree, the United States retains all its access, information gathering, inspection and enforcement authorities and rights under CERCLA, RCRA and any other applicable statute, regulation or permit.

XI. REPORTING REQUIREMENTS

64. Settling Defendants shall submit written progress reports to EPA which shall describe the activity undertaken pursuant to this Decree during the preceding reporting period and the activity planned for the next reporting period, including, without limitation: (a) the results of all sampling, monitoring and other data generated or received by Settling Defendants during the preceding reporting period's Work to the extent such results are not submitted to EPA via separate monitoring reports; (b) all activity under the RD Work Plan, RA Work Plan, and 2015 RAWP completed during the preceding reporting period and all such activity scheduled for the next reporting period; and (c) information regarding percentages of completion of the Work, and any unresolved or anticipated delays that may affect schedules for its completion, together with a description of efforts made to mitigate such delays. The reporting period for the progress reports required by this Paragraph shall be quarterly through December 31, 2017 (by the 15th of January, April, July and October) and thereafter annually (by the last day of January of each year).

65. In performance of their obligations under this Decree, Settling Defendants are subject to Section 103(a) of CERCLA, 42 U.S.C. § 9603(a), which requires reporting of certain releases of hazardous substances to the National Response Center. Settling Defendants shall immediately notify the EPA Remedial Project Manager ("RPM") or his or her alternate or, in the event of the unavailability of either the RPM or alternate, the Emergency Response Section, EPA

Region VII, orally of any such releases and shall provide the RPM with copies of all written reports submitted to the National Response Center.

XII. ENDANGERMENT AND FUTURE RESPONSE

66. In the event of any action or occurrence during performance of the Work which causes or threatens a release of a hazardous substance, pollutant or contaminant or which may present an imminent and substantial endangerment to the public health or welfare or the environment, Settling Defendants shall immediately notify the EPA Regional Project Manager or his or her alternate, as in the preceding Section of this Decree, as well as the EPA Region VII Emergency Response Section. Settling Defendants shall take all appropriate action to prevent, abate or minimize such release or endangerment, in accordance with all applicable provisions of the Health and Safety Plan and the Contingency Plan submitted as part of the final Remedial Design and the 2015 RAWP.

67. Nothing in the preceding Paragraph shall be deemed to limit the authority of the United States or this Court to take, direct or order all appropriate action to protect human health and the environment or to prevent, abate or minimize an actual or threatened release of hazardous substances on, at or from the Site.

XIII. SUBMISSIONS REQUIRING AGENCY APPROVAL

68. After review of any plan, report or other item which is required to be submitted for EPA approval under this Decree, EPA shall either: (a) approve the submission in whole or in part; or (b) disapprove the submission in whole or in part and notify Settling Defendants of its deficiencies and/or request modifications to cure the deficiencies; or (c) modify the submission to cure any deficiencies.

69. If the submission is approved (or modified and approved) by EPA, Settling Defendants shall implement the action(s) required in the plan, report or other item, as so approved.

70. Upon receipt of a notice of disapproval or a request for modification of a submission from EPA, Settling Defendants shall correct the deficiencies and resubmit the revised plan, report or other item for approval, within 30 days of receipt of the EPA notice or such longer time as may be specified in the notice. Within 30 days of receipt of the revised submission, EPA shall notify Settling Defendants of its approval or disapproval and/or request modification within a specified timeframe to correct the deficiencies. If the submission is approved in part and disapproved in part, if EPA so directs, Settling Defendants shall proceed with any action specified in the approved portion of the submission.

71. If upon the first or any subsequent resubmission, the plan, report or other item is disapproved, Settling Defendants shall be deemed to be in violation of this Decree. Implementation of approved portions of the submission, however, shall not relieve Settling Defendants of liability for stipulated penalties with respect to the disapproved portions pursuant to Section XX of this Decree, provided, however, that if a submission is approved in part and disapproved in part, that any stipulated penalties assessed pursuant to Section XX shall be adjusted to reflect the portions of the submission(s) which are approved.

XIV. PROJECT MANAGER/ COORDINATOR

72. Settling Defendants and EPA have notified each other of the name, address and telephone numbers of the designated EPA Remedial Project Manager (“RPM”) and alternate and the Settling Defendants’ Project Coordinator and alternate for the Groundwater Operable Unit at

the Site. If the RPM or Project Coordinator initially designated is changed, the successor shall be identified to the other party at least five working days before the change.

73. The EPA RPM shall have the authority vested in a Remedial Project Manager/On-Scene Coordinator (“RPM/OSC”) by the National Contingency Plan, 55 Fed. Reg. 8666, 8827 (March 8, 1990) to be codified at 400 C.F.R. § 300.120, including, without limitation, the authority to halt, conduct or direct any actions required by this Decree and to take or direct any necessary Response Action when the RPM/OSC determines that conditions at the Site may present an imminent and substantial endangerment to public health or welfare or the environment. Any oral order to halt any actions will be promptly confirmed in writing. EPA will extend deadlines affected by an order to halt any actions for part or all of the period of suspension of the Work, unless such order is a result of an act or omission of Settling Defendants inconsistent with the Decree. EPA may also designate other representatives, including EPA employees, contractors and consultants, to monitor the progress of any activity undertaken pursuant to this Decree. Settling Defendants’ Project Coordinator shall serve as principal liaison with EPA for purposes of notices, submissions and other activities required under this Decree.

XV. FINANCIAL ASSURANCES

74. Settling Defendants shall demonstrate their ability to complete the Work and to pay all claims that may arise from its performance, by obtaining and presenting to EPA for its approval, within 30 days of lodging of this Decree, one of the following: (a) a performance bond; (b) one or more letters of credit equaling the total estimated cost of the Work; (c) a guarantee to perform the Work by parent or sibling corporations or subsidiaries of Settling Defendants; or (d) internal corporate financial information sufficient to satisfy EPA that Settling Defendants’ net worth is sufficient to make additional financial assurances unnecessary. If internal financial

information is relied upon, the standards used to determine the adequacy of Settling Defendants' resources (or the adequacy of the guarantees of the parent or sibling corporations or subsidiaries) shall be equivalent to those set forth in 40 C.F.R. Part 265, Subpart H.

75. EPA will have 45 days from receipt of the financial assurance or internal corporate information to determine its adequacy and to communicate its determination to Settling Defendants. If EPA determines that such assurance or information is inadequate, Settling Defendants shall submit one of the other forms of assurance to EPA for its approval. If internal corporate information is relied upon, Settling Defendants shall submit updated financial information annually, on the anniversary of the effective date of this Decree. Upon the anniversary of the Effective Date of this Decree, or at such other date agreed to by EPA, Settling Defendants may petition for a different amount of financial assurance to be provided commensurate with and adequate for the remaining amount of Work to be performed, and EPA may at its discretion approve requested decrease in financial assurance otherwise required.

76. In no event shall any Work required under this Decree be delayed pending submission and/or approval of financial assurances under this Section.

XVI. REIMBURSEMENT OF RESPONSE COSTS

77. Settling Defendants have reimbursed the United States for past Response Costs in connection with the Site, in the amount of \$597,838.29.

78. Settling Defendants shall also reimburse the United States for all Response Costs incurred by the United States in connection with the Groundwater Operable Unit at the Site. EPA will send Settling Defendants a demand for payment of such costs on an annual basis. Payment in the amount of the demand shall be made within 30 days of Settling Defendants' receipt of each demand. All payments to be made in accordance with this Paragraph shall be made at

<https://www.pay.gov> to the U.S. Department of Justice account, in accordance with instructions provided to Settling Defendants by the Financial Litigation Unit (“FLU”) of the United States Attorney’s Office for the Southern District of Iowa or as may be described within the EPA invoice.

79. Each demand for payment shall include an itemized statement of unreimbursed Response Costs incurred prior to the date of the demand, together with any interest due thereon. The statement shall include: (a) the Department of Justice’s direct and indirect costs; (b) EPA’s payroll costs, including the names and titles of the persons charging time to the Site, the pay period, the number of hours and the applicable salary and benefits for such person; (c) EPA’s travel costs, including the names of the persons charging such travel and the applicable transportation, per diem and incidental costs; (d) EPA’s contract costs, including annual dollar amounts and date(s) paid, invoice numbers for such payments and a brief summary of activities performed; and (e) EPA’s indirect costs, including the amount computed on the basis of direct labor hours.

80. Settling Defendants may contest payment of any portion of the oversight or future Response Costs demanded by EPA, on the basis of alleged accounting errors or an allegation that a demanded cost item is inconsistent with the NCP. Any such objection shall be made in writing within 30 days of receipt of the applicable EPA demand and shall be governed by the dispute resolution procedures in Section XIX of this Decree.

81. In the event that dispute resolution procedures are invoked with respect to any cost item, all non-contested costs in the applicable EPA demand for payment shall be paid in the manner and at the time set forth in this Section. At the time the dispute resolution procedures are invoked, Settling Defendants shall remit the amount of the contested costs to an interest-bearing

escrow account established in a State or federally chartered bank authorized to do business in the State of Iowa. Confirmation as to the establishment of the escrow account, and copies of the bank statement evidencing the initial balance in such account, shall be transmitted to EPA and to DOJ. If EPA prevails as to any cost item in dispute, Settling Defendants shall direct the bank to remit escrowed funds in the appropriate amount, together with accrued interest, to the United States, in the manner provided in this Section. If Settling Defendants prevail as to any item in dispute, the applicable sum, including interest accrued during pendency of the dispute resolution proceeding, shall be disbursed to them. Within five days of resolution of the dispute, Settling Defendants shall transmit to EPA and DOJ copies of the instruction letters to the bank.

82. If, within 60 days of receipt of the demand for payment, the amount of any demand for Response Costs is not paid or remitted to the escrow account described in the preceding Paragraph, interest on the unpaid balance shall accrue from the date of receipt of the demand by the Settling Defendants. Interest shall be at the rate determined annually by the Secretary of the Treasury for interest on investments of the Hazardous Substances Superfund, pursuant to Section 107(b) of CERCLA, 42 U.S.C. § 6907(b). On October 1 of each succeeding fiscal year, any unpaid or unremitted balance will begin accruing interest at the rate determined for that year by the Secretary of the Treasury. Payments under this Paragraph shall be in addition to any other remedies or sanctions which may be available to the United States by reason of Settling Defendants' failure to make timely payment of Response Costs.

XVII. INDEMNIFICATION AND INSURANCE

83. Settling Defendants shall indemnify and hold harmless the United States and its officers, agents, employees, contractors, subcontractors and representatives from all claims, causes of action or other costs incurred by the United States, including, but not limited to,

attorney's fees and other litigation expenses arising from or out of acts or omissions of Settling Defendants and any persons acting on their behalf or under their control, in carrying out activities pursuant to this Decree. The United States assumes no such liability by agreeing to the terms of this Decree or by virtue of any designation of Settling Defendants as EPA's representatives under Section 104(e) of CERCLA, 42 U.S.C. § 9604(e). The United States shall not be held out as a party to any contract entered into by or on behalf of Settling Defendants, nor shall Settling Defendants or any such contractor be considered an agent of the United States in carrying out activities pursuant to this Decree.

84. Settling Defendants waive any claims for damages against or reimbursement from the United States, or for set-off of any payments to the United States, arising from or out of any contract or arrangement between Settling Defendants and any person for performance of the Work relating to the Groundwater Operable Unit at the Site, including claims on account of construction delays. Settling Defendants shall not be liable for and do not assume liability for any injuries or damages to persons or property resulting from acts or omissions of the United States or any person acting by, through or under it or on its behalf in carrying out any activity under this Decree.

85. Prior to commencing the Work under this Decree, Settling Defendants shall obtain commercial general liability insurance with a coverage of two million dollars per occurrence and in the aggregate, to insure against all claims of injury or property damage to third parties arising from or related to the Work. Settling Defendants may demonstrate to EPA that its contractors or subcontractors maintain equivalent coverage, or coverage for the same risks but in a lesser amount or for a lesser term, in which case Settling Defendants need provide only that portion of the insurance which is not maintained by the contractor or subcontractor. In lieu of

such coverage, Settling Defendants, at their option, may provide evidence of financial capacity sufficient for purposes of self-insurance pursuant to the requirements in 40 C.F.R. Part 265, Subpart H. Such insurance or evidence of financial capacity shall be maintained for five years following the termination date of this Decree.

86. For the duration of this Decree, Settling Defendants shall satisfy, or ensure that their contractors or subcontractors satisfy, all applicable laws and regulations regarding workers' compensation coverage for all persons performing activities that are part of the Work on their behalf in implementing this Decree. Prior to commencement of the Work, Settling Defendants shall provide EPA with copies of the applicable policies or other evidence of coverage.

XVIII. FORCE MAJEURE

87. "Force Majeure" is defined for purposes of this Decree as an event arising from causes entirely beyond the control of Settling Defendants or any entity controlled by them, including their contractors and subcontractors, which delays or prevents timely performance of any obligation under this Decree, and which Settling Defendants could not overcome by due diligence. Force Majeure events may include, but are not limited to, denial by applicable governmental agencies of any permit or authorization necessary to implement the Remedial Action required under this Decree, provided, however, that Settling Defendants have used their best efforts to obtain such permit or authorization on a timely basis. Force Majeure events may also include EPA's delay in reviewing reports, submittals and applications necessary for conduct of the Work beyond the time limits specified in the RD Work Plan or 2015 RAWP. Force Majeure shall not include unanticipated or increased costs or expenses for any of the Work or changed financial circumstances of any of the Settling Defendants.

88. If circumstances occur which may delay or prevent completion of any phase of the Work or timely achievement of any deadline, schedule or obligation under this Decree, whether or not caused by a Force Majeure event, Settling Defendants shall notify the RPM orally within 48 hours after they first become aware of such circumstances. Within 15 working days thereafter, Settling Defendants shall provide EPA with a written statement of the causes of the delay, together with Settling Defendants' position as to whether or not the delay is attributable to a Force Majeure event. The statement shall also include information as to the anticipated duration of the delay, the actions taken or to be taken to prevent or minimize the delay and a timetable for implementation of such measures. Failure to provide such timely oral and written notice shall preclude Settling Defendants from asserting any claim of Force Majeure with respect to the circumstances in question.

89. If EPA determines that the delay or anticipated delay is attributable to a Force Majeure event, the time for performance of the obligations that are affected by the Force Majeure event shall be extended by EPA to provide such additional time as may be necessary to complete the specific phase (or any succeeding phase) of the Work adversely affected by the delay. Such additional time shall correspond to the actual delay resulting from the Force Majeure event, including any unavoidable delay associated with restarting interrupted activities.

90. If EPA rejects Settling Defendants' Force Majeure assertion, or if there is disagreement as to the period of time the obligation affected by a Force Majeure event shall be extended, the issue shall be subject to the dispute resolution procedures in Section XIX of this Decree. In any such proceeding, Settling Defendants shall have the burden of proving that the delay or noncompliance was caused by a Force Majeure event and/or that the amount of additional time requested is necessary to compensate for that event.

91. Any delay that Settling Defendants demonstrate to EPA results from a Force Majeure event shall not be deemed to be a violation of Settling Defendants' obligations under this Decree and shall not subject Settling Defendants to liability for stipulated penalties pursuant to Section XX of the Decree.

XIX. DISPUTE RESOLUTION

92. The dispute resolution procedures in this Section shall be the exclusive mechanism for resolving disputes arising under or with respect to this Decree and shall apply to all disputed issues arising under or with respect to the Decree. The fact that dispute resolution is not specifically referenced in individual Sections of the Decree is not intended to and shall not bar Settling Defendants from invoking the procedures with respect to any disputed issue.

93. Any dispute which arises under or with respect to this 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 30 days from the time Settling Defendants notify EPA in writing of the existence of the dispute, unless such period is extended by agreement between the parties.

94. At or before the end of the 30-day informal negotiation period, EPA shall provide Settling Defendants with a written statement of its resolution of the disputed matter, which shall be binding unless Settling Defendants, within ten days after its receipt, invoke the administrative dispute resolution procedures in this Section. Such procedures shall be invoked by submission of a written notice to the Director of Region 7's Superfund Division. Within ten days after submission of such notice, Settling Defendants shall submit a written statement of their position ("Statement of Position") on the matter in dispute to the Director of Region 7's Superfund Division. The Statement of Position may include factual information, analysis or opinion

supporting Settling Defendants' position and shall include all supporting documentation relied upon. Within ten days after receipt of Settling Defendants' Statement of Position, EPA shall submit its Statement of Position. The administrative record for the dispute shall include the notice invoking the dispute resolution procedure, the parties' Statements of Position and all supporting documentation.

95. After review of the administrative record for the dispute, the Director of Region 7's Superfund Division shall issue a final determination resolving the dispute within 20 days of receipt of the second Statement of Position, unless another time period is agreed upon in writing between the parties. This determination shall be considered "final administrative action" and shall be binding on the parties unless judicial review is sought pursuant to the following Paragraph.

96. Any determination issued by the Director of Region 7's Superfund Division pursuant to the preceding Paragraph shall be reviewable by this Court, provided that a petition seeking such review is filed within 30 days of receipt of the determination. As to any dispute which relates to the adequacy of the Work performed or to be performed under this Decree, or as to the adequacy or appropriateness of plans, procedures or other items relating to the Work or otherwise requiring approval by EPA under this Decree, judicial review shall be on the administrative record for the dispute and the EPA determination shall be upheld unless it is arbitrary and capricious or otherwise not in accordance with law. As to other disputes, nothing herein shall prevent the United States from arguing that the Court should apply the arbitrary and capricious standard to review of the administrative determination.

97. Invocation of the procedures in this Section shall not extend or postpone any obligation, schedule or deadline applicable to Settling Defendants under this Decree. No

stipulated penalties shall accrue with respect to disputes involving the need for and/or the extent of additional work pursuant to Paragraph 53 of this Decree. Stipulated penalties with respect to other disputed matters shall accrue but payment of such penalties shall be stayed pending resolution of the dispute. If final resolution of the dispute is in favor of Settling Defendants, no stipulated penalties shall be payable. If Settling Defendants do not prevail on the disputed issue, stipulated penalties, which will have accrued from the day after performance was due or the violation occurred, shall be paid, as provided in Section XX of this Decree.

XX. STIPULATED PENALTIES

98. Subject to the provisions in Sections XVIII (Force Majeure) and XIX (Dispute Resolution) of this Decree, Settling Defendants shall pay stipulated penalties for each delay or failure to comply with the requirements of this Decree, as follows:

a. Stipulated Penalties for Deliverables.

(1) For the following major deliverables, stipulated penalties shall accrue in the amount of \$500 per day, per violation, for the first week of noncompliance; and \$2000 per day, per violation, for the eighth day and beyond of noncompliance:

(a) Sampling Results Letter Report (as required by Paragraph 48(a));

(b) PME Plan Addendum (as required by Paragraph 48(b));

(c) Well Decommissioning Work Plan (as required by Paragraph 48(c));

(d) letter report describing the results of the well decommissioning event (as required by Paragraph 48(d));

(e) any Groundwater or Surface Water Contingency Measure pursuant to the triggers in the Contingency Plan (as required by Paragraph 48(e));

(f) Hot Spot Treatment Work Plan (as required by Paragraph 48(f)); and

(g) letter report describing the results of the hot-spot treatment event (as required by Paragraph 48(g)).

(2) For all other deliverables, stipulated penalties shall accrue in the amount of \$200 per day, per violation, for the first week of non-compliance; and \$1000 per day, per violation, for the eighth day and beyond of non-compliance.

b. Stipulated Penalties for Delay or Failure to Implement or Comply with Plans and Consent Decree Requirements. Settling Defendants shall pay \$250 in stipulated penalties per day for each delay or failure to comply with groundwater and surface water monitoring, and or treatment if required, in accordance with the 2015 RAWP and associated EPA-approved addenda, and any plans approved by EPA pursuant to Paragraph 48 of this Consent Decree.

99. Any penalties which have accrued due to the failure of Settling Defendants to submit a timely and acceptable draft deliverable will be forgiven upon timely and acceptable resubmission of such deliverable. Any penalties for failure to make timely submission of a deliverable may also be forgiven, in the sole discretion of EPA, if Settling Defendants demonstrate that such delay is attributable in whole or in part to a prior period of non-compliance for which stipulated penalties have been assessed. Any other accrued penalties may be forgiven, in the sole discretion of EPA, in the event that the activities in the Remedial Action Work Plan are completed by the scheduled completion dates.

100. Stipulated penalties shall begin to accrue on the day after performance is due or a violation occurs, and shall continue to accrue through the final day when the violation or noncompliance is corrected. EPA shall give Settling Defendants written notice of each such violation or noncompliance, together with the amount of stipulated penalties due. Nothing herein shall prevent the simultaneous accrual of separate penalties for separate violations of this Decree.

101. All stipulated penalties due under this Section shall be payable within 60 days of receipt by Settling Defendants of the EPA notification of noncompliance, provided, however, that if the dispute resolution procedures in Section XIX of this Decree are invoked with respect to the violation and EPA prevails, such penalties shall be payable within 60 days of receipt by Settling Defendants of the final administrative determination or, if judicial review is sought, within 60 days of receipt of the final order of this Court upholding the EPA position. If Settling Defendants prevail in the dispute resolution proceedings, no stipulated penalties shall be payable.

102. Settling Defendants shall pay interest on the unpaid balance of any stipulated penalties, which shall begin to accrue at the end of the applicable 60 day period, at the rate established by the Department of the Treasury pursuant to 31 U.S.C. § 3713 and 4 C.F.R. § 102.13.

103. All stipulated penalties shall be paid by certified check(s) made payable to the “EPA Hazardous Substances Superfund” and shall be mailed to the following address or other address furnished by EPA:

U.S. Environmental Protection Agency
Superfund Payments Cincinnati Finance Center
P.O. Box 979076
St. Louis, Missouri 63197-9000

At the time of payment, Respondents shall send notice that payment has been made to the EPA's RPM, and to the EPA Cincinnati Finance Office by email at cinwd_acctsreceivable@epa.gov or by mail to:

EPA Cincinnati Finance Center
26 W. Martin Luther King Drive
Cincinnati, Ohio 45268

The check(s) and/or transmittal letters shall reference the name of the Site, the Court, caption and civil action number of this case and the applicable DOJ number (90-11-2-543/3), and shall indicate that the payment is on account of stipulated penalties. Copies of the check(s) and transmittal letter(s) shall be sent to EPA and to DOJ.

104. No payments made under this Section shall be deductible for federal tax purposes.

105. Neither invocation of dispute resolution procedures nor payment of penalties shall in any way alter Settling Defendants' obligation to complete the Work required under this Decree. If Settling Defendants fail to pay stipulated penalties, the United States may institute proceedings to collect such penalties and interest.

106. Payment of stipulated penalties as set forth in this Section shall not preclude the United States from seeking any other remedies, sanctions or penalties which may be available to it by reason of Settling Defendants' failure to comply with the requirements of this Decree.

107. 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 NOT TO SUE BY PLAINTIFF

108. Except as provided in Paragraphs 109 and 110 below (United States' Reservations), and Paragraph 111 (General Reservations of Rights), the United States covenants

not to sue or to take administrative action against the Settling Defendants pursuant to Sections 106 and 107(a) of CERCLA and Section 7003 of RCRA, 42 U.S.C. § 6973, relating to the Groundwater Operable Unit at the Site. Except with respect to future liability, these covenants shall take effect upon the Effective Date. These covenants are conditioned upon the satisfactory performance by Settling Defendants of their obligations under this Consent Decree. These covenants extend only to the Settling Defendants and do not extend to any other person.

109. United States' Reservations.

Notwithstanding any other provision of this Decree, the United States reserves, and this Decree is without prejudice to, the right to institute proceedings in this action or in a new action, or to issue an administrative order seeking to compel Settling Defendants to perform further response actions in connection with the Groundwater Operable Unit at the Site, or to reimburse the United States for additional costs of response in connection with the Groundwater Operable Unit, if:

- (i) conditions at the Site with regard to the Groundwater Operable Unit, previously unknown to EPA, are discovered; or
- (ii) information previously unknown to EPA relating to the Groundwater Operable Unit is received by EPA, in whole or in part

and, (2) EPA determines that these previously unknown conditions or this information together with relevant information indicate that the Remedial Action required herein is not protective of human health and the environment.

110. For purposes of Paragraph 109 (United States' Reservations), the conditions and information known to EPA shall include that information and those conditions known to EPA based on the 1989 OU1 ROD, 1991 ESD, 2012 ROD Amendment for the Groundwater Operable Unit at the Chemplex Site, the administrative record supporting the 1989 OU1 ROD, 1991 ESD,

and 2012 ROD Amendment, including data submitted during the public comment period following issuances of the 1989 OU1 ROD, 1991 ESD, and 2012 ROD Amendment, and additional work completed as of the ROD Amendment date, as well as documents in the files of EPA related to work performed by Settling Defendants to implement the 2012 ROD Amendment and 2015 RAWP through the Effective Date of this Consent Decree.

111. General Reservation of Rights. The above covenants not to sue pertain only to matters expressly specified in Paragraph 108 of this Section. The United States reserves, and this Consent Decree is without prejudice to, all rights against the Settling Defendants with respect to all matters not expressly included within the plaintiff's covenants in Paragraph 108.

Notwithstanding any other provision of this Decree, the United States reserves all rights against Settling Defendants with respect to:

- (1) claims based on a failure by Settling Defendants to meet any requirement of this Decree;
- (2) liability based on the ownership of the Site by the Settling Defendants when such ownership commences after signature of this Consent Decree by the Settling Defendants;
- (3) liability based on the operation of the Site by Settling Defendants when such operation commences after signature of this Consent Decree by Settling Defendants and does not arise solely from Settling Defendants' performance of the Work;
- (4) liability based on Settling Defendants' 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 ROD, the 2012 ROD Amendment, the Work, or otherwise ordered or approved by EPA, after signature of this Consent Decree by the Settling Defendants;
- (5) liability arising from the past, present, or future disposal, release, or threat of release of hazardous substances outside of and not attributable to the Site;

- (6) liability for the disposal of any hazardous substances taken from the Site;
- (7) liability, prior to achievement of Groundwater Cleanup Standards, for additional response actions that EPA determines are necessary to achieve and maintain the Groundwater Cleanup Standards or to carry out and maintain the effectiveness of the remedy set forth in the 2012 ROD Amendment, but that cannot be required pursuant to Section VIII (Additional Work to Obtain Cleanup Standards);
- (8) liability for damages for injury to, destruction of, or loss of natural resources, and for the costs of any natural resource damage assessments;
- (9) any matter as to which the United States is owed indemnification under Section XVII of this Decree;
- (10) claims based on criminal liability;
- (11) liability for violations of federal or state law which occur during implementation of the Work;
- (12) liability for additional operable units at the Site; and
- (13) liability for costs that the United States will incur regarding the Site but that are not within the definition of Response Costs.

XXII. COVENANTS BY SETTLING DEFENDANTS

112. Settling Defendants covenant not to sue or to assert any claims or causes of action against the United States related to or arising out of any Covered Matter, or any response action taken with respect to the Groundwater Operable Unit at the Site or pursuant to this Decree, including, but not limited to, any direct or indirect claim for reimbursement from the Hazardous Substances Superfund pursuant to Section 106(b)(2) of CERCLA, 42 U.S.C. § 9606(b)(2), or under the Equal Access to Justice Act. Nothing in this 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. § 300.25(d).

113. Settling Defendants waive any defense or claim based on the doctrines of res judicata, collateral estoppel, and/or claim splitting which they may have in this action or in any subsequent proceeding by the United States for further remediation of environmental problems at the Chemplex Site, based on the contention that claims in the subsequent proceeding were or should have been brought in the instant case.

XXIII. EFFECT OF SETTLEMENT; CONTRIBUTION PROTECTION

114. Nothing in this Decree shall be construed to create any rights in any person not a party to the Decree. Each of the parties hereto expressly reserves all rights (including any right to contribution), claims and defenses which it may have with respect to any matter covered by or related to this Decree against any person other than the United States, including parties to this Decree.

115. With regard to claims for contribution against Settling Defendants for “matters addressed” in this Decree by persons not parties to the Decree, Settling Defendants are entitled to such protection from contribution actions or claims as is provided in Section 113(f)(2) of CERCLA, 42 U.S.C. § 9613(f)(2). “Matters addressed” in this Consent Decree are all response actions taken or to be taken and response costs incurred or to be incurred, at or in connection with the Groundwater Operable Unit at the Site, by the United States or any other person, except the State; provided, however, that if the United States exercises rights under the reservations in Section XXI (Covenants Not to Sue by Plaintiff), other than in Sections 119(1) (claims based on a failure to meet any requirement of the Decree), 119(10) (criminal liability), or 119(11) (violations of federal/state law during or after implementation of the Work), the “matters addressed” in this Decree will no longer include those response costs or response actions that are within the scope of the exercised reservation.

116. Settling Defendants agree that they will notify EPA and DOJ within 30 days of the initiation of any suit or claim for contribution brought by or against them for matters covered by or related to this Decree.

XXIV. ACCESS TO INFORMATION

117. Upon request, Settling Defendants shall provide EPA with copies of all documents and information within their possession or control, or that of their contractors or agents, relating to activities at the Site or to implementation of this Decree, including, without limitation, sampling, analysis and chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing and other correspondence. Settling Defendants shall also make their employees, agents or representatives knowledgeable of relevant facts concerning performance of the Work available to EPA, for purposes of investigation, information gathering or testimony. If objection is made to production of any documents or the gathering of any information or testimony on the basis of a claim of privilege, Settling Defendants, in making such objection, shall identify the document or information in writing, together with the nature of the privilege claimed. The United States reserves the right to dispute any such claim of privilege.

118. Except as provided in the following Paragraph, Settling Defendants may assert business confidentiality claims as to all or any part of any document submitted to EPA, to the extent permitted by and in accordance with the procedures in Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7), and 40 C.F.R. § 2.203(b). EPA reserves the right to challenge any such claim of confidentiality pursuant to the procedures in 40 C.F.R. Part 2, Subpart B. If no claim of confidentiality is asserted with respect to a specific document when it is submitted to EPA, the public may be given access to such document without further notice to Settling Defendants. If Settling Defendants assert a confidentiality claim which is denied initially by EPA and Settling

Defendants seek review of such determination, the confidential status of the document shall be maintained until completion of the review procedures in 40 C.F.R. Part 2, Subpart B.

119. No claim of confidentiality shall be made with respect to any sampling or analytical data or other information evidencing conditions at or near the Site. The parties waive any objection to the admissibility into evidence (but not as to the weight to be accorded) of the results of analyses of samples collected by or for them at or near the Site, or of other data collected pursuant to this Decree which has been verified by the quality assurance/quality control procedures in the approved QAPP.

XXV. RETENTION OF RECORDS

120. For ten years after the Effective Date of this Amended Consent Decree, Settling Defendants shall preserve and retain all records and documents in their possession or control, or that of their contractors and agents, which relate in any manner to the Groundwater Operable Unit at the Site. Thereafter, Settling Defendants shall notify EPA at least 90 days prior to the destruction of any such records and, upon request, shall relinquish custody of the records to EPA, subject, however, to claims of privilege, on the terms set forth in Paragraph 117 of this Decree.

121. Settling Defendants hereby certify that since notification by EPA of their potential liability with respect to the Site, they have not, to the best of their knowledge, altered, mutilated, destroyed or otherwise disposed of any records, documents or other information related to such potential liability.

XXVI. NOTICES AND SUBMISSIONS

122. Whenever this Decree requires written notice to be given or a report, request for approval or other document to be sent by one party to another, it shall be directed to the

individuals and addresses specified below, or to such other individuals as the parties may hereafter designate in writing.

As to EPA:

Sandeep Mehta
Remedial Project Manager
United States Environmental Protection Agency, Region 7
11201 Renner Blvd.
Lenexa, Kansas 66219
mehta.sandeep@epa.gov

As to the Department of Justice:

Chief, Environmental Enforcement Section
Environment and Natural Resources Division
Department of Justice
P.O. Box 7611
Washington, D.C. 20044
Re: DOJ # 90-11-2-543/3

As to the Settling Defendants:

J. Preston Turner, Esq.
MRC Holdings, Inc.
1000 North West Street
5th Floor
Wilmington, DE 19801

Mark R. Hendrickson
Chevron Environmental Management Company
Mining & Specialty Portfolio Business Unit
1400 Smith St., Room 33124
Houston, Texas 77002

with copies to:

Baerbel Schiller, Esq.
Spencer Fane LLP
1000 Walnut St., Suite 1400
Kansas City, Missouri 63106-2140

Thomas J. Belick
EKI Environment & Water, Inc.
(formerly Erler & Kalinowski, Inc.)

577 Airport Boulevard, Suite 500
Burlingame, California 94010

XXVII. EFFECTIVE AND TERMINATION DATES

123. This Decree shall be effective as of the date it is entered by the Court, except as otherwise provided herein.

124. Upon notice by the United States to the Court that EPA has certified that all criteria for site completion have been met under applicable EPA guidance, and that Settling Defendants have satisfied all of their obligations under this Consent Decree, this Decree may be terminated on the motion of any party. EPA's certification that the criteria for site completion have been met shall not be subject to the Dispute Resolution provisions of Section XIX. Termination of the Decree shall not affect the covenants not to sue in Sections XXI and XXII of this Decree, the contribution protection and effect of settlement provisions in Section XXIII, or the retention of records, insurance and indemnification provisions in Sections XXV and XVI.

XXVIII. RETENTION OF JURISDICTION

125. This Court retains jurisdiction over the subject matter and the parties to this action for the purpose of issuing such further orders or directions as may be necessary and appropriate to construe, implement, modify, enforce, terminate or reinstate the terms of this Decree, or to resolve disputes in accordance with Section XIX hereof.

XXIX. MODIFICATION

126. Material modifications to this Consent Decree and all appendices, including the 2015 RAWP, shall be in writing, signed by the United States and Settling Defendants, and shall be effective upon approval by the Court. Non-material modifications to this Consent Decree, including the 2015 RAWP, shall be in writing and shall be effective when signed by duly

authorized representatives of the United States and Settling Defendants. A modification to the 2015 RAWP 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 2015 RAWP, the United States will provide the State with a reasonable opportunity to review and comment on the proposed modification.

XXX. COMMUNITY RELATIONS

127. Settling Defendants shall cooperate with EPA in providing information to the public regarding the Work to be performed hereunder. At EPA's request, Settling Defendants shall participate in the preparation of such information and in public meetings which may be held or sponsored by EPA to explain activities at or relating to the Site.

XXXI. LODGING AND OPPORTUNITY FOR PUBLIC COMMENT

128. In accordance with Section 122(d)(2) of CERCLA, 42 U.S.C. § 9622(d)(2), and 28 C.F.R. § 50.7, this Consent Decree shall be lodged with the Court for a period of not less than 30 days, for public notice and comment. The United States reserves the right to withdraw or withhold its consent to entry of the Decree if the comments received during the comment period disclose facts or considerations which indicate that the Decree is inappropriate, improper, or inadequate. If no comments are received or no changes are proposed in response to such comments, Settling Defendants consent to entry of the Decree without further notice.

XXXII. APPENDICES

129. The following Appendices to this Consent Decree are attached hereto and incorporated into to this Consent Decree.

Appendix 1: 1989 OU1 ROD
Appendix 2: 1991 ESD
Appendix 3: 2012 ROD Amendment

Appendix 4: Table 1-1 from the Performance Monitoring Evaluation Plan
(Appendix 5(b)).

Appendix 5: 2015 Remedial Action Work Plan, consisting of:

Appendix 5(a): 2015 QAPP

Appendix 5(b): Performance Monitoring Evaluation Plan

Appendix 5(c): May 29, 2015, Technical Memorandum

Appendix 5(d): November 16, 2017, Contingency Plan Letter

Appendix 5(e): Technical Memorandum: Hot Spot Evaluation Guidelines

Appendix 6: April 9, 2008 Additional Work Letter and Statement of Additional Work

Appendix 7: Site Map

XXXIII. SIGNATORIES

130. The undersigned representatives of each of the parties certifies that he or she is fully authorized to execute and legally bind such party to this Decree.

131. Each Settling Defendant has identified, on the attached signature page, the name and address of an agent who is authorized to accept service of process by mail on its behalf with respect to all matters arising under or relating to this Decree. Settling Defendants hereby agree to accept service in such manner and to waive the formal service requirements in Rule 4 of the Federal Rules of Civil Procedure and any applicable Local Rules of this Court.


THE UNDERSIGNED PARTIES enter into this Amended Consent Decree relating to the Groundwater Operable Unit at the Chemplex Superfund Site and submit it to the Court for approval and entry.

SO ORDERED, THIS ____ DAY OF _____, 2019.

UNITED STATES DISTRICT COURT

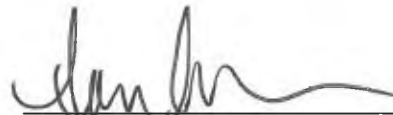
FOR THE UNITED STATES OF AMERICA:

Date 7-6-19



JEFFREY BOSSERT CLARK
Assistant Attorney General
United States Department of Justice
Environment and Natural Resources Division
Washington, D.C. 20530

Date 6-5-2019



SEAN CARMAN
Senior Counsel
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Environment and Natural Resources Division
Environmental Enforcement Section
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Washington, D.C. 20044
(202) 514-2746
Sean.carman@usdoj.gov

**FOR THE UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY**



MARY P. PETERSON

Director
Superfund Division
U.S. Environmental Protection Agency
Region 7
11201 Renner Boulevard
Lenexa, Kansas 66219



MELISSA BAGLEY

Senior Counsel
U.S. Environmental Protection Agency
Region 7
11201 Renner Boulevard
Lenexa, Kansas 66219

FOR ACC CHEMICAL COMPANY

Date 12/20/2018


Frank G. Soler - Secretary

FOR GETTY CHEMICAL COMPANY

Date 12/20/2018


Frank G. Soler - Assistant Secretary

FOR FOUR STAR OIL & GAS COMPANY

Date 12/20/2018


Frank G. Soler - Secretary

FOR MRC HOLDINGS, INC. (for itself and as successor to Primerica Holdings, Inc.):

Date 10/16/2018

A handwritten signature in blue ink is written over a horizontal line. The signature is stylized and appears to consist of several overlapping loops and strokes.

FOR EQUSTAR CHEMICALS, LP:

Date 10/17/18



FOR THE CITY OF CLINTON:

Date 10/23/2018



Appendix 1
OU 1 Record of Decision

**EPA/ROD/R07-89/024
1989**

**EPA Superfund
Record of Decision:**

**CHEMPLEX CO.
EPA ID: IAD045372836
OU 01
CLINTON, IA
09/27/1989**

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

**CHEMPLEX SITE
CLINTON, IOWA**

#SBP

STATEMENT OF BASIS AND PURPOSE

THIS DECISION DOCUMENT PRESENTS THE SELECTED OPERABLE UNIT REMEDIAL ACTION FOR THE CHEMPLEX SITE, IN CLINTON, IOWA, WHICH 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 REAUTHORIZATION ACT OF 1986 (SARA) AND, TO THE EXTENT PRACTICABLE, THE NATIONAL OIL AND HAZARDOUS SUBSTANCES POLLUTION CONTINGENCY PLAN (NCP). THIS DECISION DOCUMENT EXPLAINS THE FACTUAL AND LEGAL BASIS FOR SELECTING THE REMEDY FOR THIS SITE.

THE IOWA DEPARTMENT OF NATURAL RESOURCES CONCURS WITH THE SELECTED REMEDY. THE INFORMATION SUPPORTING THIS REMEDIAL ACTION DECISION IS CONTAINED IN THE ADMINISTRATIVE RECORD FOR THIS SITE.

ASSESSMENT OF THE SITE

RELEASES OF VOLATILE ORGANIC COMPOUNDS AND POLYNUCLEAR AROMATIC HYDROCARBONS HAVE OCCURRED IN THE SOIL AND GROUND WATER AT THIS SITE.

#DR

DECLARATION OF STATUTORY DETERMINATIONS

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, AND IT SATISFIES THE STATUTORY PREFERENCE FOR REMEDIES THAT EMPLOY TREATMENT TECHNOLOGIES THAT REDUCE TOXICITY, MOBILITY, OR VOLUME AS THEIR PRINCIPAL ELEMENT.

BECAUSE THIS REMEDY WILL RESULT IN HAZARDOUS SUBSTANCES REMAINING ON SITE ABOVE HEALTH-BASED LEVELS, A REVIEW WILL BE CONDUCTED WITHIN FIVE YEARS AFTER COMMENCEMENT OF REMEDIAL ACTION TO ENSURE THAT THE REMEDY CONTINUES TO PROVIDE ADEQUATE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT.

SIGNATURE
EPA REGIONAL ADMINISTRATOR

DATE 9/27/89

1.0 INTRODUCTION

#SD

1.1 SITE DESCRIPTION

THE CHEMPLEX SITE (ALSO KNOWN AS QUANTUM CHEMICAL CORPORATION, HEREIN QUANTUM) IS LOCATED WITHIN 5 MILES OF CLINTON, IOWA IN CLINTON COUNTY. THE SITE INCLUDES A LANDFILL AND THE ADJACENT FACILITY, WHICH MANUFACTURES HIGH AND LOW DENSITY POLYETHYLENE (HEREIN THE QUANTUM FACILITY). THE QUANTUM FACILITY HAS BEEN IN OPERATION SINCE APPROXIMATELY 1967. AS SHOWN ON FIGURE 1-1, THE LANDFILL AND DEBUTANIZED AROMATIC CONCENTRATE (DAC) AREA WITHIN THE QUANTUM FACILITY ARE THE FOCUS OF THIS RECORD OF DECISION.

FROM 1968 TO 1978, THE LANDFILL AREA WAS USED FOR DISPOSAL OF VARIOUS PLANT WASTES GENERATED AT THE QUANTUM FACILITY PLANT INCLUDING BLACK OILY SLUDGE, SCRAP POLYETHYLENE, CONSTRUCTION DEBRIS, AND CARBONATE SLUDGE. THE PRINCIPAL CONTAMINANTS OF CONCERN IN THE LANDFILL INCLUDE BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES (BTEX), POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS), AND THE CHLORINATED HYDROCARBONS; TRICHLOROETHYLENE (TCE), TETRACHLOROETHYLENE (PCE), AND 1,2-DICHLOROETHYLENE. THE PLANT WASTES HAVE CONTAMINATED THE SOIL AND GROUND WATER UNDERNEATH THE LANDFILL.

THE DAC AREA CONSISTS OF THE "PREVIOUS BASIN" AND DAC PRODUCT STORAGE AND LOADING AREAS. THE PREVIOUS BASIN, A PIT, WAS USED AS A TEMPORARY STORAGE AREA DURING RECONSTRUCTION OF THE POLISHING BASIN (THE LAST UNIT OF THE CURRENT ONSITE WASTEWATER TREATMENT PLANT) FROM 1977 THROUGH 1987. ACCORDING TO THE POTENTIALLY RESPONSIBLE PARTIES (PRPS) FOR THIS SITE, IN 1987 THE WASTE WAS REMOVED FROM THE PREVIOUS BASIN AND DISPOSED OF IN A RCRA PERMITTED LANDFILL. THE PRINCIPAL CONTAMINANTS OF CONCERN IN THE DAC AREA ARE BTEX AND PAH COMPOUNDS. ALTHOUGH EXTENSIVE SAMPLING TO DETECT THE CHLORINATED HYDROCARBONS WAS NOT CONDUCTED IN EITHER THE LANDFILL OR DAC AREAS, EPA BELIEVES THAT THESE COMPOUNDS ARE MORE PREVALENT IN THE LANDFILL AREA THAN THE DAC AREA. THIS IS BECAUSE CHLORINATED HYDROCARBONS MAY HAVE BEEN DISPOSED IN THE LANDFILL AND THE DAC PRODUCT DOES NOT CONTAIN THE CHLORINATED HYDROCARBONS. HOWEVER, CHLORINATED HYDROCARBONS WERE DETECTED IN THE DAC AREA. CONTAMINATED MEDIA IN THE DAC AREA INCLUDE THE SOILS AND UPPER AND LOWER GROUND WATER AQUIFERS.

THE LEAD AGENCY FOR THIS SITE IS EPA. THE SUPPORT AGENCY IS THE IOWA DEPARTMENT OF NATURAL RESOURCES (IDNR).

#EH

1.2 ENFORCEMENT HISTORY

ON SEPTEMBER 18, 1987, EPA ENTERED INTO AN ADMINISTRATIVE ORDER ON CONSENT, EPA DOCKET NO. 87-F-0012, (HEREIN CONSENT ORDER) WITH THE POTENTIALLY RESPONSIBLE PARTIES (PRPS), USI, NOW QUANTUM CHEMICAL COMPANY (HEREIN QUANTUM), ACC CHEMICAL COMPANY (HEREIN ACC) AND GETTY CHEMICAL COMPANY (HEREIN GETTY), TO INVESTIGATE THE LANDFILL AND DAC AREAS. THE CONSENT ORDER WAS ISSUED PURSUANT TO SECTION 106(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (CERCLA), 42 USC SS 9606(A) AND SECTION 3013 OF THE RESOURCE CONSERVATION AND RECOVERY ACT, AS AMENDED (RCRA), 42 USC SS 6934. IN MARCH 1988, THE PRPS CONTACTED THE AGENCY AND REQUESTED A MODIFICATION OF THE CONSENT ORDER AND AN EXTENSION OF TIME TO COMPLETE THE REQUIREMENTS OF THE CONSENT ORDER. ON AUGUST 16, 1988, THE CONSENT ORDER WAS AMENDED AND GETTY AND ACC WERE REQUIRED TO SUBMIT THE FINAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) REPORTS FOR THE DAC AND LANDFILL AREAS NO LATER THAN DECEMBER 1988. EPA RECEIVED THE DRAFT RI/FS REPORT IN DECEMBER 1988. EPA REVIEWED THE DRAFT REPORT AND SENT NUMEROUS COMMENTS AND RECOMMENDED REVISIONS IN APRIL AND MAY 1989. THE EPA FOUND THAT THE RI/FS REPORT DID NOT FULLY CHARACTERIZE THE NATURE AND EXTENT OF CONTAMINATION IN THE DAC AND LANDFILL AREAS, NOR DID THE FEASIBILITY STUDY CONSIDER ALL OF THE VIABLE REMEDIAL ALTERNATIVES FOR THE TREATMENT OF GROUND

WATER FROM THESE AREAS. IN JUNE OF 1989, THE PRPS SUBMITTED THE FINAL RI/FS REPORT. BECAUSE INFORMATION GAPS REMAINED IN THE FINAL REPORT, EPA CONTRACTED WITH JACOBS ENGINEERING TO PREPARE A FOCUSED FEASIBILITY STUDY REPORT. THE FOCUSED FEASIBILITY STUDY REPORT, THE RI/FS SUBMITTED BY ACC AND GETTY, AND EPA'S COMMENTS AND RECOMMENDED REVISIONS THERETO, ALL FORM A BASIS FOR THIS RECORD OF DECISION.

THE QUANTUM FACILITY, INCLUDING THE DAC AREA, BUT EXCLUDING THE LANDFILL AREA, IS REGULATED BY RCRA. THE LANDFILL WAS CLOSED IN 1978 PRIOR TO THE EFFECTIVE DATE OF THE RCRA REGULATIONS GOVERNING THE OPERATION OF SUCH FACILITIES. AT THAT TIME, ACC AND GETTY OPERATED THE LANDFILL AND IT WAS PART OF THE POLYETHYLENE MANUFACTURING FACILITY, WHICH WAS KNOWN AS THE CHEMPLEX COMPANY. IN 1984, WHEN QUANTUM BEGAN OPERATING THE FACILITY, THE LANDFILL WAS SUBDIVIDED FROM THE FACILITY. THE CITY OF CLINTON, IOWA OWNS THE REAL PROPERTY WHERE THE QUANTUM FACILITY IS LOCATED AS WELL AS THE LANDFILL. THE CITY LEASES THE FACILITY TO QUANTUM AND THE LANDFILL TO GETTY AND ACC.

THE QUANTUM FACILITY CURRENTLY OPERATES AS AN INTERIM STATUS RCRA FACILITY WITH AUTHORITY FOR THE STORAGE OF HAZARDOUS WASTES. THE OPERATORS OF QUANTUM ARE SEEKING A RCRA OPERATING PERMIT AND HAVE SUBMITTED THEIR PART B RCRA PERMIT APPLICATION. IN MAY 1989, EPA BEGAN A RCRA FACILITY ASSESSMENT (RFA) OF THE QUANTUM FACILITY. THE LANDFILL AREA IS NOT INCLUDED IN THE RFA NOR THE RCRA PART B PERMIT APPLICATION. THE DAC AREA IS INCLUDED IN THE PERMIT APPLICATION AND, EXCEPT FOR THE TRUCK LOADING AND UNLOADING AREA, IT IS INCLUDED IN THE RFA. ADDITIONAL ACTIVITIES USING RCRA AUTHORITY MAY BE NECESSARY AT THE SITE, INCLUDING A RCRA FACILITY INVESTIGATION, CORRECTIVE ACTION, AND POSSIBLY A RCRA OPERATING PERMIT.

THE QUANTUM FACILITY IS ALSO REGULATED BY THE IDNR IN ACCORDANCE WITH STATE LAWS AND THE CLEAN WATER ACT. QUANTUM HAS A NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT FOR THE ONSITE WASTEWATER TREATMENT PLANT DISCHARGE. QUANTUM ALSO HAS SPILL PREVENTION AND CONTROL PLANS FOR ONSITE STORAGE TANKS CONTAINING HAZARDOUS MATERIALS.

QUANTUM, GETTY AND ACC ARE ALL POTENTIALLY RESPONSIBLE PARTIES UNDER CERCLA. ALTHOUGH THESE COMPANIES HAVE ALL VOLUNTARILY COOPERATED WITH EPA, THE EPA HAS NOT SENT SPECIAL NOTICE LETTERS TO THE PRPS FOR NEGOTIATIONS PURSUANT TO SECTION 122 OF CERCLA, 42 USC SS 9622.

#SRO

1.3 SCOPE AND ROLE OF OPERABLE UNIT

THE SELECTED REMEDIAL ACTION GROUND WATER OPERABLE UNIT INITIATES THE REMEDIATION OF THE GROUND WATER IN THE LANDFILL AND DAC AREAS OF THE SITE. GROUND WATER REMEDIATION IS NECESSARY BECAUSE IT IS CONTAMINATED WITH THE BTEX, PAH, AND CHLORINATED HYDROCARBONS AT LEVELS WHICH EXCEED PUBLIC HEALTH AND ENVIRONMENTAL STANDARDS AND CRITERIA. THIS OPERABLE UNIT COMPRISES THE EXTRACTION AND TREATMENT OF THE GROUND WATER CONTAMINATION PLUMES AS WELL AS SOME GROUND WATER SOURCE CONTROL. GROUND WATER SOURCE CONTROL CONSISTS OF THE EXTRACTION OF FREE OIL FROM SOME OF THE WELLS AND PLACEMENT OF SOME OF THE EXTRACTION WELLS IN THE LANDFILL OVERBURDEN TO EXTRACT THE CONTAMINATED GROUND WATER BEFORE IT MIGRATES THROUGHOUT THE PLUME.

ALTHOUGH THE RI/FS REPORT SUBMITTED BY THE PRPS PRESENTS DATA AND REMEDIAL ALTERNATIVES FOR SOILS, WASTES AND GROUND WATER, EPA HAS DETERMINED THAT THE DATA AND ALTERNATIVES ARE INSUFFICIENT FOR SELECTION OF A REMEDY FOR THE SOILS AND WASTES OR FOR THE FINAL GROUND WATER REMEDY. THE RI/FS AND THE FOCUSED FEASIBILITY REPORT PRESENT SUFFICIENT INFORMATION REGARDING THE GROUND WATER CONTAMINATION IN THE DAC AND LANDFILL AREAS FOR THE EPA TO SELECT THIS OPERABLE UNIT REMEDIAL ACTION TO BEGIN CLEANUP OF THE CONTAMINATED GROUND WATER AT THE SITE.

THE PURPOSE OF THIS OPERABLE UNIT REMEDIAL ACTION IS TO MITIGATE THE MOVEMENT OF THE CONTAMINATED GROUND WATER FROM THIS SITE AND TO PERMANENTLY TREAT, DESTROY AND DISPOSE OF

CONTAMINANTS FOUND IN THESE GROUND WATER PLUMES. ALSO, THIS OPERABLE UNIT SHOULD PROTECT THE NEARBY DOWNGRADIENT PRIVATE DRINKING WATER WELLS FROM THESE CONTAMINATED PLUMES PRIOR TO IMPLEMENTATION OF THE FINAL REMEDIAL ACTION FOR THIS SITE. ADDITIONAL REMEDIAL ACTION OPERABLE UNITS WILL BE NECESSARY TO COMPLETE THE CLEANUP OF THIS SITE TO PROTECT HUMAN HEALTH AND THE ENVIRONMENT FROM THE OTHER AREAS OF CONTAMINATION AT THIS SITE, WHICH INCLUDE, BUT MAY NOT BE LIMITED TO, THE CONTAMINATED SOIL, WASTES OR DEBRIS AND HAZARDOUS SUBSTANCES FOUND AT OR NEAR THE LANDFILL, THE DAC AREA OR OTHER AREAS AT THIS SITE. THIS OPERABLE UNIT REMEDIAL ACTION WILL BE CONSISTENT WITH FUTURE OPERABLE UNITS AND THE FINAL REMEDY.

#CRH

1.4 COMMUNITY RELATIONS HISTORY

AS REQUIRED BY SECTION 113(K)(2)(B) OF CERCLA, 42 USC SECTION 9613(K)(2)(B), THE PROPOSED PLAN, RI/FS REPORT, FOCUSED FEASIBILITY STUDY, AND THE ADMINISTRATIVE RECORD WERE RELEASED TO THE PUBLIC IN JULY 1989. THE DOCUMENTS WERE MADE AVAILABLE TO THE PUBLIC IN THE INFORMATION REPOSITORIES AT THE CAMANCHE AND CLINTON, IOWA PUBLIC LIBRARIES AND THE EPA REGION VII LIBRARY IN KANSAS CITY, KANSAS. THE NOTICE OF AVAILABILITY FOR THESE DOCUMENTS WAS PUBLISHED IN THE CLINTON HERALD ON JULY 24, 1989. A PUBLIC COMMENT PERIOD WAS HELD FROM JULY 24, 1989, THROUGH AUGUST 23, 1989. COMMUNITY RELATIONS ACTIVITIES, INCLUDING INTERVIEWS AND PREPARATION OF A COMMUNITY RELATIONS PLAN, WERE COMPLETED ON AUGUST 11, 1989. A PUBLIC MEETING WAS HELD ON AUGUST 14, 1989, TO DISCUSS THE PROPOSED PLAN, FOCUSED FEASIBILITY STUDY, AND THE RI/FS DOCUMENTS. EPA'S RESPONSE TO THE COMMENTS RECEIVED DURING THIS PERIOD IS INCLUDED IN THE RESPONSIVENESS SUMMARY, WHICH IS PART OF THIS RECORD OF DECISION.

#SC

1.5 SITE CHARACTERISTICS

INFORMATION REGARDING THE SITE CHARACTERISTICS IS AVAILABLE IN THE RI/FS REPORT PREPARED BY THE PRPS AND IN THE HYDROGEOLOGIC ASSESSMENT REPORT, PREPARED BY JACOBS ENGINEERING FOR THE EPA AS WELL AS OTHER DOCUMENTS IN THE ADMINISTRATIVE RECORD. THESE DOCUMENTS FORM THE BASIS FOR THE FOLLOWING SUMMARY DISCUSSION.

A. GEOLOGY/HYDROGEOLOGY

THE CHEMPLEX SITE IS COVERED BY SURFICIAL SOILS THAT CONSIST OF A HETEROGENEOUS MIXTURE OF CLAYS, SILTS, AND GRAVEL WITH DISCONTINUOUS SAND LENSES. THE SOILS ARE A RESULT OF FORMER GLACIAL ACTIVITY AND ARE KNOWN AS GLACIAL TILL. THE RI/FS REPORT REFERS TO THESE SOILS AS THE OVERBURDEN. THE OVERBURDEN RANGES IN THICKNESS FROM A FEW FEET TO AN EXCESS OF 100 FEET.

THE OVERBURDEN IS UNDERLAIN BY BEDROCK THAT IS BELIEVED TO BE THE ANAMOSA FORMATION OF THE GOWER DOLOMITE. THE BEDROCK SURFACE IS TYPICALLY WEATHERED AND FRACTURED FOR SEVERAL FEET AND IS UNDERLAIN BY A MORE COMPETENT BEDROCK.

GROUND WATER OCCURS IN BOTH THE OVERBURDEN AND THE BEDROCK. THE GROUND WATER FLOW DIRECTION AT THE SITE APPEARS TO BE TOWARD THE SOUTHWEST. IN THE LANDFILL OVERBURDEN, A GROUND WATER MOUNDING EFFECT APPEARS TO BE CAUSING FLOW TOWARD THE NORTH AND EAST. THE MOUNDING EFFECT IS CAUSING GROUND WATER TO MOVE RADIALY FROM THE CENTER OF THE LANDFILL. IN ADDITION, THE OVERBURDEN IS RECHARGING THE BEDROCK GROUND WATER. THE GROUND WATERS IN THE OVERBURDEN AND BEDROCK APPEAR TO BE IN HYDRAULIC COMMUNICATION, MEANING THAT THE OVERBURDEN AND THE BEDROCK GROUND WATER INTERMIX.

B. SOILS/WASTES

VARIOUS WASTE STREAMS FROM THE POLYETHYLENE PLANT WERE DISPOSED OF IN THE LANDFILL FROM APPROXIMATELY 1968 TO 1978, INCLUDING CARBONATE SLUDGE, BLACK OILY SLUDGE, OFF-SPECIFICATION POLYETHYLENE AND CONSTRUCTION DEBRIS. A CONSIDERABLE AMOUNT OF THIS WASTE IS LOCATED AT OR BELOW THE GROUND WATER TABLE IN VARIOUS PORTIONS OF THE LANDFILL. AS A RESULT, CONCENTRATIONS OF BTEX HAVE BEEN DETECTED AS HIGH AS 8644 MILLIGRAMS PER KILOGRAM (MG/KG) OR PARTS PER MILLION (PPM), PAHS AS HIGH AS 5309 PPM, AND TETRACHLOROETHYLENE AS HIGH AS 100 PPM.

THE SOURCES OF SOIL CONTAMINATION IN THE DAC AREA APPEAR TO BE SPILLAGE OF DAC PRODUCT IN THE STORAGE AND TRUCK LOADING AREA AND FROM THE STORAGE OF WASTEWATER TREATMENT SLUDGES IN THE PREVIOUS BASIN AND POLISHING BASIN AREAS. ALTHOUGH SPILL CONTROL MEASURES, INCLUDING PAVING, SUMP COLLECTION, AND A BERM AROUND THE DAC TANK, HAVE BEEN IMPLEMENTED IN THE TRUCK LOADING AREA AND SLUDGES WERE REMOVED FROM THE PREVIOUS AND POLISHING BASINS, CONTAMINATED SOILS REMAIN AND GROUND WATER CONTAMINANT PLUMES EMANATE FROM THESE AREAS. BTEX AND PAHS WERE DETECTED IN THE SOIL IN THE STORAGE AND TRUCK LOADING AREA AT MAXIMUM CONCENTRATIONS OF 2198 PPM AND 1267 PPM RESPECTIVELY. SOIL CONTAMINATION IS SUSPECTED IN THE PREVIOUS BASIN, BUT HAS NOT YET BEEN CONFIRMED BECAUSE THE BASIN WAS BACKFILLED WHEN SLUDGES WERE REMOVED IN 1987.

IT SHOULD BE NOTED THAT ADDITIONAL SITE CHARACTERIZATION, AS WELL AS TREATABILITY TESTING, WILL BE REQUIRED FOR THE SOILS, WASTES AND DEBRIS IN BOTH THE LANDFILL AND DAC AREAS PRIOR TO SELECTION OF A REMEDIAL ACTION TO CLEANUP THE SOILS, WASTES AND DEBRIS. THEREFORE, THE SOILS, WASTES AND DEBRIS WILL BE ADDRESSED IN A SUBSEQUENT OPERABLE UNIT RI/FS AND WILL NOT BE DISCUSSED FURTHER IN THIS ROD.

C. GROUND WATER

IN THE LANDFILL AREA, A MOUNDING EFFECT IN THE OVERBURDEN GROUND WATER APPEARS TO HAVE RESULTED IN PLUMES OF CONTAMINATED GROUND WATER FLOWING TO THE NORTH AND EAST FROM THE LANDFILL AREA PRIOR TO RECHARGING THE UNDERLYING BEDROCK GROUND WATER. THE HIGHEST CONCENTRATIONS OF CONTAMINANTS DETECTED IN THE LANDFILL OVERBURDEN GROUND WATER PLUMES WERE 8600 MICROGRAMS PER LITER (UG/L) OR PARTS PER BILLION (PPB) BTEX, 470 PPB PAHS, AND 60 PPB TETRACHLOROETHYLENE (CHLORINATED HYDROCARBON). THIS SHALLOW AQUIFER MAY BE PERIODICALLY DISCHARGING TO THE SMALL SURFACE STREAM LOCATED WEST OF THE SITE. TETRACHLOROETHYLENE HAS BEEN DETECTED IN THIS SURFACE WATER STREAM AT A CONCENTRATION OF 198 PPB, THUS SUGGESTING THAT THIS AQUIFER IS CONTAMINATED WITH TETRACHLOROETHYLENE.

THE HIGHEST CONCENTRATION OF CONTAMINANTS IN THE LANDFILL GROUND WATER IS AT THE OVERBURDEN/BEDROCK INTERPHASE IN AN AREA ALONG THE SOUTHWEST BORDER OF THE LANDFILL. THE CONCENTRATIONS OF CONTAMINANTS IN THIS AREA ARE 96,400 PPB BTEX AND 1,821 PPB PAHS.

GROUND WATER IN THE BEDROCK AQUIFER BENEATH THE LANDFILL HAS BEEN INVESTIGATED IN FOUR DIFFERENT ZONES, DESIGNATED AS THE A, B, C AND D ZONES REPRESENTING DIFFERENT WELL SCREEN INTERVALS (DEPTHS) OF THE BEDROCK AQUIFER. SEE TABLE 1 FOR MORE DETAILS REGARDING WELL SCREEN INTERVALS AND THE MONITORING WELLS INVOLVED IN EACH ZONE. AS ILLUSTRATED ON FIGURES 1-2 THROUGH 1-5, A NUMBER OF CONTAMINANT PLUMES ARE EMANATING FROM THE LANDFILL AREA IN ALL ZONES. THE HIGHEST CONCENTRATIONS OF CONTAMINANTS ASSOCIATED WITH THESE PLUMES WERE DETECTED IN THE SHALLOW AND INTERMEDIATE BEDROCK ZONES. THESE CONTAMINANT CONCENTRATIONS ARE 52,880 PPB CHLORINATED HYDROCARBONS, AND 33,883 PPB BTEX AND 1,700 PPB PAHS, RESPECTIVELY. IN THE DEEPER BEDROCK ZONES, THESE CONTAMINANTS ARE CONSIDERABLY LOWER IN CONCENTRATION.

THE CLOSEST RESIDENTIAL DRINKING WATER WELLS SOUTHWEST OF THE FACILITY WERE SAMPLED AND ANALYZED BECAUSE THESE RESIDENCES ARE LOCATED DOWNGRADIENT OF THE SITE AND WOULD BE THE FIRST AFFECTED BY MOVEMENT OF THE PLUME. THE ANALYSES INDICATES THAT AT THIS TIME THESE WATER WELLS ARE NOT

CONTAMINATED FROM THE MIGRATION OF CONTAMINANTS FROM THE SITE.

AT THIS TIME, THE DEPTH AT WHICH THESE RESIDENTIAL WELLS DRAW WATER IS UNKNOWN, BUT THIS IS TO BE DETERMINED DURING FURTHER RI/FS ACTIVITIES.

IN THE DAC AREA THE GROUND WATER PLUME OF CONTAMINATION IN THE OVERBURDEN ALSO APPEARS TO BE MIGRATING TO THE SOUTHWEST. THE HIGHEST CONCENTRATIONS OF CONTAMINANTS DETECTED IN THE DAC OVERBURDEN PLUME ARE 249,000 PPB BTEX AND 13,829 PPB PAHS. THIS PLUME OF GROUND WATER CONTAMINATION IS FAIRLY WELL DEFINED AS DESCRIBED IN THE RI/FS.

IN THE DAC AREA, ONE MONITORING WELL WAS INSTALLED INTO BEDROCK GROUND WATER. ANALYSIS OF SAMPLES TAKEN FROM MONITORING WELLS SHOWED CONCENTRATIONS OF 650 UG/L FOR BENZENE. THE MAXIMUM CONTAMINANT LEVEL (MCL) ESTABLISHED BY THE SAFE DRINKING WATER ACT FOR BENZENE IS 5 UG/L AND THE LEVEL ESTABLISHED BY THE STATE OF IOWA IS 1 UG/L FOR BENZENE. THEREFORE, GROUND WATER REMEDIATION IS REQUIRED IN THE BEDROCK AS WELL AS THE OVERBURDEN. HOWEVER, THE PLUME OF CONTAMINATION IN THE DAC BEDROCK GROUND WATER IS NOT YET DEFINED.

IT SHOULD BE NOTED THAT SINCE THE VERTICAL AND HORIZONTAL EXTENT OF CONTAMINATION IN THE GROUND WATER IS NOT YET COMPLETELY DEFINED FOR EITHER THE LANDFILL OR DAC AREAS, FURTHER HYDROGEOLOGIC AND CHEMICAL DATA WILL NEED TO BE COLLECTED DURING REMEDIAL DESIGN TO DELINEATE THE EXTENT OF CONTAMINATION. EPA BELIEVES, HOWEVER, THAT THERE IS SUFFICIENT INFORMATION TO SELECT A REMEDY FOR THE GROUND WATER OPERABLE UNIT AT THIS TIME, SINCE INFORMATION IS AVAILABLE REGARDING GROUND WATER CHARACTERISTICS, SUCH AS THE RATE AND DIRECTION OF GROUND WATER FLOW, AND THE RI/FS DATA WHICH INITIALLY IDENTIFIES THE NATURE AND GENERAL EXTENT OF CERTAIN PLUMES OF CONTAMINATION.

#SSR

1.6 SUMMARY OF SITE RISKS

THE PRPS PREPARED AND SUBMITTED TO EPA A "DRAFT ENDANGERMENT ASSESSMENT FOR THE CHEMPLEX SITE" FOR THE PURPOSE OF EVALUATING THE EXISTING AND POTENTIAL IMPACTS OF THE SITE ON HUMAN HEALTH AND THE ENVIRONMENT. THE DRAFT ENDANGERMENT ASSESSMENT (EA) DISCUSSES CONTAMINANTS OF CONCERN, ADVERSE HEALTH EFFECTS, AND EXPOSURE PATHWAYS. IT SHOULD BE NOTED THAT THE DRAFT EA IS INCOMPLETE FOR THREE BASIC REASONS: 1) THE DRAFT EA DOES NOT ADEQUATELY ADDRESS THE GROUND WATER PATHWAY; 2) SOME PATHWAYS WERE NOT COMPLETELY ADDRESSED BASED ON THE INSUFFICIENT DATA THAT WAS COLLECTED DURING THE RI/FS PHASE TO DELINEATE THE TOTAL AERIAL AND VERTICAL EXTENT OF CONTAMINATION; AND 3) THE DRAFT EA DOES NOT ADEQUATELY ADDRESS VOLATILE ORGANIC EXPOSURE VIA THE AIR PATHWAY. THE EPA PROVIDED NUMEROUS COMMENTS TO THE PRPS REGARDING THE DEFICIENCIES OF THE DRAFT EA AND THESE COMMENTS ARE AVAILABLE IN THE ADMINISTRATIVE RECORD. AS AN ADDITION TO THE DRAFT EA SUBMITTED BY THE PRPS, EPA HAS INCLUDED INFORMATION IN THE ADMINISTRATIVE RECORD AND THIS RECORD OF DECISION REGARDING RISKS OF EXPOSURE TO THE GROUND WATER. THE FOLLOWING INFORMATION SUMMARIZES THE POTENTIAL IMPACTS OF CONTAMINATION AT THE SITE ON HUMAN HEALTH AND THE ENVIRONMENT. FURTHER INFORMATION ON THESE IMPACTS AND RISKS IS AVAILABLE IN THE DRAFT EA, THE REMEDIAL INVESTIGATION AND THE ADMINISTRATIVE RECORD.

A. CONTAMINANT IDENTIFICATION

IN ORDER TO ALLOW FOR A REALISTIC ESTIMATION OF POTENTIAL RISK WHERE A NUMBER OF CHEMICALS HAVE BEEN DETECTED AT THE SITE, IT IS OFTEN NECESSARY TO SELECT A LIST OF INDICATOR CHEMICALS TO CONDUCT THE DETAILED ANALYSIS OF THE RISK ASSESSMENT. BASED ON EXISTING DATA FOR THE CONTAMINANTS FOUND AT THE SITE AND THE MOST TOXIC CONTAMINANTS DETECTED ON THE SITE, THE INDICATOR COMPOUNDS SELECTED FOR THE RISK ASSESSMENT INCLUDED: ANTIMONY, BENZENE, CHLOROFORM, 1,2-DICHLOROETHYLENE, ETHYL BENZENE, CARCINOGENIC AND NONCARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS), STYRENE, TETRACHLOROETHYLENE, TRICHLOROETHYLENE AND TOLUENE.

B. HUMAN HEALTH EXPOSURE ASSESSMENT

THE DRAFT EA IDENTIFIED THE FOLLOWING EXPOSURE PATHWAYS AS BEING THE MOST LIKELY EXPOSURE SCENARIOS AND CONDUCTED SITE-SPECIFIC ANALYSES OF CARCINOGENIC AND NONCARCINOGENIC EFFECTS: INHALATION OF FUGITIVE DUST IN THE DAC AREA BY ONSITE WORKERS; INADVERTENT INGESTION OF, AND DERMAL CONTACT WITH, SURFACE SOIL IN THE DAC AREA BY ONSITE WORKERS; AND DERMAL EXPOSURE TO SURFACE WATER IN THE INTERMITTENT TRIBUTARY TO ROCK CREEK BY CHILDREN VISITING THE TRIBUTARY. THE DRAFT EA ERRONEOUSLY DID NOT CONSIDER THE INGESTION OF GROUND WATER AS A POTENTIAL EXPOSURE PATHWAY. CONTAMINANT CONCENTRATIONS IN THE GROUND WATER PLUMES EMANATING FROM THE LANDFILL AND DAC AREAS SUBSTANTIALLY EXCEED FEDERAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH FROM INGESTION OF CONTAMINATED WATER. TABLE 1-4 COMPARES THE MAXIMUM CONCENTRATION OF CONTAMINANTS DETECTED IN THESE PLUMES WITH THE MAXIMUM CONTAMINANT LEVELS (MCLS) AND PROPOSED MAXIMUM CONTAMINANT LEVELS AND OTHER WATER QUALITY CRITERIA. THIS COMPARISON INDICATES THAT THESE PLUMES OF CONTAMINATION PRESENT A SUBSTANTIAL RISK TO HUMAN HEALTH FROM THE INGESTION OF THE CONTAMINATED GROUND WATER. EXISTING DOWNGRADIENT PRIVATE DRINKING WATER WELLS AND ANY FUTURE WELLS INSTALLED SHOULD BE PROTECTED FROM THIS POTENTIAL RISK. THE AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (ATSDR) RECOMMENDS THAT GROUND WATER USE BE RESTRICTED IN THE VICINITY OF THESE PLUMES UNTIL THE GROUND WATER IS REMEDIATED.

AN ASSESSMENT WAS PERFORMED TO EVALUATE NONCARCINOGENIC AND CARCINOGENIC POTENTIAL ADVERSE EFFECTS TO HUMAN HEALTH DUE TO EXPOSURE TO THE INDICATOR COMPOUNDS THROUGH VARIOUS MEDIA. ALTHOUGH NOT EVALUATED IN THE DRAFT EA, HUMAN HEALTH RISKS HAVE SINCE BEEN CALCULATED FOR THE GROUND WATER PATHWAY USING CONCENTRATIONS AT THE DOWNGRADIENT PORTION OF THE PLUME AND THE RESULTS ARE PRESENTED HEREIN. SUPPORTING CALCULATIONS CAN BE FOUND IN A TECHNICAL MEMORANDUM WHICH IS PART OF THE ADMINISTRATIVE RECORD. THE TITLE OF THIS MEMORANDUM IS CHEMPLEX FACILITY SITE, CLINTON, IOWA; ENDANGERMENT ASSESSMENT OF POTENTIAL GROUND WATER EXPOSURE, DATED SEPTEMBER 22, 1989, BY JACOBS ENGINEERING FOR EPA.

THE EVALUATION OF NONCARCINOGENIC RISKS INCLUDED CALCULATION OF THE HAZARD INDEX (HI) FOR EACH MEDIA. THE HI INCORPORATES A DOSE RESPONSE ASSESSMENT FOR EXPOSURE TO INDIVIDUAL SITE-SPECIFIC COMPOUNDS. THE DAILY INTAKE (DI) OR ESTIMATED DOSE IS CALCULATED BASED ON INGESTION OR INHALATION ROUTES OF EXPOSURE TO THE CONTAMINATED SOIL OR GROUND WATER. THE DI IS THEN RELATED TO THE ESTABLISHED REFERENCE DOSE (RFD) WHICH IS DEFINED AS AN ESTIMATE OF A DAILY EXPOSURE THAT IS LIKELY TO RESULT IN NO APPRECIABLE RISK OF DELETERIOUS EFFECTS DURING A LIFETIME. THE TOTAL HI IS A SUMMATION OF THE DI DIVIDED BY THE RFD (DI/RFD) WHICH IS INTENDED TO PROVIDE A MEASURE OF POSSIBLE EFFECTS OF HUMAN EXPOSURE TO TOXIC CHEMICALS. AN HI OF ONE (1) OR GREATER INDICATES THE POSSIBILITY OF ADVERSE NONCARCINOGENIC HEALTH EFFECTS.

CARCINOGENIC RISKS WERE ASSESSED BY ESTIMATING THE EXCESS LIFETIME CANCER PROBABILITY (THE RISK ABOVE BACKGROUND). THIS ESTIMATE WAS CALCULATED BY MULTIPLYING THE ESTIMATED EXPOSURE DOSE BY THE CHEMICAL-SPECIFIC CANCER POTENCY FACTOR (CPF). THE CPF IS ESTABLISHED FOR INDIVIDUAL CARCINOGENIC COMPOUNDS. THE CPF ARE THEN RELATED TO SITE-SPECIFIC DOSE-RESPONSE AND EXPOSURE ROUTES. THE ACCEPTABLE RANGE FOR EXCESS LIFETIME CANCER PROBABILITIES IS GENERALLY CONSIDERED BY EPA TO BE FROM $1 \times (10^{-4})$ TO $1 \times (10^{-7})$ (1 IN 10,000 TO 1 IN 10,000,000).

THE DRAFT EA CALCULATIONS FOR NONCARCINOGENIC RISKS THROUGH THE DERMAL, INHALATION AND INGESTION ROUTES OF WORKERS' EXPOSURE TO DAC SOILS IS AN ESTIMATED HI OF $2.4 \times (10^{-2})$. RISKS OF CHILDREN'S DERMAL EXPOSURE TO SURFACE WATER IS AN ESTIMATED HI OF $2.19 \times (10^{-6})$. THE CALCULATED HIS FOR THESE ROUTES ARE LESS THAN ONE (1), WHICH INDICATES THAT THERE WOULD NOT BE AN UNACCEPTABLE NONCARCINOGENIC RISK TO HUMAN HEALTH BASED ON AVAILABLE SITE CONTAMINANT DATA FOR THE SPECIFIED ROUTES.

THE HI VALUES FOR THE GROUND WATER PATHWAY FOR INGESTION OF THE LANDFILL AREA BEDROCK AQUIFER FOR PCE, TCE, 1,2-DICHLORO-ETHYLENE AND TOTAL PAHS WERE CALCULATED TO BE 13.6, 0.07, 1.1, AND

5.1, RESPECTIVELY. THE HI VALUE FOR THE DAC AREA OVERBURDEN AQUIFER FOR TOTAL PAHS WAS CALCULATED TO BE 41.2. THESE VALUES, WITH THE EXCEPTION OF THE TCE VALUE IN THE LANDFILL BEDROCK, ARE GREATER THAN ONE (1) AND ARE UNACCEPTABLE FOR NONCARCINOGENIC HEALTH EFFECTS. NONCARCINOGENIC RISK CHARACTERIZATION (HI VALUES) FOR BENZENE WERE NOT CALCULATED BECAUSE OF ITS CLASS A CARCINOGENIC CLASSIFICATION.

THE CALCULATED LIFETIME CANCER RISKS ASSOCIATED WITH WORKERS' EXPOSURE TO DAC SOILS WAS ESTIMATED TO BE $4.13 \times (10^{-7})$ AND WAS ESTIMATED TO BE $2.68 \times (10^{-8})$ FOR CHILDREN'S EXPOSURE TO SURFACE WATER. THESE LEVELS ARE BELOW THE $1 \times (10^{-4})$ TO $1 \times (10^{-7})$ RISK RANGE, A LEVEL CONSIDERED ACCEPTABLE BY EPA STANDARDS. EXCESS LIFETIME CANCER RISK VALUES FOR THE GROUND WATER PATHWAY FOR THE LANDFILL AREA BEDROCK AQUIFER FOR BENZENE, PCE AND TCE WERE CALCULATED TO BE $4.9 \times (10^{-2})$, $1.4 \times (10^{-2})$, AND $2.4 \times (10^{-4})$, RESPECTIVELY. VALUES FOR THE DAC AREA OVERBURDEN AQUIFER FOR BENZENE WAS CALCULATED TO BE $2.9 \times (10^{-2})$. THE VALUE FOR THE DAC AREA BEDROCK AQUIFER FOR BENZENE WAS CALCULATED TO BE $3.2 \times (10^{-4})$. THESE VALUES ARE GREATER THAN THE $1 \times (10^{-4})$ TO $1 \times (10^{-7})$ RANGE AND ARE CONSIDERED UNACCEPTABLE BY EPA STANDARDS FOR CARCINOGENIC HEALTH AFFECTS.

ANALYTICAL DATA OBTAINED FOR VARIOUS MEDIA DURING UPCOMING FIELD ACTIVITIES MAY CHANGE CALCULATED NONCARCINOGENIC AND/OR CARCINOGENIC RISK BECAUSE ADDITIONAL ANALYTICAL DATA MAY YIELD DIFFERENT DI VALUES AND, THUS, DIFFERENT HIS.

THE AIR PATHWAY WAS NOT ADEQUATELY ADDRESSED IN THE DRAFT EA. AMBIENT AIR MONITORING MAY BE CONDUCTED DURING FUTURE REMEDIAL INVESTIGATIONS.

C. ECOLOGICAL EXPOSURE ASSESSMENT

THE ECOLOGICAL RISKS FOR TERRESTRIAL AND AQUATIC ORGANISMS WERE CALCULATED BY MEANS OF THE TOXICITY QUOTIENT METHOD. THE TOXICITY QUOTIENT METHOD COMPARES AN ESTIMATED ENVIRONMENTAL CONCENTRATION (EEC) OF AN INDICATOR CHEMICAL TO AN ECOTOXICOLOGICAL BENCHMARK (BC). THE EEC IS DIVIDED BY THE BC TO OBTAIN THE TOXICITY QUOTIENT FOR THE EXPOSURE OF A GIVEN SPECIES TO A GIVEN CHEMICAL AS FOLLOWS:

$$\text{TOXICITY QUOTIENT} = \frac{\text{EEC (UG/L)}}{\text{BC (UG/L)}} \quad (\text{UNITLESS})$$

RESULTS OF THE TOXICITY QUOTIENT METHOD ARE CONSIDERED TO BE "NO CONCERN" IF THE RATIO IS LESS THAN 0.1, "POSSIBLE CONCERN" IF THE RATIO FALLS WITHIN THE RANGE OF 0.1 TO 10, AND "HIGH CONCERN" IF THE RATIO IS GREATER THAN 10.

THE TOXICITY QUOTIENT WAS CALCULATED FOR RATS, MICE, DEER, AND MALLARD DUCKS CONSUMING FOOD ITEMS ASSUMED TO BE CONTAMINATED WITH THE ESTIMATED SOIL CONCENTRATION OF NONCARCINOGENIC PAH (NAPHTHALENE). IT WAS CONCLUDED FROM THESE RESULTS THAT THE POTENTIAL FOR ACUTE OR CHRONIC EFFECTS TO TERRESTRIAL SPECIES FROM THE INGESTION OF EDIBLE VEGETATION CONTAINING NONCARCINOGENIC PAH IS OF "NO CONCERN". THE TOXICITY QUOTIENT WAS ALSO CALCULATED FOR AQUATIC SPECIES EXPOSED TO CHEMICAL CONCENTRATIONS IN THE INTERMITTENT STREAM. IT WAS CONCLUDED FROM THESE RESULTS THAT THE POTENTIAL FOR CHRONIC EFFECTS TO AQUATIC SPECIES FROM EXPOSURE TO BENZENE, ETHYLBENZENE, TOLUENE AND TETRACHLORETHYLENE (PCE) ARE OF "NO CONCERN". THE ESTIMATED TOXICITY QUOTIENT FOR NAPHTHALENE IS IN THE LOWER RANGE OF THE "POSSIBLE CONCERN" CATEGORY. HOWEVER, SINCE NAPHTHALENE WAS NOT ACTUALLY DETECTED IN THE STREAM, A CONCENTRATION OF $\frac{1}{2}$ OF THE DETECTION LIMIT WAS USED TO CALCULATE THE TOXICITY QUOTIENT. THIS IS A CONSERVATIVE ASSUMPTION AND, THEREFORE, IT IS ANTICIPATED THAT THE ACTUAL TOXICITY QUOTIENT WOULD BE LOWER THAN THE CALCULATED VALUE.

IT SHOULD ALSO BE NOTED THAT THE CONCENTRATIONS OF CONTAMINANTS IN THE ONE SURFACE WATER STREAM SAMPLE OF THE TRIBUTARY TO ROCK CREEK DID NOT DETECT ANY CONTAMINANTS THAT EXCEEDED ANY EPA WATER QUALITY CRITERIA FOR PROTECTION OF AQUATIC LIFE. BASED ON AVAILABLE DATA, IT DOES NOT APPEAR THAT TERRESTRIAL AND AQUATIC ORGANISMS ARE ADVERSELY IMPACTED BY THE SITE. IT SHOULD ALSO BE NOTED THAT THE OVERBURDEN GROUND WATER PERIODICALLY DISCHARGES TO THIS INTERMITTENT STREAM. THE DRAFT EA DID NOT CONSIDER PERIODIC EXPOSURES OF THE AQUATIC LIFE TO THE GROUND WATER IN THIS STREAM. THE NEXT OPERABLE UNIT REMEDIAL INVESTIGATION MAY INCLUDE ADDITIONAL SAMPLING OF THIS STREAM AND A REEVALUATION OF THE RISKS TO AQUATIC LIFE.

THIS UPPER MISSISSIPPI RIVER WILDLIFE REFUGE IS LOCATED JUST A FEW MILES FROM THE SITE AND BALD EAGLES (AN ENDANGERED SPECIES) HAVE BEEN SEEN AT THIS REFUGE. THE CURRENT DATA INDICATES THAT THE CONTAMINATION FROM THIS SITE DOES NOT AFFECT THIS WILDLIFE REFUGE. WHILE THE THREAT OF CONTAMINATION FROM THIS SITE REACHING THIS REFUGE WAS NOT CONSIDERED IN THE DRAFT EA, SUCH A THREAT SHOULD BE EVALUATED IN THE NEXT OPERABLE UNIT. IN ADDITION, THE POTENTIAL IMPACTS ON, OR THREATS TO, THIS WILDLIFE REFUGE MUST BE CONSIDERED DURING ANY RESPONSE ACTIVITIES AT THIS SITE, PARTICULARLY IF THE SECOND OPERABLE UNIT RI/FS OR REMEDIAL ACTIONS MIGHT INFLUENCE ROCK CREEK OR THE NPDES DISCHARGE.

#AE

2.0 ALTERNATIVES EVALUATED

REMEDIAL ALTERNATIVES WERE SCREENED BASED ON EFFECTIVENESS, IMPLEMENTABILITY AND RELATIVE CAPITAL, OPERATIONS, AND MAINTENANCE COSTS. CONTAINMENT AND IN SITU TREATMENT OF GROUND WATER WERE ELIMINATED BECAUSE OF IMPLEMENTABILITY AND EFFECTIVENESS LIMITATIONS AS DETAILED IN THE RI/FS SUBMITTED BY THE PRPS.

THE EPA EVALUATED THREE ALTERNATIVES IN DETAIL IN THE FOCUSED FEASIBILITY STUDY FOR THIS OPERABLE UNIT. THESE ALTERNATIVES WERE 1) NO ACTION, 2) EXTRACTION AND TREATMENT AT THE EXISTING ONSITE TREATMENT PLANT WITH PRETREATMENT, AND 3) EXTRACTION AND TREATMENT AT A NEW ONSITE WASTEWATER TREATMENT PLANT. A DESCRIPTION OF THESE ALTERNATIVES IS PROVIDED BELOW.

2.1 ALTERNATIVE 1 - NO ACTION

THE NO ACTION ALTERNATIVE WOULD ALLOW SITE CONDITIONS TO REMAIN AS THEY CURRENTLY EXIST. EVALUATION OF THE NO ACTION ALTERNATIVE IS REQUIRED BY THE NATIONAL CONTINGENCY PLAN (NCP) AND ALSO PROVIDES A BASELINE FOR COMPARISON WITH THE OTHER ALTERNATIVES.

EXTRACTION AND TREATMENT AT EXISTING WASTE
WATER TREATMENT PLANT WITH PRETREATMENT

ALTERNATIVE 2 PROVIDES FOR THE EXTRACTION OF THE CONTAMINATED GROUND WATER IN THE OVERBURDEN AND IN THE DEEP AQUIFERS AT BOTH THE LANDFILL AND DAC AREAS. THE CONTAMINATED GROUND WATER WOULD BE EXTRACTED AT A RATE OF APPROXIMATELY 140 GALLONS PER MINUTE (GPM). THIS EXTRACTED GROUND WATER WOULD BE PUMPED TO A PRETREATMENT UNIT (TO BE BUILT FOR THIS ACTION) AND THEN TO THE EXISTING WASTEWATER TREATMENT PLANT OPERATED BY QUANTUM. AFTER TREATMENT, THE WATER WOULD BE DISCHARGED VIA THE QUANTUM FACILITY NPDES PERMITTED OUTFALL TO THE MISSISSIPPI RIVER. SPENT CARBON GENERATED AT THE PRETREATMENT UNIT WILL REQUIRE SPECIAL HANDLING FOR DISPOSAL AS A HAZARDOUS WASTE.

LANDFILL AREA

IN ORDER TO CONTROL THE PLUME OF CONTAMINATION IN THE LANDFILL AREA, IT IS ANTICIPATED THAT APPROXIMATELY 70 GALLONS PER MINUTE (GPM) EXTRACTION CAPACITY WOULD BE REQUIRED IN THE OVERBURDEN AND BEDROCK AQUIFERS. THE FINAL EXTRACTION CAPACITY AND PLACEMENT OF EXTRACTION

WELLS IN THE TWO AQUIFERS WILL BE DETERMINED DURING THE REMEDIAL DESIGN PHASE.

DAC AREA

IN THE DAC AREA, AN EXISTING GROUND WATER RECOVERY SYSTEM CONSISTING OF A COLLECTION TRENCH, WICK WELLS AND EXTRACTION WELLS IS IN PLACE AND OPERATES TO EXTRACT CONTAMINATED GROUND WATER FROM THE OVERBURDEN AQUIFER. APPROXIMATELY 20 GPM IS EXTRACTED USING THIS EXISTING SYSTEM. ALTERNATIVE 2 INCLUDES AN EVALUATION OF THE EFFECTIVENESS OF THIS EXISTING RECOVERY SYSTEM FOR THE OVERBURDEN AQUIFER AND DELINEATION OF THE PLUME OF CONTAMINATION IN THE BEDROCK AQUIFER. IT IS ANTICIPATED THAT AN ADDITIONAL EXTRACTION CAPACITY OF 50 GPM IN THE BEDROCK AND OVERBURDEN AQUIFERS MAY BE REQUIRED TO CONTROL THE PLUME OF CONTAMINATION IN THE DAC AREA.

THE REMEDIAL DESIGN OF THE ALTERNATIVE 2 WOULD INCLUDE COLLECTION OF ADDITIONAL HYDROGEOLOGIC DATA TO DETERMINE THE FINAL NUMBER, LOCATIONS AND CAPACITY OF THE EXTRACTION WELLS TO MEET THE OBJECTIVE OF INITIAL CONTROL OVER THE PLUMES OF CONTAMINATION.

TREATMENT

THE EXISTING ONSITE WASTEWATER TREATMENT FACILITY WITH A PRETREATMENT UNIT WOULD BE UTILIZED TO TREAT THE EXTRACTED GROUND WATER FROM THE TWO AREAS. THE EXISTING TREATMENT FACILITY CURRENTLY HAS A PERMITTED NPDES DISCHARGE TO THE MISSISSIPPI RIVER. THE EXISTING WASTEWATER TREATMENT PLANT IS A BIOLOGICAL ACTIVATED SLUDGE PLANT CAPABLE OF TREATING THE CHLORINATED HYDROCARBONS, PAH COMPOUNDS AND BTEX COMPOUNDS, WHICH ARE CONTAMINANTS OF CONCERN FOR THE SITE.

BASED ON CURRENTLY AVAILABLE DATA, IT IS APPROPRIATE TO USE PRETREATMENT UNITS SUCH AS AN AIR STRIPPER USING CARBON ABSORPTION OVERHEAD TREATMENT OR AN ULTRAVIOLET/OXIDATION SYSTEM. THESE ALTERNATIVES ARE DISCUSSED IN DETAIL IN THE FOCUSED FEASIBILITY STUDY REPORT. THE FINAL PRETREATMENT OPTION WOULD BE SELECTED DURING THE DESIGN PHASE. THE PRETREATMENT UNIT WOULD BE DESIGNED TO REMOVE THE CHLORINATED HYDROCARBONS AND OTHER VOLATILE ORGANICS, SUCH AS BENZENE, FROM THE GROUND WATER ALLOWING FOR EFFECTIVE TREATMENT OF REMAINING GROUND WATER CONTAMINANTS AT THE EXISTING PLANT. GROUND WATER WOULD CONTINUE TO BE EXTRACTED AND TREATED UNTIL THE GROUND WATER ACHIEVES THE APPLICABLE OR RELEVANT AND APPROPRIATE CLEANUP CRITERIA. THESE CRITERIA ARE IDENTIFIED IN TABLE 5-1, SECTION 5. THIS TREATMENT SYSTEM IS FLEXIBLE AND MAY BE MODIFIED BY SUBSEQUENT RESPONSE ACTIONS AT THIS SITE.

THE EPA HAS CONSIDERED TREATMENT UTILIZING THE EXISTING WASTEWATER TREATMENT FACILITY WITHOUT PRETREATMENT AS AN ALTERNATIVE. HOWEVER, BASED ON CURRENTLY AVAILABLE DATA, IT APPEARS THAT THE WASTEWATER TREATMENT FACILITY WITHOUT PRETREATMENT MAY NOT BE ABLE TO ACHIEVE COMPLIANCE WITH ALL OF THE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS). IN PARTICULAR, IT APPEARS THAT WITHOUT PRETREATMENT, THE NPDES DISCHARGE LIMITS FOR SEVERAL CONTAMINANTS WOULD BE EXCEEDED WITH THIS ALTERNATIVE. SUCH AN ALTERNATIVE WOULD ALSO ALLOW UNACCEPTABLE LEVELS OF CHLORINATED HYDROCARBONS AND OTHER VOLATILE ORGANIC COMPOUNDS SUCH AS BENZENE, TO BE RELEASED IN THE AIR IN THE AREA OF THE WASTEWATER TREATMENT FACILITY. THEREFORE, THE AGENCY PREFERS THE SELECTED REMEDY WHICH USES THE EXISTING PLANT WITH PRETREATMENT.

THE ESTIMATED CAPITAL COST FOR THIS REMEDY IS APPROXIMATELY \$552,000. THE ESTIMATED ANNUAL OPERATION AND MAINTENANCE COST FOR THIS ALTERNATIVE WOULD BE APPROXIMATELY \$219,600 AND TOTAL \$2,070,000 OVER THIRTY YEARS. THE ESTIMATED TOTAL PRESENT VALUE OF THIS ALTERNATIVE IS \$2,622,000. THE IMPLEMENTATION TIME FOR THIS REMEDY WOULD BE APPROXIMATELY 16 MONTHS.

2.3 ALTERNATIVE 3 - EXTRACTION AND TREATMENT AT A NEW WASTEWATER TREATMENT PLANT

THIS ALTERNATIVE WOULD REQUIRE THE SAME GROUND WATER EXTRACTION SYSTEM AS ALTERNATIVE 2. HOWEVER, INSTEAD OF TREATING THE GROUND WATER AT THE EXISTING ONSITE WASTEWATER TREATMENT PLANT,

ALTERNATIVE 3 REQUIRES THE DESIGN AND CONSTRUCTION OF A NEW WASTEWATER TREATMENT PLANT TO TREAT THE GROUND WATER. BASED ON AVAILABLE INFORMATION REGARDING THE PHYSICAL AND CHEMICAL CHARACTERISTICS OF THE AQUIFERS, AN ACCEPTABLE TREATMENT SYSTEM FOR THIS CONTAMINATED GROUND WATER WOULD CONSIST OF AN AIR STRIPPER FOLLOWED BY A BIOLOGICAL SEQUENCING BATCH REACTOR FOLLOWED BY A CARBON BED POLISHING UNIT. THIS TREATMENT SYSTEM MAY BE MODIFIED OR CHANGED DURING THE DESIGN PHASE.

THE ESTIMATED CAPITAL COST OF THIS ALTERNATIVE IS \$1,140,000. THE ESTIMATED ANNUAL OPERATION AND MAINTENANCE COST IS APPROXIMATELY \$353,200 AND TOTAL \$3,329,600 OVER THIRTY YEARS. THE ESTIMATED TOTAL PRESENT VALUE OF THIS ALTERNATIVE IS \$4,469,600. THE IMPLEMENTATION TIME FOR THIS REMEDY IS APPROXIMATELY 20 MONTHS.

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3.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

THE SELECTED REMEDY FOR THE LANDFILL AND DAC AREAS INITIAL GROUND WATER REMEDIATION IS ALTERNATIVE 2. AS DESCRIBED ABOVE, THIS ALTERNATIVE INVOLVES EXTRACTION OF GROUND WATER FROM THE LANDFILL AND DAC AREAS AND TREATMENT OF THE GROUND WATER AT THE EXISTING ONSITE WASTEWATER TREATMENT PLANT WITH PRETREATMENT. BASED ON CURRENTLY AVAILABLE INFORMATION, THIS ALTERNATIVE PROVIDES THE BEST BALANCE OF TRADEOFFS WITH RESPECT TO THE NINE CRITERIA THAT EPA USES TO EVALUATE REMEDIAL ACTION ALTERNATIVES. THIS SECTION PROVIDES A SUMMARY OF EACH CRITERIA AND AN ANALYSIS OF THE ALTERNATIVES UNDER CONSIDERATION FOR THIS OPERABLE UNIT OF THE CHEMPLEX SITE. FOR FURTHER INFORMATION ON THE NINE CRITERIA, REFER TO EPA INTERIM FINAL "GUIDANCE FOR CONDUCTING REMEDIAL INVESTIGATIONS AND FEASIBILITY STUDIES UNDER CERCLA" DATED OCTOBER 1988.

3.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT IS THE CENTRAL MANDATE OF CERCLA, AS AMENDED BY SARA. PROTECTION IS ACHIEVED BY MINIMIZING RISKS POSED BY THE SITE AND TAKING ACTION TO ELIMINATE FUTURE UNACCEPTABLE RISKS TO HUMAN HEALTH AND THE ENVIRONMENT THROUGH ANY PATHWAY. EACH REMEDIAL ALTERNATIVE MAY HAVE DIFFERENT LONG-TERM AND SHORT-TERM EFFECTS ON THE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT.

ALL OF THE ALTERNATIVES EVALUATED IN THIS OPERABLE UNIT, WITH THE EXCEPTION OF THE NO ACTION ALTERNATIVE, SHOULD PROVIDE ADEQUATE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT BY REDUCING AND CONTROLLING RISK THROUGH EXTRACTION AND TREATMENT OF GROUND WATER, THEREBY MINIMIZING THE POTENTIAL FOR FURTHER MIGRATION OF CONTAMINATED GROUND WATER FROM THIS SITE. THE EXTRACTION PROCESS WILL REMOVE THE CONTAMINANTS FROM THE GROUND WATER AND WILL THEREFORE PROTECT THE NEARBY RESIDENTS FROM DRINKING CONTAMINATED GROUND WATER. THE TREATMENT PROCESS WILL PERMANENTLY TREAT, DESTROY AND DISPOSE OF THE CONTAMINANTS AND THE TREATED GROUND WATER WILL BE DISCHARGED TO THE MISSISSIPPI RIVER IN ACCORDANCE WITH NPDES REQUIREMENTS THAT WILL BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT.

3.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

SECTION 121(D) OF CERCLA, 42 USC S9621(D), AS AMENDED, REQUIRES THAT REMEDIAL ACTIONS COMPLY WITH LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) UNDER FEDERAL AND STATE LAWS. ALL OF THE ALTERNATIVES CONSIDERED IN THIS OPERABLE UNIT, WITH THE EXCEPTION OF THE NO ACTION ALTERNATIVE, WILL COMPLY WITH THE ARARS IDENTIFIED FOR THIS OPERABLE UNIT OF THE SITE.

THE CHEMICAL, LOCATION, AND ACTION-SPECIFIC ARARS FOR THIS REMEDIAL ACTION ARE LISTED IN TABLES 5-1, 5-2, AND 5-3, WHICH ARE PRESENTED IN SECTION 5.2, ATTAINMENT OF THE ARARS.

REGARDING THE CHEMICAL-SPECIFIC ARARS LISTED ON TABLE 5-1, IT SHOULD BE NOTED THAT THE HEALTH ADVISORY LEVELS (HAL), NEGLIGIBLE RISK LEVELS (NRLS), AND MAXIMUM CONTAMINANT LEVELS (MCLS) ESTABLISHED UNDER THE SAFE DRINKING WATER ACT ARE CONSIDERED APPLICABLE REQUIREMENTS PURSUANT TO RULES ADOPTED BY THE STATE OF IOWA. THEREFORE, THESE LEVELS ARE THE PRIMARY CLEANUP GOALS. THE MCLS ARE ALSO CONSIDERED RELEVANT AND APPROPRIATE REQUIREMENTS BASED ON EPA GUIDANCE. EVEN THOUGH THIS IS AN OPERABLE UNIT REMEDIAL ACTION, TREATMENT OF THE CONTAMINATED GROUND WATER WILL BE REQUIRED UNTIL ACHIEVEMENT OF THE CLEANUP GOALS FOR ALL OF THE CONTAMINATED GROUND WATER FOUND AT THE SITE IN THE LANDFILL AND DAC AREAS.

3.3 LONG-TERM EFFECTIVENESS AND PERMANENCE

LONG-TERM EFFECTIVENESS AND PERMANENCE ADDRESS THE ABILITY OF A REMEDY TO MAINTAIN RELIABLE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT OVER TIME ONCE CLEANUP GOALS HAVE BEEN MET.

ALL OF THE ALTERNATIVES REFERENCED HEREIN, EXCEPT THE NO ACTION ALTERNATIVE, WOULD HAVE EQUAL EFFECTIVENESS IN PROVIDING PROTECTION TO HUMAN HEALTH AND THE ENVIRONMENT. THIS IS BECAUSE BOTH ALTERNATIVES 2 AND 3 WOULD HAVE GROUND WATER EXTRACTION SYSTEMS CAPABLE OF CONTROLLING THE PLUMES IN THE LANDFILL AND DAC AREAS AND BOTH ALTERNATIVES WOULD HAVE TREATMENT SYSTEMS CAPABLE OF PERMANENTLY TREATING, DESTROYING AND DISPOSING OF CONTAMINANTS.

3.4 REDUCTION OF TOXICITY, MOBILITY OR VOLUME

THIS EVALUATION CRITERIA RELATES TO THE PERFORMANCE OF A TECHNOLOGY OR REMEDIAL ALTERNATIVE IN TERMS OF ELIMINATING OR CONTROLLING RISKS POSED BY THE TOXICITY, MOBILITY, OR VOLUME OF HAZARDOUS SUBSTANCES.

ALL OF THE ALTERNATIVES, EXCEPT THE NO ACTION ALTERNATIVE, PROVIDED FOR THE REDUCTION OF TOXICITY, MOBILITY OR VOLUME OF CONTAMINANTS BY EXTRACTION OF THE GROUND WATER AND SUBSEQUENT TREATMENT. THIS IS BECAUSE THE EXTRACTION SYSTEM FOR ALTERNATIVES 2 AND 3 WOULD EFFECTIVELY CONTROL THE PLUMES OF CONTAMINATION AND THEREFORE WOULD REDUCE THE TOXICITY, MOBILITY AND VOLUME OF CONTAMINANTS IMPACTING THE GROUND WATER. THE TREATMENT SYSTEM FOR ALTERNATIVES 2 AND 3 WOULD THEN PERMANENTLY TREAT, DESTROY AND DISPOSE OF CONTAMINANTS.

3.5 SHORT-TERM EFFECTIVENESS

SHORT-TERM EFFECTIVENESS ADDRESSES HOW WELL AN ALTERNATIVE IS EXPECTED TO PERFORM, THE TIME TO ACHIEVE PERFORMANCE AND THE POTENTIAL ADVERSE IMPACTS OF ITS IMPLEMENTATION. THE SHORT-TERM EFFECTIVENESS OF THE TWO ALTERNATIVES WOULD BE ESSENTIALLY THE SAME, BECAUSE THE TIME IT WOULD TAKE TO IMPLEMENT THE TWO ALTERNATIVES IS A DIFFERENCE OF ONLY 4 MONTHS AND THERE WOULD BE NO ADVERSE EFFECTS FOR THE ONSITE WORKERS EXCEPT FOR THE CUSTOMARY RISKS OF CONSTRUCTION.

3.6 IMPLEMENTABILITY

IMPLEMENTABILITY ADDRESSES HOW EASY OR DIFFICULT, FEASIBLE OR INFEASIBLE, AN ALTERNATIVE WOULD BE TO CARRY OUT FROM DESIGN THROUGH CONSTRUCTION, OPERATION AND MAINTENANCE.

THE VARIOUS COMPONENTS OF ALTERNATIVES 2 AND 3 ARE PROVEN TECHNOLOGIES AND MATERIALS NECESSARY TO IMPLEMENT THEM SHOULD BE READILY AVAILABLE.

3.7 COST

CERCLA REQUIRES THAT EPA SELECT THE MOST COST-EFFECTIVE (NOT MERELY THE LOWEST COST) ALTERNATIVE THAT PROTECTS HUMAN HEALTH AND THE ENVIRONMENT AND MEETS OTHER REQUIREMENTS OF THE LAW. THE NO ACTION ALTERNATIVE, WHICH WOULD INVOLVE NO COST, WAS CONSIDERED IN ORDER TO MEET REQUIREMENTS OF

THE LAW. THE FS SUBMITTED BY THE PRPS INDICATES THAT COSTS WOULD BE INCURRED FOR MONITORING UNDER THE NO ACTION ALTERNATIVE. SINCE ADDITIONAL OPERABLE UNITS WILL BE CONDUCTED AND MONITORING WILL BE INCLUDED, SUCH COSTS ARE NOT PRESENTLY INCLUDED IN THE NO ACTION ALTERNATIVE, HEREIN.

TOTAL CAPITAL COSTS ARE ESTIMATED AT \$552,000 AND \$1,400,000, FOR ALTERNATIVES 2 AND 3 RESPECTIVELY. TABLE 3-1, HEREIN, LISTS THE ESTIMATED COSTS FOR EACH ALTERNATIVE EVALUATED. PRESENT WORTH OPERATION AND MAINTENANCE COSTS (AT 10% DISCOUNT RATE) ARE ESTIMATED AT \$2,070,000 AND \$3,329,600 FOR ALTERNATIVES 2 AND 3, RESPECTIVELY. THE TOTAL PRESENT WORTH COSTS ARE, THEREFORE, ESTIMATED AT \$2,622,000 AND \$4,469,600 FOR ALTERNATIVES 2 AND 3, RESPECTIVELY. THESE COSTS WERE TAKEN DIRECTLY FROM THE FOCUSED FEASIBILITY STUDY REPORT AND ARE PRESENTED FOR COMPARATIVE PURPOSES. FINAL COSTS OF THE SELECTED REMEDY WILL BE DEVELOPED DURING DESIGN.

3.8 COMMUNITY ACCEPTANCE

THIS EVALUATION CRITERIA ADDRESSES THE DEGREE TO WHICH MEMBERS OF THE LOCAL COMMUNITY SUPPORT THE REMEDIAL ALTERNATIVES BEING EVALUATED. THERE WERE NO SPECIFIC ADVERSE COMMENTS FROM THE PUBLIC RELATED TO THE REMEDIAL ALTERNATIVES BEING EVALUATED OR THE PROPOSED REMEDY.

A PUBLIC MEETING WAS HELD ON AUGUST 14, 1989, TO PRESENT THE PROPOSED PLAN AND SOLICIT PUBLIC COMMENT. THE PUBLIC COMMENT PERIOD WAS FROM JULY 24, 1989, UNTIL AUGUST 23, 1989. SIGNIFICANT PUBLIC COMMENTS ARE ADDRESSED IN THE RESPONSIVENESS SUMMARY, ATTACHED TO THIS ROD. OTHER COMMENTS THAT WERE RECEIVED ARE ALSO BEING RESPONDED TO.

3.9 STATE ACCEPTANCE

THE STATE ACCEPTANCE CRITERIA ADDRESSES THE CONCERN AND DEGREE OF SUPPORT THAT THE STATE GOVERNMENT HAS EXPRESSED REGARDING THE REMEDIAL ALTERNATIVES BEING EVALUATED. THE STATE HAS PARTICIPATED IN THE REVIEW OF ALL OF THE RI/FS DOCUMENTS AND IN NEGOTIATIONS WITH THE PRPS. THE STATE OF IOWA ISSUED A LETTER OF CONCURRENCE ON THE SELECTED REMEDY DATED AUGUST 3, 1989. A COPY IS ATTACHED.

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THE SELECTED REMEDY

THE SELECTED REMEDY, ALTERNATIVE 2 OF THE FOCUSED FEASIBILITY STUDY, REPRESENTS THE BEST BALANCE AMONG THE CRITERIA USED TO EVALUATE REMEDIES. THE SELECTED REMEDY WILL PROTECT HUMAN HEALTH AND THE ENVIRONMENT, ATTAIN ARARS, BE COST-EFFECTIVE, AND UTILIZE PERMANENT SOLUTIONS EMPLOYING TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE.

THE SELECTED REMEDY INCLUDES THE FOLLOWING:

- INSTITUTIONAL CONTROLS TO RESTRICT USE OF GROUND WATER UNTIL REMEDIAL ACTIONS ACHIEVE CLEANUP OF THE CONTAMINATED GROUND WATER TO REQUIRED LEVELS.
- EXTRACTION OF GROUND WATER BY PLACEMENT OF EXTRACTION WELLS IN AND AROUND THE PLUMES OF CONTAMINATION IN THE LANDFILL AND DAC AREAS.
- PRETREATMENT OF THE EXTRACTED GROUND WATER, PROPER DISPOSAL OF PRETREATMENT SOLID WASTES IN ACCORDANCE WITH RCRA.
- TREATMENT OF THE EXTRACTED AND PRETREATED GROUND WATER AT THE EXISTING ONSITE WASTEWATER TREATMENT PLANT.

- DISCHARGE OF THE TREATED GROUND WATER TO THE MISSISSIPPI RIVER VIA A FEDERALLY PERMITTED OUTFALL IN ACCORDANCE WITH THE EXISTING NPDES PERMIT, OR MODIFIED AS NECESSARY.

4.1 RESTRICT USE OF GROUND WATER

SINCE THE CONCENTRATIONS OF VARIOUS CONTAMINANTS SUBSTANTIALLY EXCEED HUMAN HEALTH AND ENVIRONMENTAL STANDARDS IN THE PLUMES OF GROUND WATER CONTAMINATION FROM THE SITE, THE AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (ATSDR) RECOMMENDS THAT GROUND WATER USE BE RESTRICTED AT OR NEAR THE PLUMES. THE IOWA ENVIRONMENTAL QUALITY ACT, IOWA CODE ANN. SS 455B, AND THE IOWA ADMIN. CODE, CHAPTER 38, REQUIRE THAT ROUTINE INSTALLATION OF ALL PRIVATE WATER WELLS BE PERMITTED BY IDNR OR ITS DESIGNEE. THIS AUTHORITY MAY BE USED TO RESTRICT INSTALLATION OF WELLS IN THE PATHWAY OF THE PLUMES. IN ADDITION, THE LANDFILL IS BEING PLACED ON THE IOWA REGISTRY OF HAZARDOUS WASTE SITES BY IDNR, WHICH REQUIRES PLACING BY THE STATE OF A NOTICE ON THE DEED PREVENTING SALE OF THE LANDFILL OR CHANGE IN LAND USE WITHOUT APPROVAL BY THE STATE. DEED RESTRICTIONS ARE ALSO REQUIRED FOR THE ADJACENT PROPERTY, UNDER WHICH THE CONTAMINATED GROUND WATER PLUMES ARE MIGRATING. SUCH RESTRICTIONS WILL BE IMPLEMENTED BY THE STATE OF IOWA OR THE LOCAL GOVERNMENT.

4.2 EXTRACTION OF GROUND WATER

THE SELECTED REMEDY INCLUDES THE PLACEMENT OF EXTRACTION WELLS IN THE CONTAMINATED GROUND WATER PLUMES TO CONTROL MIGRATION. IT IS ANTICIPATED THAT A TOTAL OF APPROXIMATELY 140 GPM OF EXTRACTION CAPACITY WILL BE REQUIRED TO CONTROL MIGRATION OF THE PLUMES IN THE OVERBURDEN AND BEDROCK AQUIFERS OF THE LANDFILL AND DAC AREAS. HOWEVER, THE FINAL EXTRACTION CAPACITY AND NUMBER AND PLACEMENT OF EXTRACTION WELLS WILL BE DETERMINED DURING THE REMEDIAL DESIGN PHASE.

4.3 PRETREATMENT OF EXTRACTED GROUND WATER

THE SELECTED REMEDY CONSISTS OF A PRETREATMENT UNIT WHICH WILL BE DESIGNED TO REMOVE APPROXIMATELY 99 PERCENT OF THE VOLATILE ORGANIC COMPOUNDS, INCLUDING CHLORINATED HYDROCARBONS AND BTEX COMPOUNDS FROM THE GROUND WATER. A VIABLE PRETREATMENT SYSTEM WHICH HAS BEEN IDENTIFIED AS THE PREFERRED DESIGN FOR THE SELECTED REMEDY TO BE USED FOR PRETREATMENT CONSISTS OF AIR STRIPPING WITH OVERHEAD TREATMENT OF THE VAPORS BY CARBON ABSORPTION. THE DESIGN FOR THIS TYPE OF PRETREATMENT SYSTEM WOULD INCLUDE AIR DISPERSION MODELING WHICH WOULD PROVIDE DATA TO CALCULATE A RISK ASSESSMENT FOR AIR EMISSIONS FROM THE AIR STRIPPER. THIS TYPE OF PRETREATMENT DESIGN COULD BE UTILIZED TO MEET THE OBJECTIVES OF PRETREATMENT. SOLID WASTES GENERATED FROM THIS TYPE OF PRETREATMENT UNIT WOULD BE DISPOSED IN ACCORDANCE WITH RCRA SUBTITLE C REQUIREMENTS. IF THE MODELING AND RISK ASSESSMENT INDICATE THAT OVERHEAD TREATMENT IS NOT REQUIRED, THE DESIGN MAY BE MODIFIED ACCORDINGLY.

ADDITIONAL PREDESIGN INVESTIGATIONS ARE PLANNED WITH AN EMPHASIS ON COLLECTION OF DATA WHICH MAY PROVIDE ADDITIONAL INFORMATION WARRANTING THE SELECTION OF A DIFFERENT PRETREATMENT SYSTEM. THE FINAL PRETREATMENT SYSTEM MUST MEET THE PRETREATMENT OBJECTIVES AND THE NINE CRITERIA FOR SELECTION OF REMEDIAL ACTIONS. SEE FIGURE 4-1 FOR A SCHEMATIC FOR THE EXTRACTION, PRETREATMENT, TREATMENT, AND DISCHARGE PROCESS.

4.4 TREATMENT OF THE EXTRACTED GROUND WATER

AFTER EXTRACTION AND PRETREATMENT, THE GROUND WATER WILL BE TREATED AT THE EXISTING ONSITE WASTEWATER TREATMENT PLANT. THE EXISTING TREATMENT PLANT IS A BIOLOGICAL ACTIVATED SLUDGE PLANT WHICH HAS BEEN USED EXTENSIVELY TO TREAT VOLATILE ORGANIC AND SEMI-VOLATILE ORGANIC COMPOUNDS, INCLUDING THE COMPOUNDS OF CONCERN THAT WILL REMAIN AFTER PRETREATMENT. THIS BIOLOGICAL ACTIVATED SLUDGE PLANT IS A PROVEN TREATMENT TECHNOLOGY.

CONTAMINANTS REMAINING IN THE EXTRACTED GROUND WATER FOLLOWING PRETREATMENT WOULD BE DILUTED FOLLOWING ADDITION TO THE PLANT PROCESS WASTEWATER STREAM. VOLATILIZATION, ADSORPTION, AND BIODEGRADATION ARE THE MECHANISM BY WHICH THE REMAINDER OF THE CONTAMINANTS WOULD BE REMOVED FROM THE WATER TO ACHIEVE THE NPDES PERMITTED DISCHARGE LEVELS. THE MAJORITY OF CONTAMINANTS REMAINING FOLLOWING PRETREATMENT WOULD BE THE SEMI-VOLATILE ORGANICS, WHICH WOULD BE BIODEGRADED IN THE EXISTING ONSITE WASTEWATER TREATMENT PLANT. THE PRETREATMENT UNIT IN CONJUNCTION WITH THE EXISTING TREATMENT PLANT WOULD ACHIEVE COMPLIANCE WITH CURRENT NPDES PERMITTED EFFLUENT LIMITATIONS.

4.5 DISCHARGE OF TREATED GROUND WATER

THE EXISTING ONSITE WASTEWATER TREATMENT PLANT EFFLUENT IS DISCHARGED VIA AN NPDES PERMITTED RELEASE TO THE MISSISSIPPI RIVER, JUST UPSTREAM OF THE UPPER MISSISSIPPI RIVER WILDLIFE REFUGE. THE SELECTED REMEDY REQUIRES THAT APPROXIMATELY 140 GPM OF CONTAMINATED GROUND WATER WILL BE EXTRACTED AND SUBSEQUENTLY TREATED AT THE EXISTING TREATMENT PLANT AFTER PRETREATMENT REMOVES THE CHLORINATED HYDROCARBONS AND OTHER VOLATILE ORGANICS, INCLUDING BENZENE. MODIFICATIONS TO THE EXISTING PERMIT OR A NEW NPDES PERMIT MAY BE REQUIRED BECAUSE OF THE ADDED BURDEN ON THE WASTEWATER TREATMENT PLANT FROM THE CONTAMINATED GROUND WATER. THE IDNR WILL REVIEW, MONITOR AND DETERMINE IF ANY MODIFICATIONS OR A NEW NPDES PERMIT IS REQUIRED. THE RESPONSIBLE PARTIES WILL APPLY FOR SUCH MODIFICATIONS, IF NECESSARY. BASED ON AVAILABLE DATA, IT APPEARS THAT TREATMENT OF THE EXTRACTED AND PRETREATED CONTAMINATED GROUND WATER WILL ACHIEVE THE EFFLUENT LIMITATIONS OF THE EXISTING NPDES PERMIT. THE SELECTED REMEDY WILL ACHIEVE APPROPRIATE DISCHARGE LIMITATIONS IN ACCORDANCE WITH THE NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) REQUIREMENTS AND WILL PROTECT THE NEARBY WILDLIFE REFUGE.

ACHIEVEMENT OF THE NPDES REQUIREMENTS AND PROTECTION OF THE WILDLIFE REFUGE AND THE BALD EAGLES THAT VISIT THE REFUGE ARE GOALS OF THE REMEDIAL ACTION FOR THIS SITE. THE SELECTED REMEDY FOR THIS OPERABLE UNIT IS THE INITIAL STEP TOWARD, AND IS CONSISTENT WITH, PROVIDING PROTECTION OF THE WILDLIFE REFUGE.

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5.0 STATUTORY DETERMINATIONS

THE SELECTED REMEDY SATISFIES THE STATUTORY REQUIREMENTS FOR THE DEGREE OF CLEANUP AS SPECIFIED BY CERCLA, BY EXTRACTION AND TREATMENT WHICH WILL PERMANENTLY TREAT, DESTROY, AND DISPOSE OF GROUND WATER CONTAMINANTS. SECTION 121 OF CERCLA, 42 USC SECTION 9621, STATES THAT THE SELECTED REMEDY SHALL:

- 1) BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT;
- 2) ATTAIN ARARS (OR PROVIDE EVIDENCE SHOWING ARARS CANNOT BE ATTAINED);
- 3) BE COST-EFFECTIVE; AND
- 4) UTILIZE PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE. THE PRETREATMENT SYSTEM AND THE BIOLOGICAL ACTIVATED SLUDGE TREATMENT SYSTEM ARE PERMANENT TREATMENT TECHNOLOGIES THAT ARE CAPABLE OF TREATING THE VOLATILE ORGANIC COMPOUNDS AND POLYNUCLEAR AROMATIC HYDROCARBONS IN THE GROUND WATER.

5.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

THE SELECTED REMEDY WILL PROVIDE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT BY EXTRACTION, PRETREATMENT AND TREATMENT OF CONTAMINATED GROUND WATER FROM THE SITE. THE CONCENTRATIONS OF

VARIOUS CONTAMINANTS IN THE GROUND WATER PRESENTLY EXCEED HUMAN HEALTH AND ENVIRONMENTAL STANDARDS AND CRITERIA. THE EXTRACTION OF THIS CONTAMINATED GROUND WATER INITIATES CONTROL OVER THE MIGRATION OF THE CONTAMINATED GROUND WATER PLUMES. SUCH CONTROL WILL REDUCE THE POTENTIAL FOR THESE PLUMES TO REACH DOWNGRAIDENT PRIVATE DRINKING WATER WELLS AND WILL REDUCE THE POTENTIAL DISCHARGE OF CONTAMINATED GROUND WATER TO SURFACE WATERS, THUS, PROTECTING AQUATIC LIFE AND WILDLIFE IN THE VICINITY OF THE SITE. THE SELECTED REMEDY WILL DISCHARGE THE GROUND WATER TO THE MISSISSIPPI RIVER AT CONCENTRATIONS OF CONTAMINANTS THAT WILL BE IN ACCORDANCE WITH THE NPDES REQUIREMENTS AND WILL PROTECT THE RIVER'S AQUATIC LIFE AS WELL AS THE DOWNSTREAM WILDLIFE AREA.

5.2 ATTAINMENT OF THE ARARS

THE SELECTED REMEDY WILL COMPLY WITH THE CHEMICAL-SPECIFIC FEDERAL AND STATE ARARS FOR CLEANUP LEVELS TO BE ATTAINED IN THE GROUND WATER AT THE SITE OR MIGRATING THEREFROM. THE REMEDY WILL BE ENGINEERED AND IMPLEMENTED TO MEET LOCATION-SPECIFIC AND ACTION-SPECIFIC ARARS.

CHEMICAL-SPECIFIC ARARS

THE ROD DESCRIBES THE CHEMICAL-SPECIFIC ARARS THAT THIS OPERABLE UNIT MUST ACHIEVE IN THE LONG-TERM FOR REMEDIATION OF THE CONTAMINATED GROUND WATER IN THE LANDFILL AND DAC AREAS. ALTHOUGH THIS IS AN OPERABLE UNIT REMEDIAL ACTION, CHEMICAL-SPECIFIC ARARS ARE APPROPRIATELY IDENTIFIED AT THIS TIME BECAUSE THIS REMEDY MAY BECOME THE FINAL GROUND WATER REMEDY FOR THESE AREAS.

THE CHEMICAL-SPECIFIC ARARS FOR THIS OPERABLE UNIT ARE IDENTIFIED IN TABLE 5-1. THESE ARARS WERE DEVELOPED TO PROTECT THE SHALLOW GROUND WATER FROM FURTHER CONTAMINATION DUE TO BTEX, PAHS AND CHLORINATED HYDROCARBONS, WHICH EMANATE FROM THE SITE. THE GROUND WATER MUST BE PROTECTED BECAUSE IT IS A CLASS II AQUIFER, WHICH IS A CURRENT AND POTENTIAL DRINKING WATER SOURCE.

TABLE 5-1, CHEMICAL-SPECIFIC ARARS, INCLUDES THE REQUIREMENTS OF THE IOWA RULES FOR DETERMINING CLEANUP ACTIONS AT HAZARDOUS WASTE SITES, IOWA ADMINISTRATIVE CODE, CHAPTER 133 (455B, 455E). THESE RULES ARE LEGALLY APPLICABLE TO THE REMEDIAL ACTION TO BE PERFORMED AT THE CHEMPLEX SITE FOR THIS OPERABLE UNIT. THE IOWA ADMINISTRATIVE CODE, SECTION 133.2, DEFINES THE HIERARCHY OF CLEANUP ACTION LEVELS FOR REMEDIATION OF CONTAMINATED GROUND WATER IN IOWA. THIS HIERARCHY ESTABLISHES THE EPA HEALTH ADVISORY LEVELS (HAL) FOR A CONTAMINANT WILL BE THE CLEANUP ACTION LEVEL IF A HAL EXISTS; IF NOT, THE EPA NEGLIGIBLE RISK LEVEL (NRL) FOR CARCINOGENS SHALL BE THE CLEANUP LEVEL IF ONE EXISTS; IF NO HAL OR NRL EXIST, THEN THE EPA ENFORCEABLE MAXIMUM CONTAMINANT LEVEL (MCL), ESTABLISHED PURSUANT TO THE SAFE DRINKING WATER ACT (SWDA), SHALL BE THE ACTION LEVEL. IF NO HAL, NRL OR MCL EXIST, THE ACTION LEVEL WILL BE ESTABLISHED ON A CASE-BY-CASE BASIS USING EPA RECOMMENDED GUIDELINES AND RECOGNIZED EXPERTS. TABLE 5-1 IDENTIFIES THE EXISTING HAL, NRL, AND MCL FOR THE CONTAMINANTS OF CONCERN AT THE CHEMPLEX SITE. IN ACCORDANCE WITH THIS IOWA RULE, THE HALS FOR TOLUENE, ETHYLBENZENE, XYLENE, 1,1-DICHLOROETHYLENE AND 1,2-DICHLOROETHYLENE ARE THE APPLICABLE ACTIONS LEVELS FOR CLEANUP OF THE CONTAMINATED GROUND WATER FOR THESE CONTAMINANTS. THE NRLS ARE THE APPLICABLE CLEANUP ACTION LEVELS FOR BENZENE AND TRICHLOROETHYLENE. ALTHOUGH A HAL EXISTS FOR TETRACHLOROETHYLENE, IT IS NOT APPLICABLE BECAUSE THE PROPOSED MCL IS MORE STRINGENT THAN THE HAL. BECAUSE OF THIS ANOMALY, THE HAL FOR TETRACHLOROETHYLENE IS RELEVANT AND APPROPRIATE AND THE PROPOSED MCL IS TO BE CONSIDERED IN IMPLEMENTATION OF THIS REMEDIAL ACTION.

IN THE EVENT THAT ATTAINMENT OF THE HALS OR NRLS IS NOT PRACTICAL, THE MCLS AND PROPOSED MCLS MAY BECOME THE ALTERNATIVE CLEANUP LEVELS FOR ANY ONE OF THE CONTAMINANTS. THIS SUBSTITUTION WOULD BE IN ACCORDANCE WITH THE IOWA ADMINISTRATIVE CODE, SECTION 133.4 (3) B.1, WHICH SAYS THAT THE MCLS AND PROPOSED MCLS ARE RELEVANT AND APPROPRIATE CLEANUP ACTION LEVELS FOR CONTAMINATED GROUND WATER WHEN HALS AND NRLS ARE IMPRACTICAL TO ACHIEVE. THE GROUND WATER DOWNGRAIDENT OF

THE SITE IS USED FOR DRINKING WATER WITHOUT TREATMENT BY RESIDENTS LIVING NEAR THE SITE. ALTHOUGH MCLS AND THE PROPOSED MCLS WOULD BE APPLICABLE AT THE TAP FOR PUBLICLY OPERATED WATER SUPPLY SYSTEMS, THESE ACTION-LEVELS ARE RELEVANT AND APPROPRIATE WHEN THE EXPECTED AND CURRENT USE OF THE GROUND WATER IS FOR DRINKING WATER.

IN ADDITION, THE RULES IN IOWA FOR ANTIDegradation OF GROUND WATER IS RELEVANT AND APPROPRIATE FOR THIS REMEDIAL ACTION. THE IOWA ADMINISTRATIVE CODE, SECTION 61.2 (2) REQUIRES THAT THE QUALITY OF THE GROUND WATER IN THE STATE SHALL NOT BE DEGRADED BY CONTAMINATION. THIS REGULATION IS RELEVANT AND APPROPRIATE TO PREVENT FURTHER DEGRADATION OF THE GROUND WATER QUALITY DUE TO MIGRATION OF THE PLUMES OF GROUND WATER ALREADY CONTAMINATED FROM THE SITE.

AT THIS TIME, NO MCL, HAL OR NRL HAVE BEEN ESTABLISHED FOR THE PAHS DETECTED IN THE GROUND WATER AT THE SITE. THEREFORE, IT IS APPROPRIATE TO ESTABLISH A SITE-SPECIFIC ALTERNATIVE CLEANUP ACTION LEVEL FOR THE PAH CONTAMINANTS AT THIS SITE. AT OTHER SITES WITH SIMILAR GROUND WATER CONTAMINATION, EPA HAS DETERMINED THAT A CLEANUP ACTION LEVEL OF 10 UG/L (PPB), THE DETECTION LIMIT, IS RELEVANT AND APPROPRIATE FOR PAH CONTAMINATION IN GROUND WATER. THE DETECTION LIMIT IS THE RELEVANT AND APPROPRIATE ACTION LEVEL FOR CLEANUP OF THE PAH CONTAMINANTS IN THE GROUND WATER AT THIS SITE.

TABLE 5-1 ALSO LISTS THE AMBIENT WATER QUALITY CRITERIA (AWQC) FOR THE PROTECTION OF HUMAN HEALTH AND AQUATIC LIFE AS CHEMICAL-SPECIFIC ARARS FOR THIS GROUND WATER REMEDY. THESE AWQC ARE ESTABLISHED PURSUANT TO THE CLEAN WATER ACT, 33 USC SS 1251, ET. SEQ. THESE CRITERIA ARE TO BE CONSIDERED IN IMPLEMENTING THIS REMEDY; HOWEVER, BECAUSE THE PROMULGATED AND PROPOSED MCLS ARE MORE STRINGENT, THE AWQC ARE NOT RELEVANT AND APPROPRIATE FOR CLEANUP OF THE GROUND WATER FOR THIS OPERABLE UNIT REMEDIAL ACTION. THE AWQC ARE TO BE CONSIDERED IN THE IMPLEMENTATION OF THIS ACTION BECAUSE AQUATIC LIFE AND HUMAN HEALTH MAY BE AFFECTED FROM THE DISCHARGE OF CONTAMINATED GROUND WATER FROM THIS SITE TO NEARBY ROCK CREEK, WHICH FLOWS TO A LAKE AND THEN TO THE MISSISSIPPI RIVER. FISH FROM THE RIVER USE THE CREEK AND THE LAKE FOR HABITAT. THE CREEK DISCHARGES TO THE RIVER JUST ABOVE THE UPPER MISSISSIPPI RIVER WILDLIFE REFUGE. COMMERCIAL FISHING IS ALLOWED IN THE RIVER JUST DOWNSTREAM OF THESE AREAS. THERE IS A THREAT OF GROUND WATER CONTAMINATION MIGRATING FROM THIS SITE TO THE SURFACE WATERS. THE PRPS SUBMITTED TO EPA A STUDY OF ROCK CREEK, WHICH INDICATES NO CONTAMINATION IN THE CREEK; HOWEVER, THE STUDY INCLUDED ONLY ONE SAMPLE OF THE TRIBUTARY TO THE CREEK, WHICH IS ADJACENT TO THE SITE. ANALYSIS OF A SAMPLE FROM THIS TRIBUTARY CONTAINED DETECTABLE LEVELS OF CHLORINATED HYDROCARBONS; THEREFORE, IT WILL BE FURTHER INVESTIGATED IN THE FUTURE RI/FS ACTIVITIES AT THE SITE. THE AWQC ARE TO BE CONSIDERED IN IMPLEMENTING THE CLEANUP OF THE GROUND WATER AT THIS SITE FOR THE PROTECTION OF THE SURFACE WATERS AT THE SITE.

ALTHOUGH IT IS POSSIBLE THAT THIS OPERABLE UNIT REMEDY WILL BECOME THE FINAL REMEDY FOR GROUND WATER REMEDIATION OF THE LANDFILL AND DAC AREAS, IT IS ALSO POSSIBLE THAT FUTURE RODS FOR THIS SITE MAY MODIFY OR EFFECT THIS REMEDY. INFORMATION TO BE GATHERED FROM FUTURE REMEDIAL INVESTIGATIONS AT THIS SITE WILL INCLUDE AN ASSESSMENT OF THE NEED FOR FURTHER GROUND WATER REMEDIATION. FOR EXAMPLE, FUTURE REMEDIAL INVESTIGATIONS MAY DISCLOSE NEW CONTAMINANTS OR MAY REVEAL THAT A GREATER VOLUME OF GROUND WATER IS CONTAMINATED THAN CURRENTLY ESTIMATED. IN THE EVENT THAT NEW INFORMATION AFFECTS THIS SELECTED REMEDY, THEN FUTURE RECORDS OF DECISIONS MAY MODIFY THIS OPERABLE UNIT REMEDIAL ACTION. FOR EXAMPLE, THE LENGTH OF TIME TO PUMP AND TREAT THE GROUND WATER MAY BE EXPANDED OR ADDITIONAL TREATMENT MAY BE NECESSARY. IN ADDITION, FUTURE REMEDIAL ACTION AT THE SITE MAY INCLUDE SOURCE REMOVAL IN THE LANDFILL AND DAC AREAS, AND SUCH REMEDIATION MAY DECREASE THE OVERALL TIME NECESSARY TO PUMP AND TREAT THE CONTAMINATED GROUND WATER. NEVERTHELESS, THE TREATMENT OF THE EXTRACTED GROUND WATER IN THE LANDFILL AND DAC AREAS WILL CONTINUE UNTIL GROUND WATER CONTAMINATED WITH PAHS, BTEX AND CHLORINATED HYDROCARBONS IS REMEDIATED TO THE LEVELS IDENTIFIED HEREIN AS THE CHEMICAL-SPECIFIC ARARS. THEREFORE, IT IS APPROPRIATE TO IDENTIFY THE CONTAMINANT-SPECIFIC ARARS AT THIS TIME.

LOCATION-SPECIFIC ARARS

THE LOCATION-SPECIFIC ARARS FOR THIS OPERABLE UNIT REMEDIAL ACTION ARE IDENTIFIED IN TABLE 5-2. THESE REQUIREMENTS ARE BASED ON THE LOCATION OF THE SITE AND THE EFFECTS THE SITE MAY HAVE ON ITS SURROUNDING ENVIRONMENT. BECAUSE THE SITE IS NEAR THE MISSISSIPPI RIVER AND THE UPPER MISSISSIPPI RIVER WILDLIFE REFUGE (WHERE BALD EAGLES HAVE BEEN LOCATED), THE STANDARDS FOUND IN TABLE 5-2 FOR THE PROTECTION OF A WILDLIFE REFUGE, ENDANGERED SPECIES HABITAT AND FISH AND WILDLIFE ARE RELEVANT AND APPROPRIATE REQUIREMENTS FOR THIS OPERABLE UNIT. BECAUSE THE DISCHARGE OF TREATED GROUND WATER IS DIRECTLY INTO THE MISSISSIPPI RIVER AND THE CONTAMINATED GROUND WATER DISCHARGES DIRECTLY TO CREEKS ADJACENT TO THE SITE, WHICH FLOW TO THE RIVER, THESE REQUIREMENTS ARE RELEVANT AND APPROPRIATE.

ACTION-SPECIFIC ARARS

THE ACTION-SPECIFIC ARARS FOR THIS OPERABLE UNIT REMEDY ARE IDENTIFIED IN TABLE 5-3. THESE ARARS ARE ACTIVITY-BASED REQUIREMENTS OR LIMITATIONS ON ACTIONS TAKEN WITH RESPECT TO THE HAZARDOUS SUBSTANCES FOUND ON THE SITE. THIS OPERABLE UNIT REMEDY INCLUDES THE TREATMENT OF GROUND WATER CONTAMINATED WITH BTEX, PAHS AND CHLORINATED HYDROCARBONS, WHICH IS REGULATED UNDER BOTH THE CLEAN WATER ACT (CWA) AND THE RCRA.

THE SELECTED REMEDY INCLUDES THE PRETREATMENT OF THE CONTAMINATED GROUND WATER USING AN AIR STRIPPER AND AN OVERHEAD ACTIVATED CARBON TREATMENT UNIT. THE CARBON FILTERS MAY CONTAIN HAZARDOUS WASTES AND WILL BE DISPOSED IN ACCORDANCE WITH SUBTITLE C REQUIREMENTS OF RCRA. THE SOURCE OF THESE HAZARDOUS WASTES IS THE CONTAMINATED GROUND WATER, WHICH SEEMS TO BE CONTAMINATED FROM THE DISPOSAL OF CHLORINATED HYDROCARBONS, SUCH AS TCE AND PCE, IN THE LANDFILL. ALTHOUGH THE DISPOSAL OF CHLORINATED HYDROCARBONS IN THE LANDFILL HAS NOT BEEN CONFIRMED, THESE HAZARDOUS SUBSTANCES WERE FOUND IN THE CONTAMINATED GROUND WATER EMANATING FROM THE LANDFILL AND CHLORINATED SOLVENTS WERE USED AT THE FACILITY. THE CHLORINATED HYDROCARBONS FOUND AT THE SITE CONTAIN HAZARDOUS CONSTITUENTS AND ARE SUFFICIENTLY SIMILAR TO HAZARDOUS WASTES THAT THE RCRA REQUIREMENTS WILL BE RELEVANT AND APPROPRIATE FOR DISPOSAL OF THE FILTERS FROM THE PRETREATMENT OF THE CONTAMINATED GROUND WATER.

AFTER PRETREATMENT THE CONTAMINANTS REMAINING IN THE GROUND WATER WILL BE TREATED IN THE EXISTING ONSITE WASTEWATER TREATMENT PLANT, WHICH HAS AN NPDES PERMITTED DISCHARGE TO THE MISSISSIPPI RIVER. BECAUSE THIS DISCHARGE IS OFFSITE, THE NPDES PERMIT REQUIREMENTS ARE LEGALLY APPLICABLE REQUIREMENTS FOR THIS REMEDY. TABLE 5-3 IDENTIFIES THE NPDES REQUIREMENTS ESTABLISHED UNDER THE CWA AND THE IOWA WATER QUALITY LAWS AND REGULATIONS. THE EXISTING NPDES PERMIT LIMITATIONS ARE TO BE CONSIDERED IN THE IMPLEMENTATION OF THIS REMEDY. IN THE EVENT THAT THE EXISTING PERMIT IS MODIFIED UPON REVIEW BY IDNR OR EPA, SUCH MODIFIED PERMIT WOULD BE A LEGALLY APPLICABLE REQUIREMENT FOR THIS REMEDIAL ACTION.

THE SELECTED REMEDY WILL INCLUDE CONSTRUCTION AND OTHER ACTIVITIES SUCH THAT WORKERS WILL BE ONSITE IMPLEMENTING THE REMEDY. OSHA WORKER PROTECTION STANDARDS ARE APPLICABLE REQUIREMENTS FOR THIS ACTION. OSHA STANDARDS ARE ALSO APPLICABLE TO PROTECT WORKERS FROM AIR EMISSIONS FROM THE GROUND WATER TREATMENT AND PRETREATMENT UNITS BECAUSE WORKERS WILL OPERATE AND MAINTAIN THESE UNITS.

THE STATE OF IOWA REGULATES THE CONSTRUCTION OF PRIVATE WATER WELLS, IOWA ADMIN. CODE, CHAPTER 38. SUCH REGULATIONS ARE AN IMPORTANT INSTITUTIONAL CONTROL AND ARE LEGALLY APPLICABLE. THE STATE OF IOWA WILL PREVENT CONSTRUCTION OF SUCH WELLS ON THE SITE AND IN THE VICINITY OF THE GROUND WATER CONTAMINATION UNTIL THE REMEDIATION OF THE GROUND WATER IS COMPLETE.

5.3 COST-EFFECTIVENESS

THE SELECTED REMEDY IS COST-EFFECTIVE. SEE TABLE 5-4 FOR ESTIMATED COST OF THE SELECTED REMEDY. IT PROVIDES OVERALL EFFECTIVENESS PROPORTIONAL TO ITS COSTS SUCH THAT THE REMEDY REPRESENTS A REASONABLE BENEFIT FOR THE COST EXPENDITURES. THE SELECTED REMEDY WILL PROVIDE A REDUCTION IN THE CONTAMINANTS OF CONCERN IN THE GROUND WATER. THE SELECTED REMEDY IS LESS EXPENSIVE THAN THE OTHER ALTERNATIVES EVALUATED, EXCEPT FOR THE NO ACTION ALTERNATIVE. UTILIZATION OF THE EXISTING WASTEWATER TREATMENT PLANT AS PART OF THE SELECTED REMEDY PROVIDES A COST-EFFECTIVE ALTERNATIVE TO THE ALTERNATIVE OF BUILDING A COMPLETELY NEW WASTEWATER TREATMENT PLANT.

5.4 UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT (OR RESOURCE RECOVERY) TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE/PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

THE SELECTED REMEDY WILL PERMANENTLY TREAT, DESTROY, AND DISPOSE OF CONTAMINANTS FOUND IN THE GROUND WATER BY EXTRACTION AND TREATMENT OF GROUND WATER. THE SELECTED REMEDY IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT.

THE AIR STRIPPER WITH OVERHEAD TREATMENT REMOVES THE MAJORITY OF VOLATILE ORGANIC CONTAMINANTS, WHICH WOULD BE STRIPPED FROM THE EXTRACTED GROUND WATER AND ADSORBED ONTO ACTIVATED CARBON. THE SPENT CARBON CONTAINING THE CONTAMINANTS WOULD THEN BE DISPOSED OF OR RECYCLED OFFSITE IN ACCORDANCE WITH RCRA SUBTITLE C. THE REMAINING CONTAMINANTS WOULD THEN BE TREATED IN THE EXISTING PLANT BY VOLATILIZATION, ADSORPTION, AND BIODEGRADATION. THE MAJORITY OF CONTAMINANTS REMAINING FOLLOWING PRETREATMENT WOULD BE SEMI-VOLATILE ORGANICS. THE MAJORITY OF THESE COMPOUNDS WOULD BE DESTROYED BY BIODEGRADATION IN THE EXISTING WASTEWATER TREATMENT PLANT. THE PRETREATMENT UNIT IN CONJUNCTION WITH THE EXISTING TREATMENT PLANT WOULD ACHIEVE COMPLIANCE WITH CURRENT NPDES PERMITTED EFFLUENT LIMITATIONS.

5.5 SIGNIFICANT CHANGES

TWO SIGNIFICANT CHANGES WHICH HAVE BEEN INCORPORATED INTO THIS ROD THAT WERE NOT DISCUSSED IN THE PROPOSED PLAN AND RI/FS REPORTS. THESE CHANGES HAVE TO DO WITH ARARS THAT AFFECT THE PERFORMANCE OF THIS REMEDIAL ACTION.

THE FIRST CHANGE IS IN REGARD TO THE NEW ADMINISTRATIVE REGULATIONS ESTABLISHED BY THE STATE OF IOWA THAT BECAME EFFECTIVE ON AUGUST 16, 1989. ACCORDING TO THE IOWA ADMIN. CODE, CHAPTER 133, THE HIERACHY OF GROUND WATER CLEANUP ACTION LEVELS HAVE BEEN ESTABLISHED AS THE HEALTH ADVISORY LEVEL, THE NEGLIGIBLE RISK LEVEL, AND THE MCL. THE RULE WAS NOT EFFECTIVE AT THE TIME THE PROPOSED PLAN AND RI/FS WERE AVAILABLE FOR PUBLIC COMMENT. EPA CONSIDERS THE IDNR ACTION LEVELS TO BE APPLICABLE REQUIREMENTS FOR GROUND WATER CLEANUP AND LISTED THESE LEVELS ON TABLE 5-1, CHEMICAL-SPECIFIC ARARS, HEREIN.

SECOND, IN REGARD TO THE PAH CONTAMINANTS, EPA BELIEVES THAT THE DETECTION LIMIT OF 10 UG/L IS AN ACCEPTABLE ACTION LEVEL FOR THE PAH COMPOUNDS FOUND AT THIS SITE. EPA HAS USED 10 UG/L AS A GROUND WATER CLEANUP VALUE AT OTHER SUPERFUND SITES. THIS IS ALSO DISCUSSED IN SECTION 5.2, ATTAINMENT OF ARARS, HEREIN.

#RS

RESPONSIVENESS SUMMARY OF THE RECORD OF DECISION

1.1 OVERVIEW

THE PROPOSED PLAN, RI/FS REPORTS AND ADMINISTRATIVE RECORD WERE AVAILABLE FOR PUBLIC COMMENT FROM JULY 24 THROUGH AUGUST 23, 1989. A PUBLIC MEETING WAS ALSO HELD ON AUGUST 14 IN THE CLINTON, IOWA CITY HALL. COMMENTS RECEIVED FROM THE LOCAL COMMUNITY, BOTH IN WRITING AND DURING THE PUBLIC MEETING, WERE DIRECTED TOWARD ISSUES INVOLVING THE EFFECT OF THE SITE ON HUMAN HEALTH AND THE ENVIRONMENT IN GENERAL AND NOT ON THE REMEDIAL ALTERNATIVES PRESENTED IN THE PROPOSED PLAN. THE TRANSCRIPT FROM THE PUBLIC MEETING IS AVAILABLE WITH THE ADMINISTRATIVE RECORD. THE LOCAL COMMUNITY, THEREFORE, DID NOT EXPRESS A PREFERENCE NOR INDICATE ANY ADVERSITY TO EPA'S PREFERRED ALTERNATIVE 2. THE POTENTIALLY RESPONSIBLE PARTIES (PRPS), HOWEVER, INDICATED THAT THEY WOULD PREFER THAT THE SELECTION OF EITHER ALTERNATIVE 2 OR 3 BE POSTPONED UNTIL THE DESIGN PHASE.

1.2 BACKGROUND ON COMMUNITY INVOLVEMENT

AS PART OF THE COMMUNITY RELATIONS PROCESS, WHICH INCLUDED INTERVIEWS OF THE LOCAL COMMUNITY AND PREPARATION OF A COMMUNITY RELATIONS PLAN, SEVERAL MAJOR COMMUNITY CONCERNS WERE IDENTIFIED.

THE CHEMPLEX SITE IS LOCATED IN A RURAL AREA, APPROXIMATELY 5 MILES WEST OF THE CITIES OF CLINTON AND CAMANCHE, IOWA. IN ADDITION, ANOTHER NPL SITE, THE DUPONT/TODTZ LANDFILL SITE, IS LOCATED APPROXIMATELY ONE MILE FROM CHEMPLEX. THEREFORE, CITIZENS WHO LIVE IN THE SURROUNDING AREA HAVE EXPRESSED CONCERN THAT THE PROXIMITY OF THE SITES TO THEIR PROPERTY HAS CAUSED THEIR PROPERTY VALUES TO DECLINE.

THE LOCAL COMMUNITY ALSO EXPRESSED CONCERN REGARDING ADVERSE IMPACTS THAT THE TWO SITES, AS WELL AS OTHER INDUSTRIES IN THE COMMUNITY, MIGHT HAVE ON THEIR DRINKING WATER WELLS AND AIR QUALITY. SOME OF THE MEMBERS OF THE LOCAL COMMUNITY HAD CONCERNS REGARDING THE CONCENTRATIONS OF CONTAMINANTS IN THEIR DRINKING WATER WELLS AND THE POTENTIAL ADVERSE HEALTH EFFECTS FROM DRINKING GROUND WATER THAT HAD CONCENTRATIONS EXCEEDING FEDERAL STANDARDS.

RESPONSE: DURING THE PUBLIC MEETING, SEVERAL OF THESE CONCERNS WERE RAISED AND EPA RESPONDED TO THEM.

REGARDING THE POTENTIAL DECLINE OF PROPERTY VALUES AND THE EFFECT OF CONTAMINATION ON AN INDIVIDUAL'S PROPERTY, THE INDIVIDUAL MAY PURSUE A PRIVATE ACTION AGAINST THE COMPANY CAUSING THIS CONTAMINATION. THIS IS DISCUSSED ON PAGE 46 OF THE PUBLIC MEETING TRANSCRIPT.

REGARDING THE CITIZENS' CONCERNS OF THE NATURE AND EXTENT OF CONTAMINATION, EPA MADE THE FOLLOWING POINTS DURING THE MEETING:

THE OPERABLE UNIT REMEDY IS THE FIRST STEP IN DEALING WITH THE PROBLEM THAT EXISTS AT THE CHEMPLEX SITE. THIS WILL ACCOMPLISH EXTRACTION AND TREATMENT OF THE CONTAMINATED GROUND WATER PLUMES IN THE LANDFILL AND DAC AREAS TO CONTROL THE PLUMES OF CONTAMINATION. FURTHER REMEDIAL ACTIONS WILL BE UNDERTAKEN TO DEAL WITH THE LANDFILL AND DAC AREAS SOILS AND WASTES AS WELL AS FURTHER GROUND WATER EXTRACTION AND TREATMENT.

THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) WAS ENACTED TO CONTROL THE GENERATION, TRANSPORT AND MANAGEMENT OF HAZARDOUS WASTES. AS A RESULT, THERE HAS BEEN A MINIMIZATION OF THE AMOUNT OF WASTE THAT IS BEING GENERATED AT THIS SITE. THIS IS DISCUSSED ON PAGE 48 OF THE PUBLIC MEETING TRANSCRIPT.

REGARDING THE GROUND WATER CONTAMINATION IN THE LANDFILL AND DAC AREAS, THE CONCENTRATIONS OF CONTAMINANTS, SUCH AS BENZENE AND TRICHLOROETHYLENE, EXCEED HUMAN HEALTH AND ENVIRONMENTAL STANDARDS AND CRITERIA (SUCH AS MCLS) IN THE GROUND WATER PLUMES OF CONTAMINATION. THE PLUMES OF CONTAMINATION HAVE BEEN INITIALLY DEFINED. ALSO, ANALYTICAL RESULTS FROM SAMPLES COLLECTED FROM DRINKING WATER WELLS AT THE CLOSEST RESIDENCES IN THE DOWNGRAIDENT PLUME DIRECTION INDICATE THAT THESE RESIDENTIAL WELLS ARE NOT CONTAMINATED. THEREFORE, NO INDIVIDUALS ARE PRESENTLY DRINKING CONTAMINATED GROUND WATER FROM THESE PLUMES.

ONE OF THE LOCAL CITIZENS EXPRESSED A CONCERN THAT TCE HAS BEEN DETECTED IN HER DRINKING WATER WELL AT 5 PPB, WHICH IS THE MCL VALUE. AT THE MEETING, DAN HARPER OF ATSDR DISCUSSED THE SIGNIFICANCE OF INGESTING GROUND WATER AT THIS CONCENTRATION AND THE BASIS OF THE MCL VALUE. MR. HARPER STATED THAT INGESTING WATER AT THIS LEVEL IS EXPECTED TO CAUSE AN ADDITIONAL ONE IN 100,000 CANCER RISK DURING A LIFETIME EXPOSURE (70 YEARS) TO TCE AT A CONCENTRATION OF 5 PPB. THE EFFECT OF THE ADDITIONAL INCREASE OF CANCER RISK SHOULD, THEREFORE, NOT BE A PROBLEM OVER A PERIOD OF SEVERAL WEEKS OR SEVERAL YEARS. THIS RESPONSE IS DISCUSSED FURTHER ON PAGE 29 OF THE PUBLIC MEETING TRANSCRIPT.

1.3 SUMMARY OF PUBLIC COMMENTS AND LEAD AGENCY RESPONSES

THE FOLLOWING COMMENTS WERE RECEIVED ON THE PROPOSED PLAN AND RI/FS REPORTS. THE FIRST SET OF COMMENTS ARE FROM POTENTIALLY RESPONSIBLE PARTIES FOR THE SITE:

1. REGARDING NUMBER AND PLACEMENT OF EXTRACTION WELLS AND EXTRACTION CAPACITY IN THE OVERBURDEN AND IN THE LANDFILL AREA, AND BEDROCK AQUIFERS IN THE DAC AREAS, THE PRPS SUGGEST THAT NOT ENOUGH INFORMATION IS AVAILABLE TO DETERMINE THE NUMBER AND PLACEMENT OF EXTRACTION WELLS AND EXTRACTION CAPACITY IN THESE TWO AREAS.

RESPONSE: THE PROPOSED PLAN ACKNOWLEDGED THAT THE FINAL NUMBER, LOCATIONS, AND EXTRACTION CAPACITY OF THE WELLS WOULD BE DETERMINED DURING THE DESIGN PHASE. ADDITIONAL INFORMATION WILL BE DEVELOPED DURING THE REMEDIAL DESIGN TO DETERMINE THE NUMBER, LOCATION AND CAPACITY OF THE EXTRACTION WELLS.

2. THE FOCUSED FEASIBILITY STUDY USED INAPPROPRIATE TREATMENT SYSTEMS FOR A COMPARATIVE ANALYSIS OF ALTERNATIVES.

RESPONSE: SEE RESPONSE TO #3 BELOW.

3. THERE IS NO BASIS IN THE ADMINISTRATIVE RECORD FOR PRESELECTING EITHER A PRETREATMENT UNIT IN SERIES WITH THE EXISTING PLANT OR A NEW TREATMENT PLANT.

RESPONSE: THE FOCUSED FS CLEARLY INDICATES THAT COLLECTION OF ADDITIONAL DATA DURING REMEDIAL DESIGN MAY INDICATE THAT THE PROPOSED ALTERNATIVE MAY BE MODIFIED. THIS PROVIDES FLEXIBILITY TO UTILIZE DATA OBTAINED DURING THE REMEDIAL DESIGN PHASE TO REEVALUATE THE REMEDIAL ACTION, IF NECESSARY.

THE PHASE II RI/FS PREPARED BY THE PRPS CONCLUDED THAT THE EXTRACTED GROUND WATER SHOULD BE TREATED USING THE EXISTING WASTEWATER TREATMENT PLANT ONLY. IT WAS DETERMINED BY THE AGENCY THAT ELEVATED LEVELS OF VOLATILE ORGANICS (SPECIFICALLY TETRACHLOROETHYLENE AND BENZENE) WOULD CAUSE INCREASED PLANT AIR EMISSIONS AND POTENTIALLY WOULD CAUSE EXCEEDANCE OF THE EXISTING NPDES PERMITTED EFFLUENT LEVELS. DUE TO THE FACT THAT THE PHASE II RI/FS FAILED TO CONSIDER THE EFFECT OF THE ELEVATED LEVELS OF VOLATILE ORGANICS AND THE EFFECT OF THESE COMPOUNDS ON THE PERFORMANCE OF THE EXISTING PLANT, THE FOCUSED FS WAS UNDERTAKEN TO EVALUATE TREATMENT SYSTEMS TO TAKE INTO ACCOUNT THE ELEVATED LEVELS OF VOLATILE ORGANICS IN THE GROUND WATER. IT IS ALSO IMPORTANT TO EMPHASIZE THAT THE TREATMENT SYSTEMS FOR PRETREATMENT AND A NEW PLANT WERE SELECTED

TO PROVIDE A BASIS FOR COMPARISON OF ALTERNATIVES. THE FOCUSED FS CLEARLY INDICATES THAT ADDITIONAL INVESTIGATION WORK MAY PROVIDE ADDITIONAL INFORMATION WHICH WOULD WARRANT THE MODIFICATION OF THE SELECTED REMEDIAL ALTERNATIVE.

THE PRPS ALSO STATED IN THEIR COMMENTS THAT "THE MEANS TO ACCOMPLISH TREATMENT CANNOT BE DETERMINED AT THIS TIME," HOWEVER, THE PHASE II RI/FS MAKES THE DETERMINATION THAT IT IS APPROPRIATE AT THIS TIME TO TREAT THE EXTRACTED GROUND WATER BY USING THE EXISTING PLANT ONLY.

THE FOCUSED FS ESTABLISHED A DESIGN BASIS IN WHICH TO EVALUATE ALL THE ALTERNATIVES BASED ON AVAILABLE DATA. IT WAS ESTIMATED BASED ON THE CURRENT UNDERSTANDING OF THE HYDROGEOLOGIC SYSTEM THAT THE EXTRACTION AND TREATMENT OF APPROXIMATELY 140 GPM FROM THE TWO AREAS WOULD BE REQUIRED TO MEET THE OBJECTIVE OF THE OPERABLE UNIT GROUND WATER REMEDY OF CONTROLLING THE PLUMES OF CONTAMINATION. IT IS IMPORTANT TO EMPHASIZE THAT THE ALTERNATIVES WERE EVALUATED USING THIS ESTABLISHED DESIGN BASIS AND THE FOCUSED FS CLEARLY INDICATES THIS. THE PHASE II RI/FS USED A SIMILAR DESIGN BASIS TO RECOMMEND TREATMENT AT THE EXISTING PLANT ONLY. THE PRPS STATE IN THEIR COMMENTS THAT "IT IS PREMATURE TO SELECT PRETREATMENT RATHER THAN THE CONSTRUCTION OF A NEW TREATMENT FACILITY," HOWEVER, THEY DID NOT SIMILARLY CONSIDER IT PREMATURE TO RECOMMEND TREATMENT AT THE EXISTING PLANT ONLY AS OPPOSED TO A NEW PLANT.

THE AGENCY BELIEVES THAT SUFFICIENT INFORMATION IS AVAILABLE IN THE ADMINISTRATIVE RECORD TO CONCLUDE THAT TREATMENT AT THE EXISTING PLANT ONLY WILL NOT BE ADEQUATE TREATMENT. IN ADDITION, THE AGENCY BELIEVES THAT PRETREATMENT IS REQUIRED IF THE EXISTING PLANT IS TO BE USED TO TREAT EXTRACTED GROUND WATER. IF SIGNIFICANT INFORMATION IS DISCOVERED DURING REMEDIAL DESIGN THAT INDICATES THE EXISTING PLANT WILL NOT HAVE THE CAPACITY TO HANDLE THE ADDITIONAL LOAD, THE SELECTED REMEDY MAY BE MODIFIED AND EPA MAY REEVALUATE THE REMEDIAL ACTION. THIS WAS CLEARLY INDICATED IN BOTH THE PROPOSED PLAN AND THE FOCUSED FS.

4. THE PRPS SUGGESTED THAT MCLS ARE NOT LEGALLY APPLICABLE NOR RELEVANT AND APPROPRIATE ARARS FOR THIS OPERABLE UNIT REMEDIAL ACTION. THE PRPS ALSO STATE THAT THIS IS AN "INTERIM" GROUND WATER REMEDY.

RESPONSE: THE MCLS PROMULGATED UNDER THE FEDERAL SAFE DRINKING WATER ACT (SDWA) WERE ESTABLISHED FOR PROTECTION OF HUMAN HEALTH. THE MCLS ARE LEGALLY APPLICABLE TO REGULATE WATER SUPPLY SYSTEMS FOR 25 PEOPLE OR MORE. IN ACCORDANCE WITH EPA GUIDANCE, MCLS ARE RELEVANT AND APPROPRIATE CLEANUP REQUIREMENTS FOR GROUND WATERS AT SITES THAT ARE A CURRENT AND/OR POTENTIAL SOURCE OF DRINKING WATER. AT THE CHEMPLEX SITE, THE AQUIFERS ARE CURRENT AND POTENTIAL SOURCES OF DRINKING WATER.

THIS OPERABLE UNIT GROUND WATER REMEDY IS NOT AN "INTERIM" REMEDY BUT IT IS THE FIRST STAGE OF THE REMEDIAL PROCESS FOR THE CHEMPLEX SITE. ADDITIONAL REMEDIATION MAY INCLUDE CLEANUP OF THE SOILS AND WASTES ON THE CHEMPLEX SITE AS WELL AS ADDITIONAL GROUND WATER REMEDIATION. THE MCLS AS GOALS ARE RELEVANT AND APPROPRIATE.

5. THE PRPS COMMENTED THAT THE CLEAN AIR ACT REGULATIONS ARE NOT LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FOR GROUND WATER TREATMENT.

RESPONSE: THE EPA AGREES THAT THE CLEAN AIR ACT (CAA) IS NOT AN ARAR FOR THIS SITE. HOWEVER, THIS REMEDY MUST MEET THE NINE CRITERIA FOR SELECTION OF A REMEDY. THE MOST IMPORTANT OF THE NINE CRITERIA IS PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. THEREFORE, AIR DISPERSION MODELING AND A RISK ASSESSMENT WILL BE CONDUCTED FOR ANY TREATMENT UNIT THAT MIGHT RELEASE HAZARDOUS SUBSTANCES INTO THE AIR.

CONCERN WITH PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT FOR THE AIR PATHWAY OF EXPOSURE HAS PROMPTED FEDERAL AND STATE AGENCIES TO PROPOSE AIR REGULATIONS. THEREFORE, BOTH FEDERAL AND

STATE AIR REGULATIONS FOR WASTEWATER TREATMENT UNITS MAY BE PROMULGATED IN THE FUTURE.

6. THE FOCUSED FEASIBILITY STUDY DOES NOT MENTION OR CONSIDER THE INSTITUTIONAL CONTROL ON GROUND WATER USE PROVIDED BY THE IOWA ENVIRONMENTAL ACT.

RESPONSE: THE IOWA ENVIRONMENTAL ACT WAS INCLUDED AS AN ARAR IN THE PROPOSED PLAN AND IS INCLUDED AS AN ARAR IN THE ROD.

7. TWO OF THE POTENTIAL ARARS LISTED IN TABLE 2 OF THE FOCUSED FEASIBILITY STUDY DO NOT APPEAR TO BE APPROPRIATE FOR THIS SITE: THE ENDANGERED SPECIES ACT AND THE WILDLIFE REFUGE SYSTEM RESTRICTIONS.

RESPONSE: THE LOCATION-SPECIFIC ARARS FOR THIS OPERABLE UNIT ARE IDENTIFIED IN TABLE 5-2. THESE REQUIREMENTS WERE SELECTED BASED ON THE LOCATION OF THE SITE AND THE EFFECTS THE SITE MAY HAVE ON ITS SURROUNDING ENVIRONMENT. BECAUSE THE SITE IS NEAR THE MISSISSIPPI RIVER AND THE UPPER MISSISSIPPI RIVER WILDLIFE REFUGE (WHERE BALD EAGLES HAVE BEEN LOCATED), THE STANDARDS FOUND IN TABLE 5-2 FOR THE PROTECTION OF WILDLIFE REFUGE, ENDANGERED SPECIES HABITAT AND FISH AND WILDLIFE ARE RELEVANT AND APPROPRIATE REQUIREMENTS FOR THIS OPERABLE UNIT. THESE REQUIREMENTS MAY NOT BE LEGALLY APPLICABLE BECAUSE THE DISCHARGE OF TREATED GROUND WATER IS TO THE MISSISSIPPI RIVER (NOT DIRECTLY TO THE WILDLIFE REFUGE). NEVERTHELESS, THESE REQUIREMENTS ARE RELEVANT AND APPROPRIATE.

8. THE PRPS COMMENTED THAT TABLE 4 OF THE FOCUSED FEASIBILITY STUDY STATES THAT THERE IS "NO REDUCTION IN RISK" UNDER THE NO ACTION ALTERNATIVE. HOWEVER, AS PREVIOUSLY STATED, THERE IS PRESENTLY NO KNOWN EXPOSURE VIA INGESTION OR GROUND WATER CONTAMINATED FROM THE SITE.

RESPONSE: BOTH THE RI/FS AND EA REPORTS PREPARED BY THE PRPS DID NOT ADDRESS THE POTENTIAL RISK FROM INGESTION OF GROUND WATER, WHICH IS A DRINKING WATER SOURCE. THE NO ACTION ALTERNATIVE WOULD NOT CONTAIN ANY PROVISIONS TO CONTROL THE CONTAMINANT PLUMES. THEREFORE, RESIDENTS NEAR THE SITE IN THE DIRECTION OF GROUND WATER FLOW COULD SOME DAY BE DRINKING GROUND WATER AS CONTAMINATED AS THE PLUMES IF THE NO ACTION ALTERNATIVE IS INCORPORATED. EVEN IF INSTITUTIONAL CONTROLS ARE IMPLEMENTED WITH THE NO ACTION ALTERNATIVE, THIS WOULD NOT BE RESPONSIVE BECAUSE THE PLUMES COULD STILL MIGRATE TO THE RESIDENTIAL WELLS.

THE STATEMENT THAT..."THERE IS NO REDUCTION IN RISK UNDER THE NO ACTION ALTERNATIVE" IS CORRECT.

9. THE PRPS COMMENTED THAT AN NPDES PERMIT WOULD NOT NECESSARILY BE REQUIRED FOR THE DISCHARGE OF TREATED GROUND WATER BECAUSE THE DISCHARGE IS NEAR THE SITE.

ON PAGES 4, 10, AND THROUGHOUT THE DOCUMENT, THE FOCUSED FEASIBILITY STUDY STATES THAT AN NPDES PERMIT WOULD BE REQUIRED FOR A NEW TREATMENT PLANT BUILT AT THE SITE. ACCORDING TO SECTION 121(E) OF CERCLA, "NO FEDERAL, STATE OR LOCAL PERMIT SHALL BE REQUIRED FOR THE PORTION OF ANY REMOVAL OR REMEDIAL ACTION CONDUCTED ENTIRELY ONSITE..." THE PREAMBLE TO SUBPART E OF THE PROPOSED NCP (53 FR 51394) SAYS THAT EPA'S INTERPRETATION OF "ONSITE" FURTHER INCLUDES SITUATIONS WHERE THE REMEDIAL ACTIVITY OCCURS ENTIRELY ONSITE BUT THE EFFECTS OF SUCH ACTIVITY CANNOT BE STRICTLY LIMITED TO THE SITE. FOR EXAMPLE, A DIRECT DISCHARGE OF CERCLA WASTEWATER WOULD BE AN ONSITE ACTIVITY IF THE RECEIVING WATER BODY IS IN THE AREA OF CONTAMINATION OR IS IN VERY CLOSE PROXIMITY TO THE SITE, EVEN IF THE WATER FLOWS OFFSITE. AN ACTUAL NPDES PERMIT MAY NOT BE REQUIRED; RATHER, ONLY THE SUBSTANTIVE REQUIREMENTS OF THE DISCHARGE PERMIT MAY HAVE TO BE MET.

RESPONSE: IT SHOULD BE NOTED THAT TABLES E1 AND E6 OF THE EXECUTIVE SUMMARY OF THE PRP'S PHASE II REMEDIAL INVESTIGATION: VOLUME II, STATE THAT THE "CLEAN WATER ACT: DISCHARGE OF TREATED GROUND WATER TO SURFACE WATER MUST MEET NPDES LIMITS". THE DISCHARGE IS PRESENTLY REGULATED

UNDER THE NPDES PROGRAM AND IT IS AN OFFSITE DISCHARGE. THE EXCEPTION TO THIS RULE, SET FORTH IN SECTION 121(E) OF CERCLA, 42 USC SS 9621(E), APPLIES ONLY TO ONSITE DISCHARGES. FINALLY, THE INTERPRETATION OF "ONSITE" ACTION RECITED IN THE COMMENT IS FROM THE PROPOSED NCP, WHICH HAS NOT BEEN PROMULGATED.

10. THE FOCUSED FEASIBILITY STUDY DREW CONCLUSIONS REGARDING PRETREATMENT LIMITS AND THE EFFECTIVENESS OF TREATMENT FROM EXTREMELY LIMITED DATA ON THE NATURE OF PROCESS WASTEWATER.

RESPONSE: WE RECOGNIZE THAT THE CONCENTRATIONS OF 1000 PPB FOR BENZENE AND 10,000 PPB NAPHTHALENE ARE BASED ON A ONE TIME EVENT AND MAY NOT REFLECT FLUCTUATIONS IN THE COMPOSITION OF INDUSTRIAL WASTEWATER. THIS IS THE BEST INFORMATION AVAILABLE AT THIS TIME IN REGARD TO CALCULATION OF ESTIMATED EFFLUENT CONCENTRATIONS. IN ADDITION, IT IS IMPORTANT TO NOTE THAT QUANTUM DOES HAVE A PLANT WIDE COMMITMENT TO KEEP THE BENZENE CONCENTRATIONS IN THE INFLUENT WASTEWATER TO NO GREATER THAN 1000 PPB. THE USE OF THE L000 PPB SHOULD PROVIDE A CONSERVATIVE ESTIMATE OF THE BENZENE CONCENTRATIONS IN THE INFLUENT. IN CONCLUSION, THE CALCULATIONS REGARDING PRETREATMENT LIMITS ARE ACCURATE AND ARE BASED ON THE BEST AVAILABLE INFORMATION.

11. THE PRPS COMMENTED THAT THE FOCUSED FEASIBILITY STUDY DISCUSSED SEVERAL DESIGN POINTS WHICH CAN BE ADDRESSED MORE APPROPRIATELY AND COMPLETELY DURING REMEDIAL DESIGN INCLUDING EFFLUENT LIMITS FOR PRETREATMENT.

RESPONSE: A PRETREATMENT SYSTEM SHOULD BE ABLE TO REMOVE 99 PERCENT OF THE VOLATILE ORGANIC COMPOUNDS WHICH WOULD LIKELY BE BELOW THE CONCENTRATIONS IN THE PROCESS WASTEWATER FROM QUANTUM. IN ANY EVENT, NEITHER THE PROPOSED PLAN OR ROD SPECIFY THAT A PRETREATMENT UNIT MUST ACHIEVE CONCENTRATIONS LOWER THAN THE INFLUENT TO THE WASTEWATER TREATMENT PLANT FROM QUANTUM. THE EFFLUENT LIMITS FOR PRETREATMENT WILL BE MORE FULLY ADDRESSED DURING THE DESIGN PHASE.

THE FOLLOWING COMMENTS WERE RECEIVED FROM THE LOCAL CITIZENS DURING THE PUBLIC MEETING.

1. DURING THE PUBLIC MEETING, ONE MEMBER OF THE LOCAL COMMUNITY EXPRESSED CONCERN REGARDING THE LENGTH OF TIME (FIVE YEARS) FROM WHEN THE SITE WAS PROPOSED FOR THE NPL UNTIL THE START OF CLEANUP, WHICH IS JUST TO BEGIN.

RESPONSE: EPA EXPLAINED DURING THE PUBLIC MEETING THAT THERE IS A PRIORITY SYSTEM ESTABLISHED FOR RESPONDING TO SUPERFUND SITES. THERE IS LIMITED MONEY AND RESOURCES TO BE ABLE TO RESPOND TO ALL OF THESE SITES AT ONCE. REFER TO PAGE 38 OF THE PUBLIC MEETING TRANSCRIPT FOR MORE EXPLANATION.

2. ONE OF THE LOCAL CITIZENS ASKED WHETHER THE DRAWDOWN CAUSED BY THE PROPOSED EXTRACTION WELLS WOULD INFLUENCE THE AMOUNT OF WATER AVAILABLE FOR THE SURROUNDING DRINKING WATER WELLS.

RESPONSE: THERE WILL STILL BE SUFFICIENT WATER AVAILABLE FOR DRINKING WATER PURPOSES. FOR MORE DISCUSSION, REFER TO PAGE 40 OF THE PUBLIC MEETING TRANSCRIPT.

3. ONE OF THE LOCAL CITIZENS ASKED IF THE NPDES DISCHARGE WAS EVER MONITORED BY EPA.

RESPONSE: THE WATER FROM THE NPDES DISCHARGE IS MONITORED BY THE IOWA DEPARTMENT OF NATURAL RESOURCES (IDNR). THE NPDES PROGRAM HAS BEEN DELEGATED TO IDNR BY EPA.

4. ONE OF THE LOCAL CITIZENS HAD A QUESTION REGARDING THE WATER QUALITY OF THE DRINKING WATER SUPPLY WELLS LOCATED AT THE QUANTUM CHEMICAL COMPANY (FORMERLY CHEMPLEX) PLANT.

RESPONSE: THE EPA RESPONDED THAT THE WATER SUPPLY WELLS ARE MUCH DEEPER THAN THE CONTAMINATED GROUND WATER PLUMES, AND, THEREFORE, DID NOT ANTICIPATE THAT THE WATER SUPPLY WELLS WOULD BE

CONTAMINATED. BOB SCHULER OF QUANTUM ALSO RESPONDED THAT THE WATER SUPPLY WELLS HAVE BEEN SAMPLED AND THAT THE ANALYSIS INDICATE THAT THE WATER SUPPLY WELLS WERE NOT CONTAMINATED. THESE RESPONSES ARE LISTED ON PAGE 53 AND 54 OF THE PUBLIC MEETING TRANSCRIPT. IT SHOULD BE NOTED THAT THIS GROUND WATER OPERABLE UNIT REMEDY SHOULD PREVENT MIGRATION TO THE DEEPER AQUIFERS.

5. ONE OF THE LOCAL CITIZENS ASKED IF THE FRACTURES IN THE BEDROCK COULD CAUSE THE MONITORING TO BE INEFFECTIVE IN DETECTING SOME OF THE CONTAMINATION.

RESPONSE: THE MONITORING WELLS ARE SCREENED TO COVER A LARGE AREA AS OPPOSED TO ONE PARTICULAR ELEMENT OF THE GROUND WATER. ALSO, THE FRACTURED BEDROCK HYDROGEOLOGY IS TAKEN INTO ACCOUNT FOR PLACEMENT OF MONITORING WELLS AND EXTRACTION WELLS. THEREFORE, THE EPA IS SATISFIED THAT THE EXTRACTION WELLS WILL BE PLACED TO PREVENT CONTAMINATION FROM MIGRATING FURTHER. THIS IS ALSO DISCUSSED ON PAGES 56 AND 57 OF THE PUBLIC MEETING TRANSCRIPT.

6. ONE OF THE LOCAL CITIZENS ASKED WHEN THE REMEDIAL ACTION (PLACEMENT OF EXTRACTION WELLS) WOULD BEGIN.

RESPONSE: THE EPA ANTICIPATES THAT ADDITIONAL MONITORING WELLS TO DELINEATE THE EXTENT OF CONTAMINATION CAN BEGIN IN FALL 1989 AND THAT THE EXTRACTION AND TREATMENT PROCESS WILL START DURING THE NEXT CONSTRUCTION SEASON. REFER ALSO TO PAGE 65 AND 66 OF THE PUBLIC MEETING TRANSCRIPT.

TABLE 1

**GROUPING OF BEDROCK MONITORING WELLS
BY SCREENED INTERVAL**

SHALLOW BEDROCK ZONE A (SCREENED ELEVATIONS 598 TO 629 FT. MSL)

MW-2B
MW-5C
MW-9B
MW-10B
MW-11B
MW-12B
MW-12C
MW-19B
MW-20B
MW-121B

INTERMEDIATE BEDROCK ZONE B (SCREENED ELEVATIONS 567 TO 598 FT. MSL)

MW-2C
MW-9C
MW-10B
MW-11B
MW-13B
MW-17B
MW-18B
MW-19C
MW-21C

DEEP BEDROCK ZONE C (SCREENED ELEVATIONS 522 TO 555 FT. MSL)

MW-13C
MW-17C
MW-18C
MW-19D
MW-20C
MW-21D

DEEPEST BEDROCK ZONE D (SCREENED ELEVATIONS 484 TO 520 FT. MSL)

MW-13D
MW-17D
MW-18D
MW-20D

TABLE 1 - 4
GROUND WATER CONCENTRATIONS (UG/L) OF CONTAMINANTS
OBSERVED IN MONITORING WELLS

CONTAMINANTS	MAXIMUM IN	MAXIMUM IN DAC AREA
BENZENE	96,000	244,000
ETHYLENEBENZENE	2,780	1,150
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)	1,821	13,800
TETRACHLOROETHYLENE	50,000	190
TOLUENE	10,300	27,600
TRICHLOROETHYLENE	3,700	52
1,2-DICHLOROETHYLENE	3,800	100

CONTAMINANTS	CRITERIA
BENZENE	5 (A)
ETHYLENEBENZENE	700 (B)
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)	0.20 (C)
TETRACHLOROETHYLENE	5 (B)
TOLUENE	2000 (B)
TRICHLOROETHYLENE	5 (A)
1,2-DICHLOROETHYLENE	100 (D)

(A) - MAXIMUM CONTAMINANT LEVEL (MCL) ESTABLISHED BY THE SAFE DRINKING WATER ACT.

(B) - PROPOSED MAXIMUM CONTAMINANT LEVEL ESTABLISHED BY THE SAFE DRINKING WATER ACT.

(C) - CRITERIA FROM THE 1970 WORLD HEALTH ORGANIZATION EUROPEAN STANDARDS FOR DRINKING WATER BASED ON A COMPOSITE ANALYSIS OF SIX PAHS.

REFERENCE: HANDBOOK OF TOXIC AND HAZARDOUS CHEMICALS AND CARCINOGENS; SECOND EDITION BY MARSHALL SITTIG.

(D) - US EPA OFFICE OF DRINKING WATER HEALTH ADVISORY LEVEL (HAL).

TABLE 3 - 1
COST ESTIMATES

ALTERNATIVE	IMPLEMENTATION TIME	CAPITAL COST (A)
NO ACTION 1	0	0
ALTERNATIVE 2	16	552,000
ALTERNATIVE 3	20	1,140,000
	ANNUAL O & M	ANNUAL O & M 30 YEAR PRESENT WORTH
NO ACTION 1	0	0
ALTERNATIVE 2	219,000	2,070,200
ALTERNATIVE 3	353,200	3,329,000

TOTAL PRESENT VALUE (A + C)

NO ACTION 1	0
ALTERNATIVE 2	2,622,200
ALTERNATIVE 3	4,469,600

ASSUMPTIONS: INTEREST RATE 10%
NUMBER OF YEARS 30
NO MAJOR EQUIPMENT REPLACEMENT

TABLE 5 - 1
CHEMICAL-SPECIFIC ARARS

	HAL (UG/L)	NRL (UG/L)	SDWA MCLS (UG/L)
BTEX COMPOUNDS			
BENZENE	*	1	5
TOLUENE	2,000	*	*
ETHYL BENZENE	700	*	*
XYLENES	10,000	*	*

SDWA PROPOSED
MCLS (UG/L)

BTEX COMPOUNDS	
BENZENE	*
TOLUENE	2,000
ETHYL BENZENE	700
XYLENES	10,000

TABLE 5 - 1 (CONT)

CWA - WATER QUALITY CRITERIA PROTECTION OF HUMAN HEALTH

	WATER AND FISH INGESTION (UG/L)	FISH (ONLY) CONSUMPTION (UG/L)
BTEX COMPOUNDS		
BENZENE	0.66	*
TOLUENE	14,000	420,000
ETHYL BENZENE	1,400	3,300
XYLENES	*	*

CWA - AMBIENT WATER QUALITY/PROTECTION
OF AQUATIC LIFEFRESHWATER ACUTE/CHRONIC
(UG/L)

BTEX COMPOUNDS	
BENZENE	5,300/*
TOLUENE	17,000/*
ETHYL BENZENE	32,000/*
XYLENES	*

CHLORINATED HYDROCARBON COMPOUNDS

	HAL (UG/L)	NRL (UG/L)	SDWA MCLS (UG/L)
TETRACHLOROETHYLENE	10	*	*
TRICHLOROETHYLENE	*	3	5
1,1-DICHLOROETHYLENE	7	*	7
1,2-DICHLOROETHYLENE	70	*	*

TABLE 5 - 1 (CONT)

	SDWA PROPOSED MCLS (UG/L)
TETRACHLOROETHYLENE	5
TRICHLOROETHYLENE	
1,1-DICHLOROETHYLENE	
1,2-DICHLOROETHYLENE	100

CWA - WATER QUALITY CRITERIA
PROTECTION OF HUMAN HEALTH

	WATER AND FISH INGESTION (UG/L)	FISH (ONLY) CONSUMPTION (UG/L)
TETRACHLOROETHYLENE	0.8	8.9
TRICHLOROETHYLENE	2.7	81
1,1-DICHLOROETHYLENE	3,100	*
1,2-DICHLOROETHYLENE	*	*

CWA - AMBIENT WATER QUALITY/PROTECTION
OF AQUATIC LIFE

FRESHWATER ACUTE/CHRONIC
(UG/L)

TETRACHLOROETHYLENE	5,200/840
TRICHLOROETHYLENE	45,000/21,000
1,1-DICHLOROETHYLENE	11,000/*
1,2-DICHLOROETHYLENE	*

POLYNUCLEAR AROMATIC HYDROCARBON COMPOUNDS (PAH)

	HAL (UG/L)	NRL (UG/L)	SDWA MCLS (UG/L)
ANTHRACENE	*	*	*
FLUORENE	*	*	*
NAPHTHALENE	*	*	*

TABLE 5 - 1 (CONT)

POLYNUCLEAR AROMATIC HYDROCARBON COMPOUNDS (PAH)

SDWA PROPOSED MCLS
(UG/L)

ANTHRACENE	*
FLUORENE	*
NAPHTHALENE	*
PHENANTHRENE	*
PYRENE	*

POLYNUCLEAR AROMATIC HYDROCARBON
COMPOUNDS (PAH)

	WATER AND FISH INGESTION (UG/L)	FISH (ONLY) CONSUMPTION (UG/L)
ANTHRACENE	*	*
FLUORENE	*	*
NAPHTHALENE	*	*
PHENANTHRENE	*	*
PYRENE	*	*

FRESHWATER ACUTE/CHRONIC
(UG/L)

ANTHRACENE	*
FLUORENE	*
NAPHTHALENE	*
PHENANTHRENE	*
PYRENE	*

* STANDARDS NOT SPECIFIED FOR COMPOUND

HAL - OFFICE OF DRINKING WATER LIFETIME HEALTH ADVISORY LEVEL.

NRL - NEGLIGIBLE RISK LEVEL FOR EXCESS 1.00E - 6 LIFETIME CANCER RISK.

SQWA - SAFE DRINKING WATER ACT MCL - MAXIMUM CONTAMINANT LEVEL

CWA - CLEAN WATER ACT

OTHER CHEMICAL-SPECIFIC ARARS ARE LISTED BELOW.

STATE IOWA ADMINISTRATIVE CODE SECTION 61.2(2), ANTIDEGRADATION
POLICY: THE QUALITY OF THE WATERS OF THE STATE SHOULD NOT DEGRADE.

CLEANUP LEVEL HIERACHY OF HAL, NRL, AND MCL.

TABLE 5 - 2
LOCATION-SPECIFIC ARARS

LOCATION	REQUIREMENT
CRITICAL HABITAT UPON WHICH ENDANGERED SPECIES OR THREATENED SPECIES DEPENDS	ACTION TO CONSERVE ENDANGERED SPECIES OR THREATENED SPECIES, INCLUDING CONSULTATION WITH THE DEPARTMENT OF THE INTERIOR
	CITATION
	ENDANGERED SPECIES ACT OF 1973 (16 USC SECTIONS 1531 ET. SEQ.); 50 CFR PART 200, 50 CFR PART 402; FISH AND WILDLIFE COORDINATION ACT (16 USC SECTIONS 661 ET. SEQ.) 33 CFR PARTS 320 - 330.
LOCATION	REQUIREMENT
WILDLIFE REFUGE	ONLY ACTIONS ALLOWED UNDER THE PROVISIONS OF 16 USC SECTION 668 MAY BE TAKEN IN AREAS THAT ARE PART OF THE NATIONAL WILDLIFE REFUGE SYSTEM.
	CITATION
	16 USC SECTIONS 668 ET. SEQ; 50 CFR PART 27.
LOCATION	REQUIREMENT
AREA AFFECTING STREAM OR RIVER	ACTION TO PROTECT FISH OR WILDLIFE
	CITATION
	FISH AND WILDLIFE COORDINATION ACT (16 USC SECTIONS 661 ET. SEQ.); 40 CFR 6.302

TABLE 5 - 3
ACTION-SPECIFIC ARARS

ACTION

REQUIREMENT

DISCHARGE OF TREATMENT
SYSTEM EFFLUENT

BEST AVAILABLE TECHNOLOGY;

USE OF BEST AVAILABLE TECHNOLOGY (BAT)
ECONOMICALLY ACHIEVABLE IS REQUIRED TO
CONTROL TOXIC AND NONCONVENTIONAL
POLLUTANTS. USE OF BEST CONVENTIONAL
POLLUTANT CONTROL TECHNOLOGY (BCT) IS
REQUIRED TO CONTROL CONVENTIONAL
POLLUTANTS. TECHNOLOGY BASED LIMITATIONS
MAY BE DETERMINED ON A CASE BY CASE BASIS.

CITATION

CWA 40 CFR SECTION 122.44(A)

REQUIREMENTS

WATER QUALITY STANDARDS:

APPLICABLE FEDERALLY APPROVED STATE WATER
QUALITY STANDARDS MUST BE COMPLIED WITH. THESE
STANDARDS MAY BE IN ADDITION TO OR MORE
STRINGENT THAN OTHER FEDERAL STANDARDS UNDER THE CWA.

DISCHARGE LIMITATIONS MUST BE ESTABLISHED AT A
MORE STRINGENT LEVELS THAN TECHNOLOGY BASED
STANDARDS FOR TOXIC POLLUTANTS.

BEST MANAGEMENT PRACTICES:

DEVELOP AND IMPLEMENT A BEST MANAGEMENT
PRACTICES PROGRAM TO PREVENT THE RELEASE OF
TOXIC CONSTITUENTS TO SURFACE WATERS.

CITATION

40 CFR SECTION 125.100

REQUIREMENTS

THE BEST MANAGEMENT PRACTICES PROGRAM MUST:

- * ESTABLISH SPECIFIC PROCEDURES FOR THE
CONTROL OF TOXIC AND HAZARDOUS POLLUTANT SPILLS.

- * INCLUDE A PREDICTION OF DIRECTION, RATE OF FLOW, AND TOTAL QUANTITY OF TOXIC POLLUTANTS WHERE EXPERIENCE INDICATES A REASONABLE POTENTIAL OF EQUIPMENT FAILURE.

- * ASSURE PROPER MANAGEMENT OF SOLID AND HAZARDOUS WASTE IN ACCORDANCE WITH REGULATIONS PROMULGATED UNDER RCRA.

CITATION
40 CFR SECTION 125.104

ACTION

REQUIREMENTS

DISCHARGE OF TREATMENT
SYSTEM EFFLUENT (CONTINUED)

MONITORING REQUIREMENTS:

DISCHARGE MUST BE MONITORED TO ASSURE COMPLIANCE. DISCHARGE WILL MONITOR:

- * THE MASS OF EACH POLLUTANT
- * THE VOLUME OF EFFLUENT
- * FREQUENCY OF DISCHARGE AND OTHER MEASUREMENTS AS APPROPRIATE

APPROVED TEST METHODS FOR WASTE CONSTITUENT TO BE MONITORED MUST BE FOLLOWED. DETAILED REQUIREMENTS FOR ANALYTICAL PROCEDURES AND QUALITY CONTROLS ARE PROVIDED.

CITATION
40 CFR SECTION 122.41(I)

REQUIREMENTS

SAMPLE PRESERVATION PROCEDURES, CONTAINER MATERIALS, AND MAXIMUM ALLOWABLE HOLDING TIMES ARE PRESCRIBED.

CITATION

40 CFR SECTION 136.1-136.4

REQUIREMENTS

COMPLY WITH ADDITIONAL SUBSTANTIVE CONDITIONS SUCH AS:

- * DUTY TO MITIGATE ANY ADVERSE AFFECTS OF ANY DISCHARGE; AND

- * PROPER OPERATION AND MAINTENANCE OF TREATMENT SYSTEMS.

CITATION
40 CFR SECTION 122.41(I)

LOCATION

REQUIREMENTS

TREATMENT, STORAGE, AND
DISPOSAL OF SOLID WASTES
FROM WASTEWATER TREATMENT
PLANT

SUBTITLE C AND D OF RCRA, GUIDELINES AND
REQUIREMENTS FOR THE TREATMENT, STORAGE, AND
DISPOSAL OF SOLID WASTES.

CITATION

SECTIONS 3001 ET. SEQ. OF RCRA, 42 USC SECTIONS 6901 ET.
SEQ. OF RCRA, 42 USC SECTIONS 6901 ET. SEQ.

OTHER ACTION SPECIFIC ARARS ARE LISTED BELOW.

FEDERAL: 20 CFR SECTIONS 1904, 1910, AND 1926, OSHA WORKER PROTECTION
STANDARDS: HEALTH AND SAFETY REQUIREMENTS FOR WORKERS INVOLVED IN
REMEDIAL ACTIONS.

STATE: IOWA CODE ANNOTATED (I.C.A.) SECTION 455B.171 ET. SEQ., WATER
QUALITY I.C.A. SECTIONS 455B.211 ET. SEQ., WATER TREATMENT;

I.C.A. SECTIONS 455B.301 ET. SEQ., SOLID WASTE DISPOSAL;

I.C.A. SECTIONS 455E.1 ET. SEQ., GROUNDWATER PROTECTION; I.C.A. SECTION
455B.131 ET. SEQ., AIR QUALITY;

IOWA ADMINISTRATIVE CODE, CHAPTER 60, IOWA WATER POLLUTION CONTROL
REGULATIONS; ANALOGOUS TO FEDERAL DISCHARGE REGULATIONS;

IOWA ADMINISTRATIVE CODE, CHAPTER 38, AND I.C.A. SECTION 455.187, WATER
WELL CONSTRUCTION REGULATIONS; WATER WELL CONSTRUCTION MUST BE
REGISTERED AND PERMITTED.

TABLE 5 - 4
SUMMARY OF COSTS FOR ALTERNATIVE 2

1. NON-CONSTRUCTION COSTS		
ENGINEERING/CONSTRUCTION		
DESIGN AND SUPERVISION	56,000	
CONTINGENCIES	56,000	
PERMITTING	15,000	
SUBTOTAL 1		\$ 127,000
2. COMPONENT INSTALLATION		
COSTS EXTRACTION SYSTEM	\$267,000	
AIR STRIPPER	20,000	
CARBON (GAC) UNIT FOR		
AIR (2 UNITS)	20,000	
HEATER/BLOWER/DEHUMIDIFIER	10,000	
BUILDING/SLAB	30,000	
TANKS	10,000	
PUMPS	10,000	
SUBTOTAL 2		\$367,000
3. NON-COMPONENT COSTS		
ELECTRICAL/INSTRUMENTATION	\$ 43,000	
SITE PREPARATION	15,000	
SUBTOTAL		\$ 58,000
TOTAL CAPITAL COST		\$ 552,000

Appendix 2
1991 ESD

Site:	Chemplex
ID#:	1A054597/89
Break:	SIL
Other:	70#1
Date:	7/26/91

EXPLANATION OF SIGNIFICANT DIFFERENCES

I. Introduction.

On September 27, 1989, the U.S. Environmental Protection Agency (EPA) issued a Record of Decision (ROD) which presented the EPA-selected remedy for the first operable unit at the Chemplex Site in Clinton, Iowa. The remedy selected in the ROD called for remediation of contaminated groundwater in the landfill and DAC areas at the Chemplex Site. As a result of information generated and received by EPA since issuance of the ROD, EPA has determined that a number of significant changes to the remedy selected in the ROD are necessary. This Explanation of Significant Differences (ESD) describes and summarizes the basis for these changes.

EPA serves as the lead agency for site activities, with support from the Iowa Department of Natural Resources (IDNR). This ESD is issued pursuant to Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, 42 U.S.C. § 9617(c), which provides that after adoption of a final remedial action plan, if any settlement or consent decree under section 106 or section 122 is entered into, and if such action, settlement, or decree differs in any significant respects from the final plan, the lead agency shall publish an explanation of the significant differences and the reasons such changes were made.

Due to information which has developed since issuance of the ROD, EPA has determined that significant changes are necessary to components of the selected remedy, as described in the ROD. This ESD will explain these changes and the reasons for them. In accordance with Section 300.435(c)(2)(i)(A) of the National Contingency Plan, 55 Fed Reg. 8666, 8852 (March 8, 1990), to be codified at 40 CFR Part 300, this ESD and the information supporting it are part of the administrative record file and are available for public comment. EPA is proposing to enter into a Consent Decree under Section 122 of CERCLA, 42 U.S.C. § 9622, which would require ACC Chemical Company, Getty Chemical Company, Getty Oil, Skelly Oil, Four Star Gas & Oil and Primerica Holdings, Inc. to perform the selected remedy. That Consent Decree is also being published and is consistent with the selected remedy as described in this ESD.

II. Site History and Contamination Problems.

The Chemplex Site is located in Clinton County, Iowa, approximately two miles from the Mississippi River and within five miles of the towns of Clinton and Camanche. The Site consists of a polyethylene manufacturing facility, an adjacent landfill, and surrounding areas to which groundwater contamination has spread.

Chemplex

Plant wastes containing hazardous substances have been disposed of at a number of areas at the facility, including: i) the landfill; ii) the "DAC area", a product storage and transfer area where spills have resulted in soil and groundwater contamination; iii) the polishing basin, which is the final step in the facility's wastewater treatment plant and is a source of releases of hydrocarbons to groundwater; iv) the "previous basin", an unlined pit northeast of the DAC area in which sludges from the polishing basin were placed in 1974; and v) an area north of the polishing basin where a product spill occurred in 1982. In addition to these areas, there are a number of other solid waste management units which are potential sources of hazardous substance releases to groundwater, and which are presently being investigated pursuant to the requirements of administrative orders issued under CERCLA and the Resource Conservation and Recovery Act, as amended (RCRA), 42 U.S.C. § 6901 et seq.

The Chemplex Site is covered by surficial soils that consist of a heterogeneous mixture of clays, silts, and gravel with discontinuous sand lenses. The soils are a result of former glacial activity and are known as glacial till or overburden. This overburden ranges in thickness from a few feet to in excess of 100 feet.

The overburden is underlain by bedrock that is believed to be the Anamosa formation of the Gower dolomite. The bedrock surface is typically weathered and fractured for several feet and is underlain by a more competent bedrock.

Groundwater occurs in both the overburden and the bedrock. The general groundwater flow direction at the site appears to be toward the southwest. In the overburden in the landfill area, a groundwater mounding effect appears to be causing groundwater to move radially from the center of the landfill. In addition, the overburden aquifer is recharging the bedrock aquifer. The groundwater in the overburden and bedrock aquifers appear to be in hydraulic communication, meaning that the overburden and the bedrock groundwater intermix.

The most significant source of groundwater contamination at the Site is the landfill. From 1968 to 1978, the landfill area was used periodically for disposal of various plant wastes generated at the facility, including black oily sludge, liquid hydrocarbon process wastes, chlorinated hydrocarbon wastes, scrap polyethylene, construction debris, and carbonate sludge. Some of these wastes contained hazardous substances, and significant contamination of soils and groundwater in the area of the landfill has resulted.

The primary contaminants of concern at this Site are of three types:

- 1) BTEX compounds - benzene, toluene, ethylbenzene, and xylene;
- 2) chlorinated hydrocarbons - perchloroethylene (PCE), trichloroethylene (TCE), and 1,2-dichloroethylene; and
- 3) polynuclear aromatic hydrocarbons (PAHs) - naphthalene, fluorene, phenanthrene, pyrene, and anthracene.

At the time the ROD was issued, extensive sampling and analysis had been conducted for the BTEX and PAH compounds. These compounds are associated with the polyethylene process and were believed to be the main contaminants of concern at the Site. Only limited sampling and analysis had been conducted for the chlorinated hydrocarbons because at the time the remedial investigation was conducted, the chlorinated hydrocarbons were not believed to be of major concern. However, the limited sampling and analysis that was performed for chlorinated hydrocarbons detected levels of up to 50,000 parts per billion (ppb) of PCE.

The limited data showed that the horizontal extent of chlorinated hydrocarbon contamination was greater than the extent of BTEX or PAH contamination. For example, in monitoring well 13B, which is approximately 60 feet deep and 900 feet southwest of the landfill boundary, concentrations of BTEX and PAHs were determined to be 48 ppb and non-detect, respectively, indicating that well 13 was near the edge of the plume of contamination for BTEX and PAH contaminants. However, the concentration of chlorinated hydrocarbons at this location was determined to be approximately 20,000 ppb, indicating that the plume of contamination for these compounds was much larger than originally anticipated. Therefore, it was determined that additional investigation was required to determine the extent of contamination for the chlorinated hydrocarbons as well as for the BTEX and PAH contaminants. A summary of the contaminants detected in each zone during the OU #1 RI/FS is included in figures 1-4. Following is a summary of the findings in the landfill and DAC areas.

Landfill Area.

The highest concentrations of contaminants detected in the landfill overburden groundwater during the first operable unit Remedial Investigation were 8600 ppb BTEX, 470 ppb PAHs, and 60 ppb tetrachloroethylene, respectively.

The highest concentration of contaminants detected in the landfill groundwater was at the overburden/bedrock interphase in

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an area along the southwest border of the landfill. The maximum concentrations of contaminants in this area were determined to be 96,400 ppb BTEX and 1,821 ppb PAHs, respectively.

Groundwater in the bedrock aquifer beneath the landfill was investigated at four different depths, designated as the A, B, C, and D zones. These zones range in depth from approximately 50 feet to 180 feet below ground surface. The data showed that contaminant plumes are emanating from the landfill area in all zones. The highest concentrations of contaminants associated with these plumes were detected in the shallow and intermediate bedrock zones - 52,880 ppb chlorinated hydrocarbons, and 33,883 ppb BTEX and 1,700 ppb PAHs, respectively. In the deeper bedrock zones, the concentrations of these contaminants were considerably lower. However, the total horizontal and vertical extent of contamination was not established prior to issuance of the ROD, and it was determined that additional investigation would be necessary to fully delineate the vertical and horizontal extent of contamination.

DAC Area.

In the DAC area, results of sampling and analysis indicated that the plume of contamination in the overburden appeared to be migrating toward the southwest. The maximum concentrations detected in the bedrock were 249,000 ppb of BTEX and 13,829 ppb of PAHs. In the bedrock aquifer, a concentration of 650 ppb for benzene was detected in one downgradient monitoring well. This was the only bedrock monitoring well which had been installed downgradient of the DAC Area at the time the ROD was issued. Since this concentration is substantially above the Maximum Contaminant Level (MCL) of 5 ppb established by the Safe Drinking Water Act, it was determined prior to issuance of the ROD that additional investigation would be required to delineate the extent of contamination in the bedrock aquifer.

III. Selected Remedy.

The September 27, 1989 ROD for the first operable unit at the Site called for remediation of two distinct plumes of contaminated groundwater in the landfill and DAC areas of the Site. The ROD stated that remediation of soil and wastes in the landfill and DAC areas, as well as any other groundwater remediation which might be necessary, would be addressed in future operable units. However, the ROD also stated that based on the results of future investigations the first operable unit might be the final groundwater remedy for the Site.

The major components of the selected remedy were:

- Institutional controls to restrict use of contaminated ground water.

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- Extraction of ground water by placement of extraction wells in the plumes of the landfill and DAC areas.
- Pretreatment, if necessary, of the extracted ground water.
- Treatment of the extracted ground water either at the existing onsite wastewater treatment plant or at a new treatment plant.
- Discharge of treated groundwater to the Mississippi River pursuant to an NPDES permit.

The stated purpose of the first operable unit remedial action was "to mitigate the movement of the contaminated groundwater from this site and to permanently treat, destroy, and dispose of contaminants found in these groundwater plumes". The groundwater at the Site is classified as a Class II aquifer, which is a current and potential drinking water source, and thus restoration of the aquifer to drinking water quality was one of the goals of the selected remedy. The ROD did not specify an area of attainment or point of compliance. The selected remedy required that extraction and treatment of groundwater in the landfill and DAC areas continue until drinking water quality remediation goals were met throughout the plumes of contamination.

IV. Significant Differences and the Basis for the Differences.

A. Summary of New Information.

Since issuance of the ROD, significant new information has been collected relating to groundwater at the Site. The phase I Remedial Design Investigation (RDI), which was initiated as part of pre-design work, was completed between October, 1989 and March, 1990. The objectives of the RDI were to collect sufficient characterization and treatability data for evaluation of groundwater remediation options and preparation of a preliminary remedial design. The data collected indicate that there are additional contaminant problems that were not known at the time the ROD was signed.

One of the principal new discoveries was the existence in the bedrock aquifer of high concentrations of PCE which indicate the presence of pure-phase PCE. PCE has a solubility limit of 150,000 ug/l. When concentrations of 10% or more are detected in groundwater samples, pure phase product is expected to be nearby. The 10% level for PCE is 15,000 ug/l. As indicated on figure 3, a number of monitoring wells in the landfill area have concentrations of PCE in this range, including MW-12B (37,300 ug/l), MW-12C (12,300 ug/l), MW-17B (11,700 ug/l), MW-17C (88,000 ug/l), MW-26C (15,500 ug/l), MW-26D (31,300 ug/l) and MW-23D

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(13,500ug/l). This pure phase product is commonly referred as dense non-aqueous phase liquid (DNAPL), since it is denser than water and immiscible in water. Due to the nature of DNAPL migration, the potential for migration of the DNAPL vertically through the bedrock aquifer exists. For more information on the nature and behavior of DNAPLs, see "Technical Memorandum, Chemplex Site, First Operable Unit RD/DA: Difficulties in Remediation of DNAPL in Fractured Bedrock", U.S. EPA, Region VII, (September 1990), which is contained in the administrative record.

In addition, the investigation revealed that the extent of PCE contamination in the bedrock system is greater, both horizontally and vertically, than previously known. The groundwater contamination by chlorinated compounds is more widespread than contamination by either BTEX or PAH compounds. The entire horizontal and vertical extent of contamination in the bedrock was not determined. The first confining layer (aquitarde) is believed to be a shale formation known as the Maquoketa Shale.

A supplemental remedial design investigation will be conducted in the fall of 1990, to determine the vertical and horizontal extent of contamination for all contaminants of concern (including the chlorinated hydrocarbons) and to confirm the existence and nature of the first confining layer. The results of this investigation will be available in February 1990 and will be used in preparing the remedial design.

This new information requires that the remedial strategies described in the ROD be modified to ensure that the most effective remediation techniques are employed. Following is a description and explanation of these modifications.

B. Significant Differences.

The changes to the remedy do not alter the fundamental features of the selected remedy. The technology is the same - extraction of contaminated groundwater, followed by treatment and then discharge to the Mississippi River. However, based on information received by EPA since issuance of the ROD, EPA has determined that it is necessary to make a number of significant modifications to the selected remedy:

(1) The remedy will encompass remediation of all contaminated groundwater at the Site, rather than being limited to groundwater in the landfill and DAC areas only.

(2) The ROD required that extraction and treatment of contaminated groundwater in the landfill and DAC areas continue until all groundwater throughout those plumes of contamination was remediated to health-based cleanup standards. A modified

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compliance boundary and Attainment Area are now specified in the remedy.

(3) A contingent waiver of the cleanup standards is added to the remedy.

(4) The remedial action will comply with a number of applicable or relevant and appropriate requirements (ARARs) identified since issuance of the ROD since this is now the final groundwater decree.

The remedial action to be performed under the proposed Consent Decree which EPA has entered into is consistent with the selected remedy as described in this ESD. Following is a detailed description of each of these differences and the basis for the changes.

1. Final, Site-Wide Groundwater Remedy

Although the remedy selected in the ROD called for remediation of groundwater in the landfill and DAC areas only, the ROD stated that the selected remedy could become the final groundwater remedy, based on the results of additional investigation. On the basis of information received by the Agency since issuance of the ROD, EPA has determined that it is appropriate to implement a final, Site-wide groundwater remedy.

Groundwater monitoring well data collected since issuance of the ROD show that there are not two distinct plumes of groundwater contamination in the landfill and DAC areas, as was originally believed. Rather, there appear to be commingled plumes of contamination from numerous source areas at the Site, including the landfill, the DAC area, the polishing basin area, and the previous basin. This information is presented in the "Investigation Report for Phase I Remedial Design", ENSR Consulting and Engineering, May 1990. Based on this data, the scope of groundwater remediation should not be limited to the landfill and DAC areas. Instead, a system should be designed to remediate all contaminated groundwater at the Site.

Also, at the time the ROD was written there was insufficient information to design a Site-wide extraction and treatment system. Specifically, the volume of contaminated groundwater to be extracted and treated and the degree of treatment which would be required for a Site-wide remedy could not be estimated at the time the ROD was issued. Thus, the ROD selected remediation of groundwater in the landfill and DAC areas as a necessary first step to be taken in remediating groundwater at the Site.

The results of groundwater data collected since issuance of the ROD, together with additional data which will be collected this fall, will be sufficient to optimally place extraction wells

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at the Site, to estimate the volume of groundwater which will need to be extracted and treated, and to provide information on the concentrations of contaminants in groundwater to be treated. Under the Site-wide remedial approach, a treatment system will be designed with sufficient capacity to treat all contaminated groundwater extracted at the Site.

Characterization of the nature and extent of most of the groundwater contamination at the Site will be completed prior to initiation of design work. However, investigation at some areas which is being conducted by Quantum Chemical Corporation as part of a RCRA Facility Investigation under the terms of a RCRA 3008(h) Order issued by EPA on May 11, 1990 will not be completed until late in 1991. Based on the results of this investigation, the groundwater extraction and treatment system will be modified in the future, if necessary.

Finally, implementation of the Site-wide groundwater remedy will not result in any delay, since implementation will require approximately the same amount of time as would have been required to implement a landfill/DAC area remedy. One of the objectives of the remedy selected in the ROD was prevention of further migration of contaminated groundwater by initiation of control over plumes of contamination. The ROD stated that groundwater remediation would begin as a first operable unit while additional operable units would address soil and waste remediation. The change to a Site-wide groundwater remedy does not change this approach and control over contaminated groundwater will be initiated as soon as possible.

In sum, by implementing a Site-wide remedy, a single, comprehensive extraction and treatment system will be designed and constructed. Such a system will protect human health and the environment by providing for remediation of all groundwater at the Site in an expeditious manner and will be cost-effective by considering Site-wide groundwater remediation requirements in design and construction of a remediation system.

2. Attainment Area.

As described earlier in Section III, the remedy selected in the ROD required extraction and treatment of groundwater in the landfill and DAC areas until health based cleanup standards were attained throughout the plumes of contamination. The ROD did not specify a point of compliance. However, based on new information, EPA has determined that the modified point of compliance boundary shown on the attached map is appropriate. All contaminated groundwater in the area beyond the point of compliance boundary, (hereinafter, the Attainment Area), will be extracted and treated until health-based cleanup standards are met. In the area inside the point of compliance boundary, mass contaminant removal and containment will continue until it is

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demonstrated that the area no longer acts as a source of contamination of groundwater in the Attainment Area.

The point of compliance boundary has been determined in accordance with the preamble to the National Contingency Plan (NCP), 55 Fed. Reg. 8753, 8754 (March 8, 1990), and EPA policy on remediation of contaminated groundwater. The plume of contamination at the Site is caused by releases from a number of distinct sources - the landfill, polishing basin, DAC area, previous basin, and other potential source areas - which are in close geographical proximity. Also, the DNAPL found in the bedrock aquifer, which is likely to continue to act as a long-term source of groundwater contamination and which is technically impracticable to remediate with existing technology, is located just west of the landfill. The point of compliance boundary encompasses these sources of releases to groundwater.

Zones of residual DNAPL and DNAPL pools can comprise significant sources of long-term groundwater contamination unless they are removed. At present, excavation of the contaminated source is the only effective means of fully remediating DNAPL sources in the subsurface. This is possible where DNAPL is present in soils. At the Chemplex Site, however, DNAPL has penetrated to a significant depth into the fractured bedrock formation. Thus, excavation of the DNAPL source is not feasible at this Site.

Pump and treat technology is of limited effectiveness where DNAPL is present in fractured media. Experience has shown that in such situations, it may be possible to recover small quantities of DNAPL through the use of pump and treat technology, but recovery rates are slow and it is often not possible to sustain continued recovery. Following recovery of the free DNAPL that can be extracted, a considerable percentage of DNAPL will remain in the subsurface as residual and will continue to be a long-term source of groundwater contamination.

In fact, extraction of groundwater in DNAPL areas must be performed carefully. High volume pumping in areas near DNAPL could result in drawdown of contaminants. Drilling through zones of DNAPL can result in DNAPL moving down the boring as drilling proceeds, possibly contaminating groundwater in deeper strata. Thus, attempts to achieve cleanup standards in the vicinity of DNAPL could exacerbate the groundwater contamination. Accordingly, areas of groundwater associated with DNAPL are not within the Attainment Area. Rather, highly contaminated groundwater associated with DNAPL sources will be extracted and treated in such a way as to contain the DNAPL sources and minimize migration of contaminants into the Attainment Area. Extraction and treatment will continue in DNAPL source areas until it is demonstrated that the areas no longer represent a source of groundwater contamination beyond the point of compliance.

Remediation based on the point of compliance shown on the attached map will be protective of human health and the environment. Groundwater in the Attainment Area will be restored to drinking water quality. Inside the point of compliance, contaminated groundwater will be contained and extracted and treated in order to minimize migration of contaminants into the Attainment Area and significantly expedite Site-wide remediation. In addition, institutional controls will be implemented to restrict use of contaminated groundwater.

3. Contingent Technical Impracticability Waiver.

One goal of this remedial action is restoration of the ground water in the area of attainment to its beneficial use as a source of drinking water. Based on information obtained during investigation of the Site, and analysis of all remedial alternatives, EPA believes that the selected remedy will achieve this goal. However, ground water contamination may be especially persistent in the immediate vicinity of the contaminant sources where concentrations are relatively high. The ability to achieve cleanup goals at all points throughout the area of attainment cannot be determined until the extraction system has been implemented, modified as necessary, and the plume response monitored over time.

The ability to attain cleanup standards throughout the Attainment Area is uncertain for a number of reasons. The hydrogeologic setting at the Chemplex Site includes fractured bedrock, and contaminant movement through fractures is difficult to trace. The DNAPL will continue to be a long term source of contamination to groundwater. Also, information gathered since issuance of the ROD indicates that contamination is significantly deeper and at significantly higher concentrations than previously believed. Experience with groundwater remediation at sites with similar conditions indicates that it may be difficult to achieve cleanup standards. See "Considerations in Ground Water Remediation at Superfund Sites", Memorandum from Jonathan Z. Cannon, EPA Acting Assistant Administrator, October 18, 1989, which is part of the administrative record.

The selected remedy will include ground water extraction and treatment for a minimum of twenty years, during which time the system's performance will be carefully monitored on a regular basis and adjusted as warranted by the performance data collected during operation. Adjustments to the operating system may include:

- a) discontinuing operation of extraction wells in areas where cleanup goals have been attained;
- b) alternating pumping at wells to eliminate stagnation

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points; and

c) pulse pumping to allow aquifer equilibration and encourage adsorbed contaminants to partition into ground water.

If the extraction and treatment system, as adjusted over time, cannot meet health-based cleanup standards in the Area of Attainment, additional measures, such as use of innovative technologies, may be employed in order to attain the remediation goals. Such additional measures will be consistent with the remedy selection criteria set forth in Section 121 of CERCLA, 42 U.S.C. § 9621, and the National Contingency Plan, and will be technically practicable under the circumstances.

In the event that the health based cleanup standards have not been met after at least twenty years of operation of the extraction and treatment system, as adjusted, contingent remediation goals and measures may be established. Such contingent goals and measures will be implemented only if it is clearly demonstrated based on strong hydrogeological and chemical evidence that it is technically impracticable to achieve and maintain remediation goals throughout the Area of Attainment. To invoke the contingency, at a minimum it must be demonstrated that contaminant levels have ceased to decline over time and are remaining constant at some statistically significant level above remediation goals in a discrete portion of the area of attainment, as verified by multiple monitoring wells.

If it is determined, based on the preceding criteria and the system performance data, that certain portions of the Area of Attainment cannot be restored to their highest beneficial use, all of the following long-term management measures may be implemented for an indefinite time as a modification of the existing system:

a) low level pumping may be implemented as a long-term gradient control or containment measure;

b) chemical specific ARARs (cleanup standards) may be waived for the cleanup of those portions of the Area of Attainment based on the technical impracticability of achieving further contaminant reduction;

c) institutional controls may be maintained to restrict use of water from those portions of the aquifer which remain above health-based goals.

In areas where it is determined that it is technically impracticable to achieve cleanup standards, ground water extraction and treatment would typically continue as necessary to achieve mass contaminant reduction and remediation goals throughout the rest of the area of attainment.

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If a determination is made that it is technically impracticable to attain chemical specific ARARs and that a waiver is appropriate, a proposed Amendment to the Record of Decision will be issued at the time of the determination to inform the public of the details of the proposed waiver and to provide an opportunity for public comment.

4. Compliance with ARARs.

One of the requirements for CERCLA remedial actions is that they comply with all requirements of federal or state environmental laws which are applicable or relevant and appropriate under the circumstances of the release or threatened release at the site. As discussed above, this remedy is now a final groundwater remedy encompassing all groundwater at the site rather than being limited to groundwater in the landfill and DAC areas. Certain requirements have been identified since issuance of the ROD which are ARARs for the final groundwater remedy. Also, certain requirements identified as ARARs in the ROD have been modified since issuance of the ROD. Since this is now the final groundwater remedy, the ARARs for this remedial action are those requirements of federal or state environmental law which are ARARs as of the date of this ESD under the circumstances of the release at the Chemplex Site.

The ROD did not specify groundwater cleanup standards for a number of hazardous substances which have been detected at the Site. Cleanup standards for these contaminants have been established and are included as part of the final groundwater remedy. Table 1 identifies these contaminants, the corresponding cleanup standards, and the basis for the cleanup standards.

A number of other groundwater cleanup standards established in the ROD have been modified since issuance of the ROD. The cleanup standard established in the ROD for tetrachloroethylene was 10 parts per billion, which was the applicable cleanup standard at the time based on Chapter 133 of the Iowa Administrative Code. However, since issuance of the ROD, EPA has established a negligible risk level (NRL) for tetrachloroethylene of 0.7 ppb which is now the applicable cleanup standard under Chapter 133 of the Iowa Administrative Code. Also, at the time the ROD was issued no MCLs, HALs, or NRLs had been established for non-carcinogenic PAH compounds detected in groundwater at the Site. The ROD established a site-specific alternative cleanup standard of 10 ppb for the PAH contaminants. Since issuance of the ROD, EPA has established a lifetime Health Advisory Level of 20 ppb for naphthalene, one of the non-carcinogenic PAH compounds. The HAL is the applicable cleanup standard for naphthalene under Chapter 133 of the Iowa Administrative Code.

TABLE 1

CHEMPLEX GROUNDWATER CLEANUP STANDARDS

<u>COMPOUND</u>	<u>CLEANUP STANDARD (ug/l)</u>	<u>BASIS</u>
Benzene	1	NRL
Toluene	2,000	HAL
Ethylbenzene	700	HAL
Xylenes	10,000	HAL
Tetrachloroethylene	0.7	NRL
Trichloroethylene	3	NRL
1,1-Dichloroethylene	7	HAL
1,2-Dichloroethylene	70	HAL
Methylene Chloride	5	NRL
1,1,2,2-Tetrachloroethane	0.2	NRL
1,1,1-Trichloroethane	200	HAL
Vinyl Chloride	0.015	NRL
Styrene	100 or 0.01	NRL ¹
1,2-Dichlorobenzene	600	HAL
Benzo(a)anthracene	0.1	PMCL ²
Benzo(a)pyrene	0.2	PMCL ²
Benzo(k)fluoranthene	0.2	PMCL ²
Chrysene	0.2	PMCL ²
Naphthalene	20	HAL ₃
Acenaphthene	20	---3
Acenaphthylene	20	---3
Anthracene	20	---3
Fluorene	20	---3
Fluoranthene	20	---3
2-Methylnaphthalene	20	---3
Phenanthrene	20	---3
Pyrene	20	---3
Antimony	3	HAL
Arsenic	.03	NRL
Beryllium	.007	NRL
Cadmium	5	HAL
Chromium	100	HAL
Lead	50	MCL
Nickel	100	HAL

¹ EPA is presently considering whether to classify styrene as a carcinogen or non-carcinogen. If EPA determines that styrene is a carcinogen, the cleanup standard will be .01. If EPA determines that styrene is a non-carcinogen, the cleanup standard will be 100.

² The cleanup standards for these compounds are presently set at the level of the proposed MCLs, and will be amended to conform to final MCLs when final MCLs are established.

³ There are no HALs, NRLs, or MCLs for these compounds. Since they are all non-carcinogenic PAH compounds similar to naphthalene, the cleanup standard for each of these is the same as the standard for naphthalene. Should a HAL be established for any of these compounds, the cleanup standard will be amended to conform to the HAL.

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There are no MCLs, HALs, or NRLs which have been established for acenaphthene, acenaphthalene, anthracene, fluorene, fluoranthene, 2-methylnaphthalene, phenanthrene, and pyrene. These compounds are all non-carcinogenic PAH compounds similar to naphthalene. Accordingly, EPA has determined that the appropriate site-specific cleanup standard for each of these compounds is 20ppb. If, however, a lifetime HAL is established for any of these compounds, the cleanup standard shall become the HAL.

The ROD specified that contaminated groundwater would be pretreated, as necessary, in order to ensure that discharge to the Mississippi River from the final treatment system was in compliance with NPDES permit discharge limitations. The ROD identified air stripping as the preferred pretreatment system and provided that the need for control of air emissions from air strippers would be determined by performance of a risk assessment based on air emission dispersion modeling. Since issuance of the ROD, EPA has promulgated a regulation limiting organic emissions from process vents associated with air stripping operations. If air stripping is used, air stripping operations shall comply with the requirements of this regulation, which is contained at 55 Fed. Reg. 25454 (June 21, 1990), to be codified at 40 CFR §264 Subpart AA and BB.

V. Affirmation of Statutory Determinations.

Considering the new information that has been developed and the changes that have been made to the selected remedy, EPA believes that the remedy remains protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to this remedial action, and is cost effective. In addition, the revised remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this Site.

VI. Role of Community in the Process.

The EPA solicits input from the community on the cleanup methods proposed for response actions. This ESD, along with a number of other documents which formed the basis for the changes in the remedy, can be found in the administrative record file. EPA encourages the public to review these documents to gain a more comprehensive understanding of the Site and ongoing activities. The administrative record file is available at the Clinton Public Library and Camanche Public Library.

Please submit written comments on the site to:

Ms. Hattie Thomas
U.S. Environmental Protection Agency
Region VII

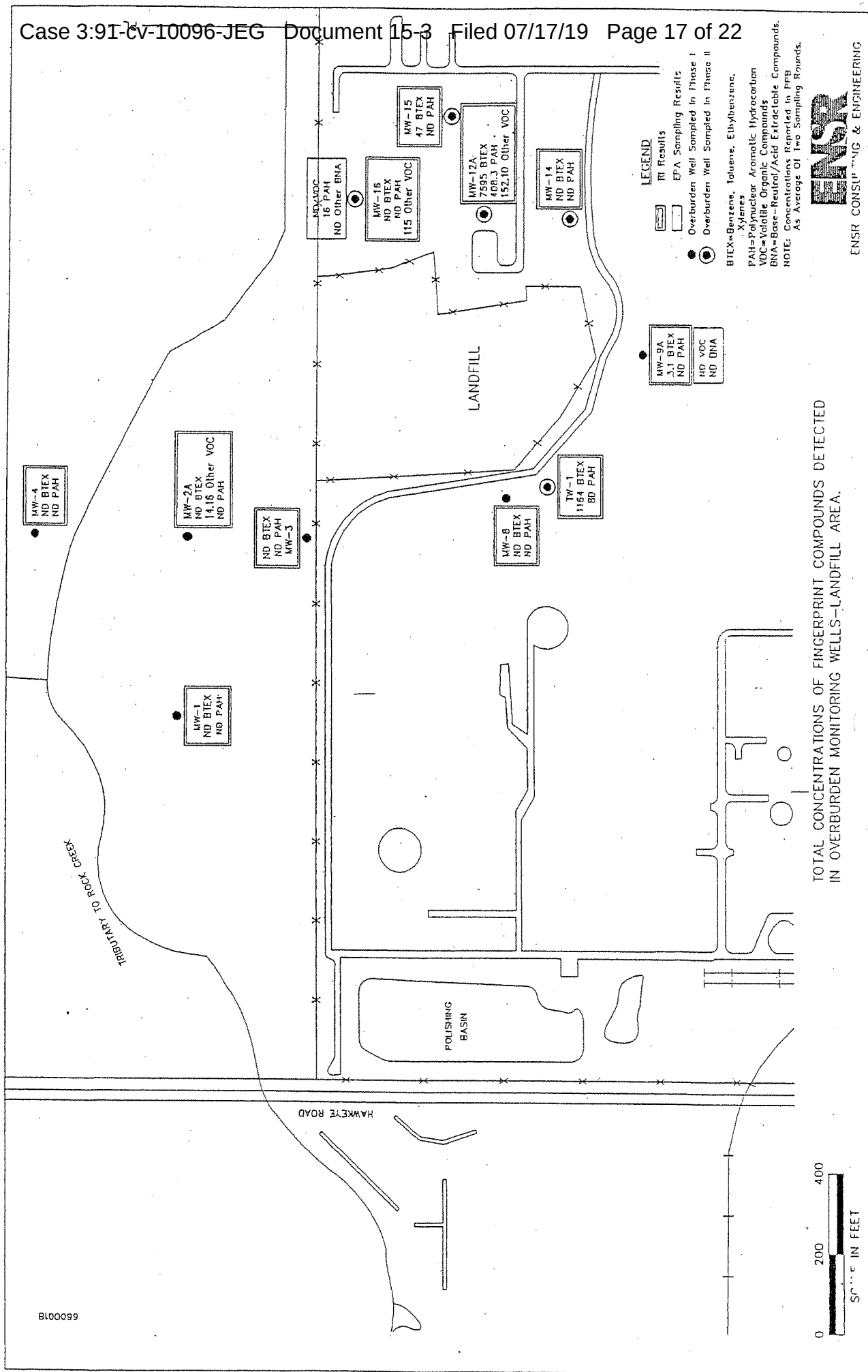
- 14 -

Office of Public Affairs
726 Minnesota Avenue
Kansas City, Kansas 66101

If you have questions or need additional information on the Site, please contact:

Nancy Johnson
U.S. Environmental Protection Agency
Region VII
Office of Public Affairs
726 Minnesota Avenue
Kansas City, Kansas 66101
(913) 551-7703

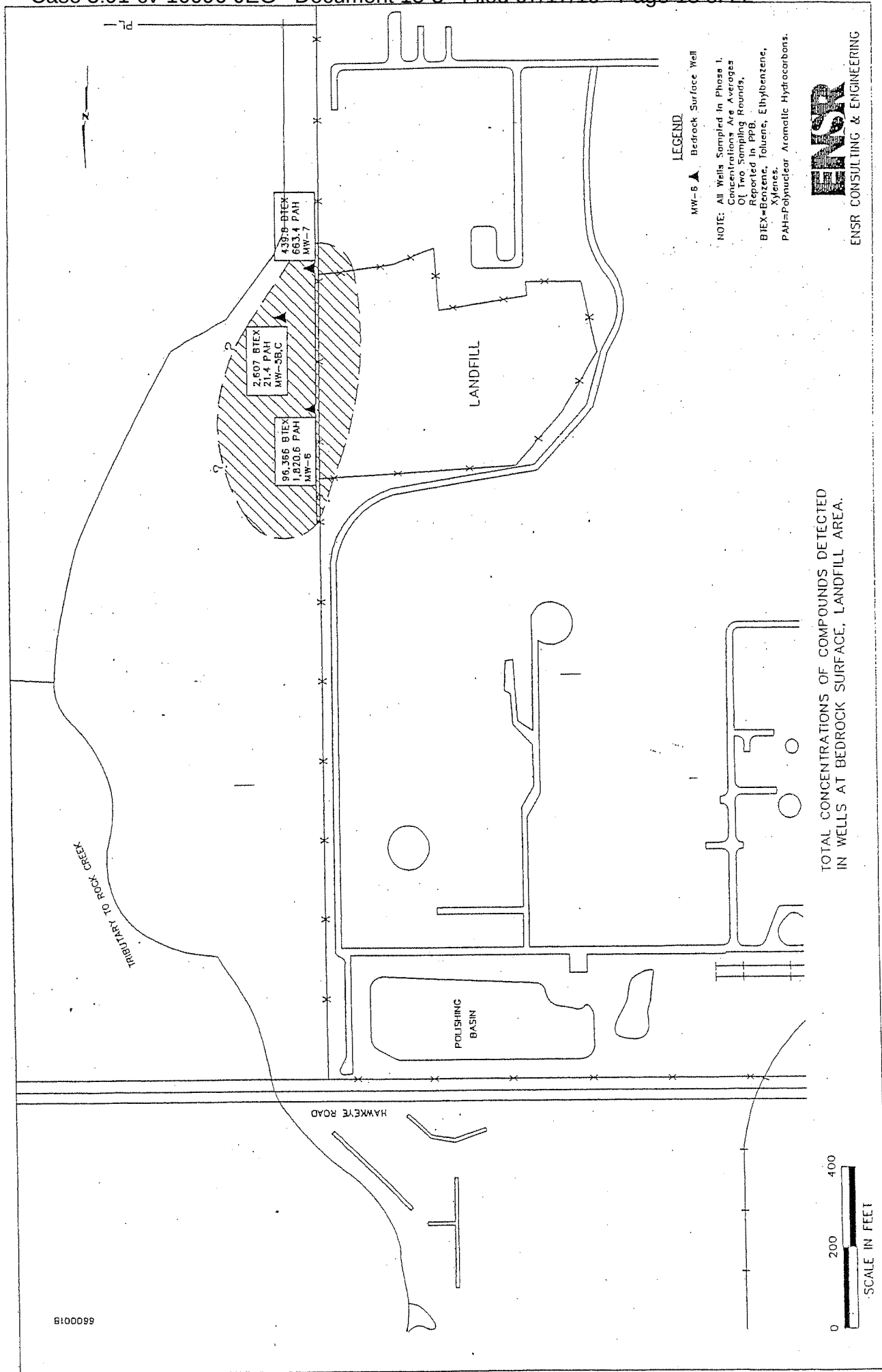
FIGURE 1



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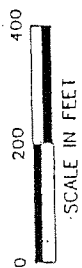
TOTAL CONCENTRATIONS OF FINGERPRINT COMPOUNDS DETECTED IN OVERBURDEN MONITORING WELLS—LANDFILL AREA.

FIGURE 2



6600099

TOTAL CONCENTRATIONS OF COMPOUNDS DETECTED IN WELLS AT BEDROCK SURFACE, LANDFILL AREA.



LEGEND

MW-6 ▲ Bedrock Surface Well

NOTE: All Wells Sampled in Phases I, Concentrations Are Averages of Two Sampling Rounds, Reported in PPB.

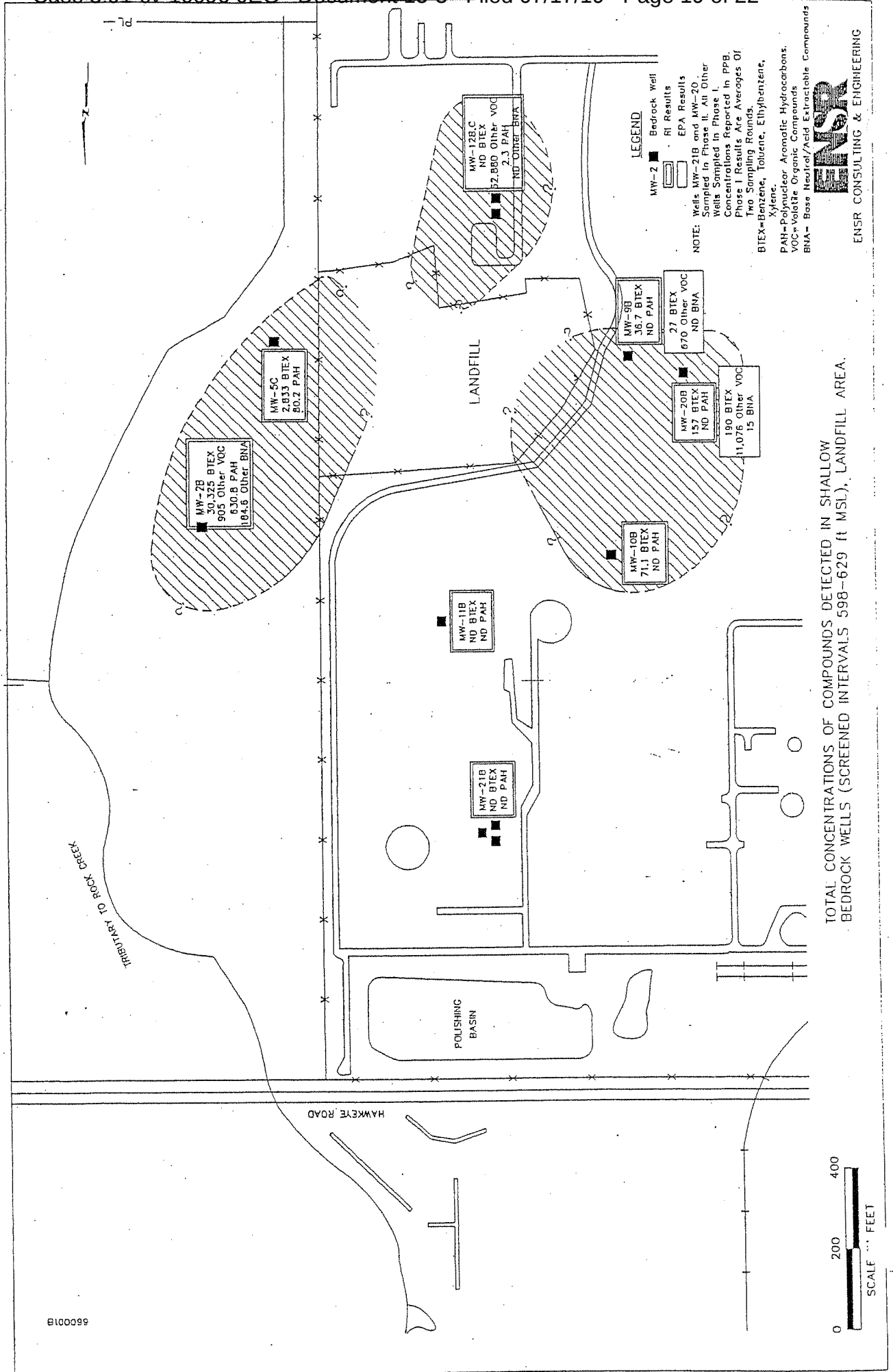
BTEX= Benzene, Toluene, Ethylbenzene, Xylenes.

PAH= Polynuclear Aromatic Hydrocarbons.



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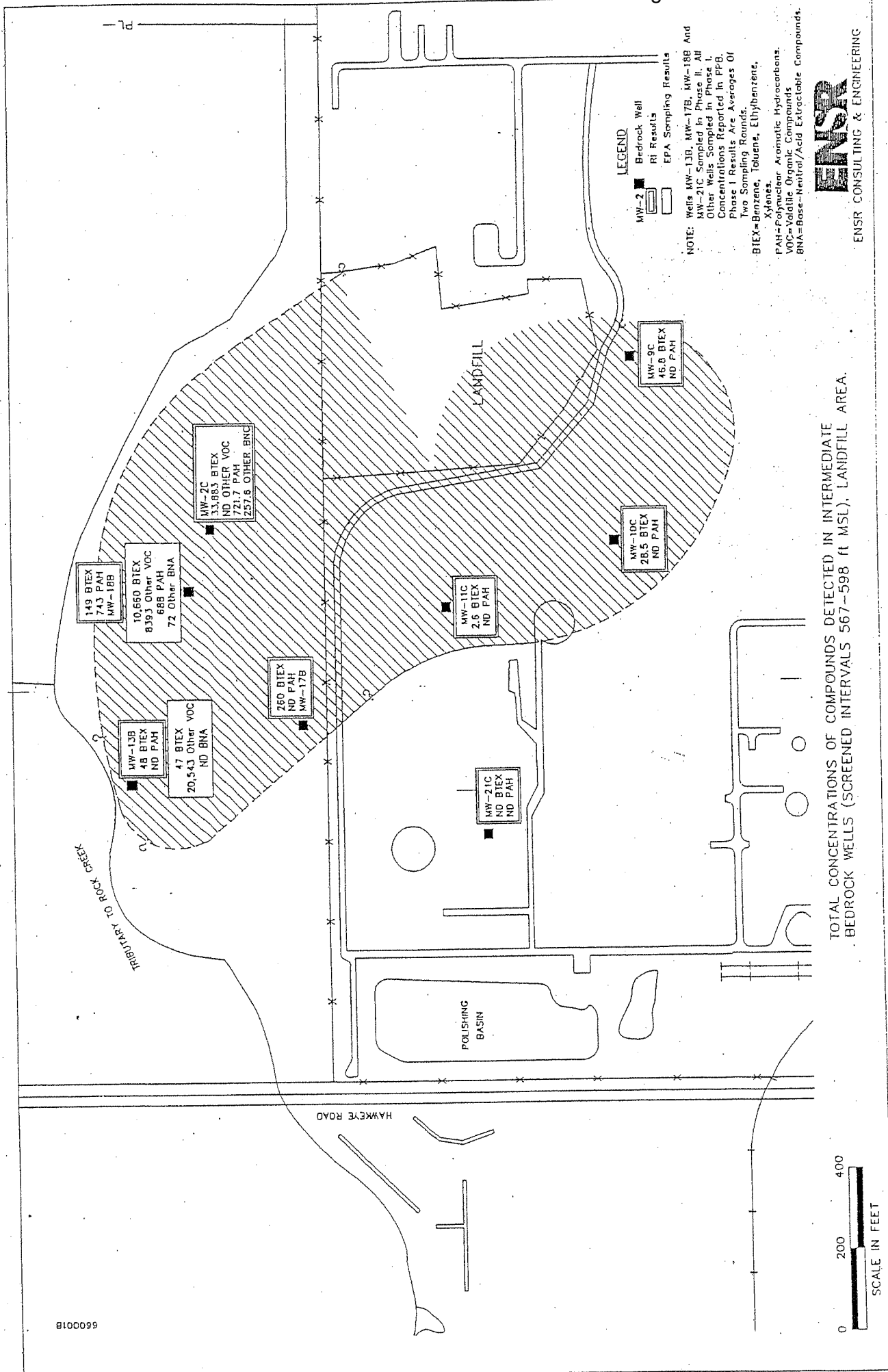
FIGURE 3



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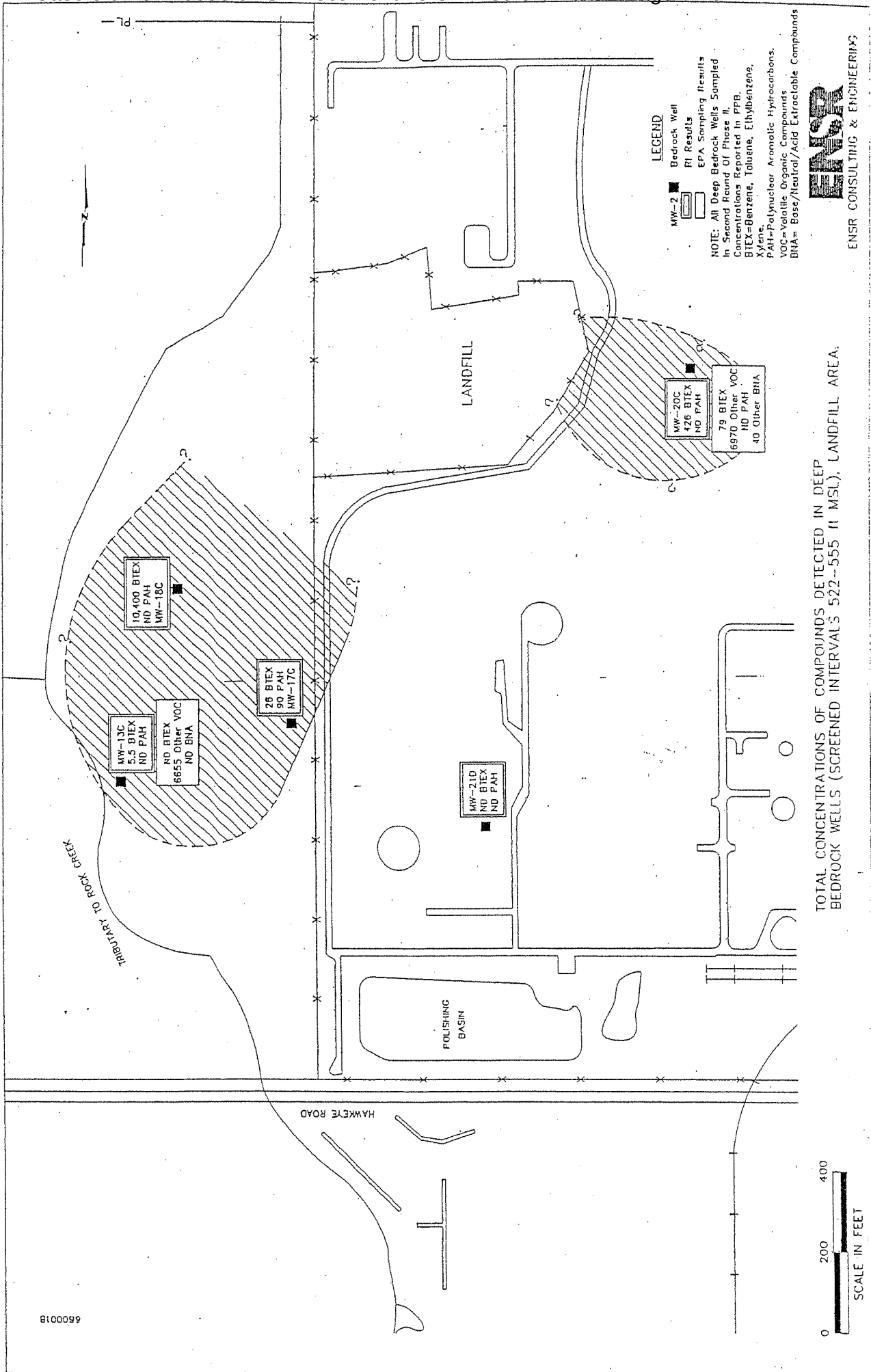
FIGURE 4



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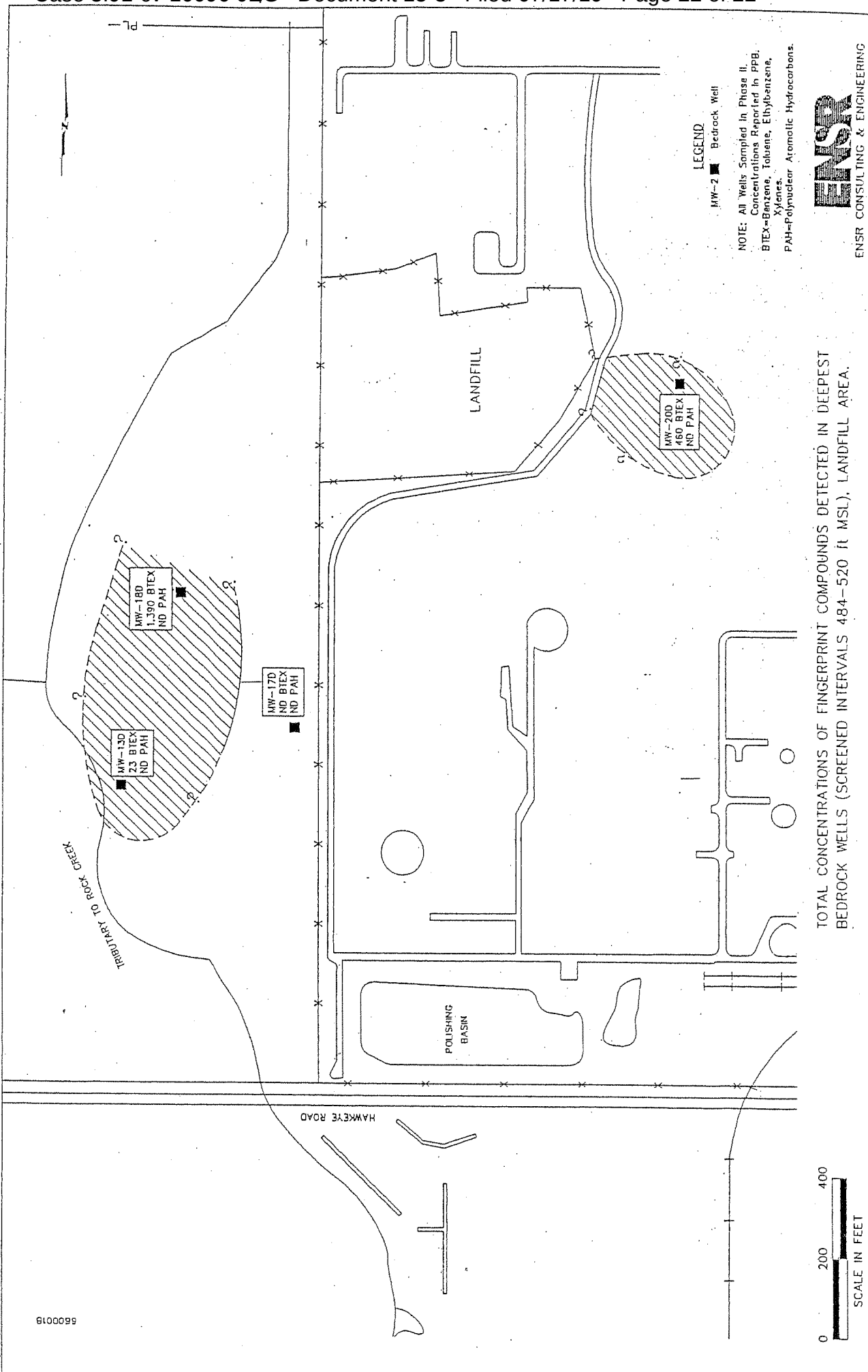
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FIGURE 5



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FIGURE 6



Appendix 3
2012 Amended Record of Decision

**AMENDMENT TO THE
RECORD OF DECISION**

CHEMPLEX SUPERFUND SITE

OPERABLE UNIT NO. 1 – GROUNDWATER

IAD045372836



December 2012

**U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 7
11201 Renner Boulevard
Lenexa, Kansas**

30284032

Superfund

AMENDMENT TO THE RECORD OF DECISION

**CHEMPLEX SUPERFUND SITE
Operable Unit No. 1 - Groundwater**

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1. DECLARATION

1.1 Site Name and Location

The Chemplex Superfund Site (Site) is a non-National Priorities List¹ (NPL) site located in Clinton County, Iowa in portions of Sections 19, 20, 29 and 30 within Township 81 North, Range 6 East. The Site, encompassing approximately 700 acres, is located 1.5 miles northwest of the center of the city of Camanche and five miles west of the city of Clinton's downtown, between U.S. Highway 30 and 21st Street (Figure 1). The Site is located within the city limits of Clinton and Camanche.

1.2 Statement of Basis and Purpose

Section 117 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. § 9617, provides public participation requirements for remedy selection and for changes to a remedy after the issuance of a Record of Decision (ROD). This Amendment to Record of Decision (ROD Amendment) presents changes to the remedy selected in the ROD for Operable Unit number 1 (OU1) for the Site issued by the U.S. Environmental Protection Agency on September 27, 1989, (the "OU1 ROD"). This ROD Amendment is issued in accordance with CERCLA and Sections 300.430(f)(3) and 300.435(c)(2)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (the "NCP"), which specifies the public participation requirements for remedy selection and for revising a remedy previously selected by the EPA.

1.3 Assessment of Site

The Chemplex groundwater extraction and treatment system was constructed in 1994 as part of the Site remedy selected in the OU1 ROD. Although this system has removed significant volatile organic compound (VOC) mass from Site groundwater, monitoring data indicate that the extraction system has been ineffective in capturing portions of the contaminated groundwater due to extensive fracturing of the dolomite bedrock underlying the Site. Furthermore, based on groundwater monitoring results, the effectiveness of hydraulic capture cannot be significantly improved by adding extraction wells due to technical limitations associated with uncertainties in locating the bedrock fractures in the aquifer. Recent monitoring data indicate that the groundwater cleanup levels set forth in the OU1 ROD cannot be achieved using the extraction and treatment remedy selected in the OU1 ROD.

Pilot testing of the revised remedy, which includes treatment of VOC "hot spots" and institutional controls to reduce the risk of exposure to impacted groundwater, has shown that this revised approach will be protective of human health and the environment. Section 3 of this ROD Amendment discusses this in more detail.

1.4 Description of the Revised Remedy

This ROD Amendment applies to OU1 which addresses contaminated groundwater at the Site. In the OU1 ROD, the EPA selected groundwater extraction and treatment as the remedy to address contaminated groundwater. This ROD Amendment revises that remedy by selecting an enhanced exposure control remedy which includes the following components: (1) expanded groundwater and

¹ The National Priorities List, or NPL, is a list compiled by the EPA pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, of uncontrolled hazardous substance releases in the United States that are priorities for long-term remedial evaluation and response.

surface water monitoring; (2) permanent shutdown of the groundwater extraction and treatment system; (3) establishment of a technical impracticability (TI) zone; (4) performance of in situ hot spot treatment; (5) extension of the city of Camanche municipal water supply system; and (6) institutional controls. For reasons described below, this enhanced exposure control remedy will replace the groundwater extraction, pretreatment, treatment, and discharge components of the remedy as selected in the OUI ROD.

The EPA is the lead regulatory agency for this ROD Amendment, and the Iowa Department of Natural Resources (IDNR) is the support agency.

1.5 Statutory Determinations

The selected remedy is consistent with CERCLA and the NCP. The selected remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial action (except as waived), and are cost effective. Treatment of contaminant sources has occurred at the Site, both through landfill gas extraction (LGE) and groundwater extraction and treatment. In addition, hot spot treatment is a component of the revised remedy. Accordingly, the CERCLA preference for treatment has been, and will be, satisfied. However, the EPA recognizes that further treatment has limited applicability at the Site since it is technically impracticable from an engineering perspective to effectively treat groundwater in the bedrock.

Because the selected remedy will result in hazardous substances, pollutants, or contaminants remaining on-Site above levels that allow for unlimited use and unrestricted exposure, the EPA will continue to review the remedy no less often than every five years to ensure that the remedy is or will be protective of human health and the environment.

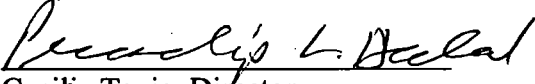
1.6 ROD Data Certification Checklist

The following information is included, as indicated, in this ROD Amendment. Additional information can be found in the Administrative Record file for the Site, OUI.

- Contaminants of Concern (COCs) and their respective concentrations – Section 2.3 and Appendix B.
- Baseline risk presented by the COCs – Section 4.5.
- How source materials constituting principal threats are addressed – Section 7.6.
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater in the baseline risk assessment and ROD – Sections 2.1 and 4.
- Potential land and groundwater use that will be available at the Site as a result of the selected remedy – Section 4.

- Estimated capital, annual operation and maintenance, total present worth costs, discount rate and the number of years over which the remedy cost estimates are projected – Section 5.7.
- Key factor(s) that led to the selected remedy – Section 3.

1.7 Authorizing Signature

fore 
Cecilia Tapia, Director
Superfund Division

12/26/12
Date

2. DECISION SUMMARY

2.1 Site Description and Site Geology

The Site is located in a predominantly semi-rural area, with agricultural fields, scattered residences and some industries. A polyethylene manufacturing plant that occupies a portion of the Site is currently operated by Equistar Chemicals (Equistar), a subsidiary of LyondellBasell Industries (Lyondell). A former fertilizer manufacturing plant, previously known as Hawkeye Chemical, Arcadian Fertilizers and PCS Nitrogen Fertilizer (PCS Nitrogen) and which is now owned by Cross Roads Land Development Corporation, is located southeast of the Site. The Todtz Superfund Site (IAD000606038) is located about one mile to the south of the Site (Figure 1).

Two streams, the Eastern and Western Un-named Tributaries, flow near the eastern and western boundaries of the Site. These two streams flow south, draining into Rock Creek. Rock Creek flows primarily west to east near the southern boundary of the former PCS Nitrogen property. About one-and-one-half miles southeast of the Site, Rock Creek flows adjacent to a series of lakes that, in part, are the result of past quarrying operations. Rock Creek and the lakes eventually discharge to the Mississippi River, located about two miles south of the Site.

A schematic illustration of the Site soil and bedrock layers, or "stratigraphy," is presented on Figure 2. The stratigraphic layers at the Site, from the ground surface downward, consist of: (1) an alluvial, unconsolidated soil overburden; (2) several fractured Silurian-era dolomite layers, consisting of the Upper Scotch Grove, Lower Scotch Grove, Picture Rock, Farmers Creek, Lower Hopkinton and Blanding layers; and (3) the Ordovician-era Maquoketa Shale layer.

The massive, dense shale of the Maquoketa Formation has extremely low permeability and serves as an "aquiclude" that blocks downward groundwater flow. The Picture Rock layer, which has a lower permeability than the overlying and underlying bedrock layers, restricts groundwater flow but does not block the flow completely.

2.2 Site History

The polyethylene plant began operating at the Site under the Chemplex name in 1968, manufacturing both low-density polyethylene (LDPE) and high-density polyethylene (HDPE). The plant includes several ethylene production areas, water and wastewater treatment plants, a landfill now called the "Chemplex Landfill," and several other chemical and product storage tanks and loading areas.

A byproduct of the polyethylene manufacturing process is debutanized aromatic concentrate (DAC), a liquid that is approximately 40 to 50 percent benzene. This byproduct is stored in above-ground tanks inside the plant before shipment via railroad car or tanker truck.

The West Region of the Site includes the seven acre Chemplex Landfill that was used for the disposal of various materials, including demolition debris and water treatment sludges. From about 1968 to 1978, tetrachloroethene, also known as tetrachloroethylene, perchloroethylene, or PCE, was used periodically at the plant to clean clogged process piping. Spent PCE was also reportedly disposed of within the Chemplex Landfill.

American Chemical Company and Getty Chemical Company (ACC/GCC) operated the Chemplex facility from 1968 through 1984, after which it was sold to a series of different entities. The polyethylene facilities are currently operated by Equistar. ACC/GCC owns the land occupied by the landfill, as well as other properties to the southwest.

2.3 Nature and Extent of Site Contamination

PCE is the primary contaminant of concern (COC) at the Site. The other key COCs in Site groundwater are benzene and polynuclear aromatic hydrocarbons (PAHs). Although the Chemplex Landfill is the primary source of PCE to the groundwater, it is believed that there is a second source of PCE, located within the East Region of the Site. While the landfill source contains both PCE and DAC, the East Region source apparently contains PCE but no DAC. This suspected second source is believed to be smaller than the landfill source. The Eastern Region source area was generally believed to be located near the active production areas of the plant. Contamination from this area may have originated from a combination of past drum and pipe leaks. Due to its proximity to buildings and active production areas, source evaluation was limited to monitoring wells in nearby locations. These wells indicated the presence of dense nonaqueous phase liquid (DNAPL) and a smaller source footprint compared to the West Region of the Site. The presence of DNAPL in fractured bedrock prevents any active source area remediation due to the strong potential for loss of contaminant equilibrium, resulting in movement of concentrated contaminants.

These two sources have resulted in two separate PCE plumes, the "West Plume" and the "East Plume" (Figure 3). Appendix B summarizes groundwater/surface water data from the latest sampling event conducted in April/May 2012. Figures 1 through 6 of Appendix B depict the PCE concentrations from the monitoring wells located in the stratigraphic layers at the Site, from the Overburden to the Blanding.

PCE and its breakdown products, also called "daughter products," can be biodegraded under certain conditions. Benzene and similar organics found in DAC are easily biodegraded, thus limiting their migration from the landfill or from the DAC storage and handling area. Migration of PAHs is limited due to poor mobility in soil and groundwater. Figure 8 of Appendix B depicts the concentrations of the COCs other than PCE that were detected during the April/May 2012 sampling event.

Past releases of nitrogen-containing chemicals from the former fertilizer manufacturing operations southeast of the Site - the PCS Nitrogen area - have resulted in substantial ammonia and nitrate concentrations in the groundwater under and downgradient of the former fertilizer facility. The location and extent of the nitrate plume is indicated on Figure 3. As a result of these past releases of nitrogen-containing chemicals, the groundwater located downgradient of the Chemplex East Region and the former fertilizer plant is no longer a viable long-term source of potable water for downgradient areas. However, the aquifer is still classified by the State as a drinking water aquifer.

2.4 Original Remedy

2.4.1 First Operable Unit Remedy

Through the OUI ROD, the EPA selected a groundwater extraction and treatment system to remediate contaminated groundwater beneath the landfill and the DAC storage and management area. The extent of the presence of PCE in the form of DNAPL was not known at the time that the OUI ROD was issued by the EPA. DNAPLs are liquids that are heavier than, and do not mix well with, water, including groundwater.

Based on groundwater monitoring data collected between October 1989 and March 1990, the presence of DNAPL was confirmed. In the OUI ROD, the EPA selected groundwater extraction and treatment as the remedy to address contaminated groundwater. This ROD Amendment revises that remedy by selecting an enhanced exposure control remedy which includes the following: (1) expanded groundwater and surface water monitoring; (2) permanent shutdown of the groundwater extraction and treatment system; (3) establishment of a TI zone; (4) performance of in situ hot spot treatment; (5) extension of the city of Camanche municipal water supply system; and (6) institutional controls. For reasons described below, this enhanced exposure control remedy will replace the groundwater extraction, pretreatment, treatment and discharge components of the remedy as selected in the OUI ROD.

The presence of DNAPL resulted in the EPA modifying the remedy through an "Explanation of Significant Differences," or "ESD," which it issued on July 26, 1991. The ESD was followed by a Consent Decree dated November 7, 1991, which was entered into between the United States and several defendants. This Consent Decree required the implementation of the remedy as set forth in the OUI ROD, as modified by the ESD.

Because available technologies are not able to effectively remove or otherwise remediate the DNAPL present at the Site, the remedial approach described in the ESD focused instead on containing the VOCs found in Site groundwater. To implement this containment approach, the ESD established a "Point of Compliance" boundary. For areas of contaminated groundwater located outside of this Point of Compliance boundary, called the "Attainment Areas," the ESD called for extracting and treating groundwater in an effort to meet health-based cleanup standards for groundwater. The Point of Compliance Boundary is shown on Figure 4.

For the contaminated groundwater within the Point of Compliance boundary, the objective at the time that the ESD was issued was the removal and containment of contaminant mass to the extent practicable so that this chemically-impacted area would no longer act as a source of contamination for the Attainment Areas. The ESD also recognized the possibility of implementing alternative approaches to addressing contaminated groundwater if it was demonstrated that groundwater extraction and treatment could not restore groundwater to drinking water standards outside of the Point of Compliance boundary.

The Site groundwater extraction and treatment system began operating in 1994 and consisted of 50 extraction wells screened at various depths in the soil overburden and underlying bedrock layers. When the system was in operation, extracted groundwater was conveyed to the Chemplex groundwater treatment system in two process streams. One stream, anticipated to contain both PAHs and VOCs, was labeled the Base-Neutral/Acid (BNA) Stream². The other stream, anticipated to contain only VOCs, was referred to as the VOC Stream. The BNA and VOC Streams were passed through separate air stripping towers to remove VOCs. The BNA Stream also flowed through granular activated carbon to remove PAHs. After treatment, the two streams were combined and discharged to the Mississippi River through a permitted outfall shared with the neighboring Equistar polyethylene plant.

The groundwater recovery and treatment system was placed into standby mode on September 29, 2008, as part of a "Performance Test" of a revised remedial alternative as discussed in more detail in Sections 3.2 through 3.4 below. Cumulatively, approximately 28,000 pounds of VOCs had been removed by the groundwater extraction and treatment system as of that date.

² "Base-neutral/acid" refers to a type of analytical test used to detect PAHs.

2.4.2 Second Operable Unit Remedy

The Second Operable Unit, also called "OU2," focused on remediating contaminated soil. OU2 remedial actions included constructing a low-permeability cover over the Chemplex Landfill and performing LGE to reduce VOC mass remaining in the landfill. The ROD for OU2, issued by the EPA on May 12, 1993, provides that the Remedial Action Objectives for these measures were to eliminate direct contact threats posed by the contaminated soils and wastes and reduce contaminant migration from soils and wastes to groundwater. The EPA and certain defendants entered into a Consent Decree for the implementation of the OU2 ROD. This Consent Decree became effective in February 1995.

The OU2 Statement of Work, an appendix to the OU2 Consent Decree, established cleanup requirements for the soil remedy. To eliminate threats of direct contact with contaminated soil, several areas within or near the polyethylene plant were designated for capping or for construction of vegetative covers, plus the posting of warning signs. These caps and covers have been constructed and are inspected annually and repaired as needed.

To reduce further contaminant migration from landfilled waste to groundwater, the OU2 Statement of Work also called for operating a LGE system for the portion of the Chemplex Landfill above the water table - that is, the "unsaturated zone." Five chemicals, PCE, benzene, toluene, ethylbenzene and xylene, were designated "Target Compounds." As described in the OU2 Statement of Work, the LGE system was to operate either until the Target Compound concentrations decreased in the extracted vapor to certain prescribed levels, or until four years of cumulative operation were recorded for each active LGE well.

The Chemplex Landfill's low-permeability cover and LGE system were constructed in 1997. The LGE system operated from February 1998 to April 2003. The system consisted of 55 LGE wells, a collection system for recovering floating oily materials and a catalytic oxidizer for treating the VOC-containing vapor stream extracted from the LGE wells. The LGE system was permanently shut down once four years of cumulative operation was achieved for all active LGE wells. VOC recovery from the LGE system decreased over time and at the time that the system was shut down, VOC recovery had reached a steady, low rate. Cumulatively, based on vapor flowrates and sample analyses, approximately 53,100 pounds of VOCs were removed by the LGE system, including 32,700 pounds of the five designated Target Compounds. The low permeability landfill cover will continue to be maintained under the revised remedy.

For more information regarding the mass recovery rate of the LGE system, refer to Table 3-2 of Appendix C of the February 2012 Updated Focused Feasibility Study (UFFS).

3. BASIS FOR THE ROD AMENDMENT

This ROD Amendment is based on consideration of the following factors as discussed below:

- The presence of DNAPL and dissolved VOCs in fractured bedrock;
- Groundwater monitoring data collected over the past 17 years;
- Status of bioremediation that is occurring in Site groundwater; and

- The impact of institutional controls that were implemented to minimize the potential for exposure to COCs.

3.1 Presence of DNAPL and Dissolved VOCs in Fractured Bedrock

As described in the UFFS dated February 2012, spent PCE used to unclog process piping during polyethylene manufacturing was reportedly disposed of in the Chemplex Landfill. This spent material then acted as a source of PCE contamination to Site groundwater. After traveling down through the soil overburden, PCE in the form of DNAPL is believed to have migrated vertically and horizontally through fractures in the underlying bedrock. This migration continued until the PCE became immobile due to being absorbed into rock pores or being trapped in dead-end fractures. PCE in the form of DNAPL has not been directly observed in the soil or groundwater at the Site, but the presence of DNAPL has been inferred from PCE concentrations measured in groundwater. PCE has a solubility limit of 150,000 micrograms per liter ($\mu\text{g/L}$). When concentrations of ten percent of PCE or more are detected in groundwater samples, pure phase product is presumed to be nearby. The ten percent level for PCE is 15,000 $\mu\text{g/L}$. PCE has been detected in source area monitoring well MW-17C in concentrations as high as 88,000 $\mu\text{g/L}$ as discussed in the ESD.

As discussed in the UFFS, reliable containment and remediation of contaminated groundwater in fractured rock at the Site was not possible utilizing the groundwater extraction and treatment remedy required by the OU1 ROD. There are several reasons for this. Due to the inability of well extraction to capture groundwater from the entire fractured bedrock network, the Site groundwater recovery system has not been able to effectively contain groundwater impacted by VOCs. As a result of these fractured bedrock conditions, groundwater capture by the Site recovery system cannot be significantly improved and made more effective by installing additional extraction wells. The specific bedrock fractures that would need to be intercepted or influenced by the groundwater recovery wells to effectively control VOC migration cannot be identified with existing technologies.

As described in the UFFS, the rate of VOC mass removal progressively declined following the startup of the groundwater extraction and treatment system in 1994. As of 2007-2008, the rate of VOC mass removal had reached a low, steady level of about two pounds per day. This decline suggests that groundwater extraction had removed the more-concentrated PCE from permeable, easy-to-access sand and gravel areas in the overburden and from the larger bedrock fractures. Although significant VOC mass was removed during the early years of operation, data collected over the past several years indicate that the Site groundwater recovery system was later limited to removing residual PCE diffusing back out of the bedrock pores - that is, "back-diffusing" - into groundwater migrating through nearby fractures.

The consequence of such slow, ongoing "back-diffusion" for the Site is that significant PCE mass will persist along the former DNAPL migration pathways long after residual DNAPL has largely disappeared. PCE continues to back-diffuse out of the impacted clay, silt and bedrock into the groundwater which will then continue to migrate. This back-diffusion occurs slowly, limiting the rate of remedial progress. Long-term removal of PCE mass cannot be controlled by how fast groundwater is pumped, but instead is governed by the rate at which PCE back-diffuses out from the impacted silt, clay and dolomite. Thus, additional groundwater extraction would not accelerate the time period for remediation.

The extent of DNAPL and other residual PCE sources in the subsurface is extremely difficult to characterize. Similar to many other fractured bedrock sites, DNAPL has never been directly observed in

soil cores or groundwater monitoring wells at the Site. The difficulty in locating DNAPL and other residual PCE mass is a major obstacle to source remediation at the Site. There are no reliable means of identifying or locating the DNAPL that may remain and there is concern that aggressively looking for it, or attempting to remediate it, could cause residual PCE to mobilize and spread beyond areas where it is already located. Whether or not PCE still exists in the form of DNAPL, most of the remaining PCE mass is now in bedrock pores, from where it will back-diffuse into surrounding groundwater for many decades.

The presence of residual DNAPL in the fractured bedrock also eliminates the potential to effectively remediate the VOC plumes by controlling remaining source areas. Even if all residual DNAPL at the Site source areas could somehow be identified, most of the remaining PCE mass is now located in rock pores, where it cannot be accessed. This remaining mass will continue to diffuse back out of the impacted fractured rock into migrating groundwater.

As a result of these factors, it is technically impracticable from an engineering perspective, using current technologies, to restore groundwater at the Site and achieve the cleanup goals set forth in the 1989 OUI ROD and 1991 ESD. A technical impracticability waiver of certain existing groundwater cleanup standards, called "Applicable or Relevant and Appropriate Requirements" or "ARARs," is therefore appropriate for this Site and is being invoked through this ROD Amendment. The basis for a technical impracticability waiver of ARARs at the Site is discussed in more detail below.

3.2 Groundwater Monitoring Data

Appendix B contains figures from the latest groundwater/surface water sampling event conducted in April/May 2012. The distribution of PCE measured in Site groundwater is depicted in Figures 1 through 6 of Appendix B. COCs other than PCE that were detected in Site groundwater are depicted in Figure 8 of Appendix B.

Figure 3 of this ROD Amendment illustrates the extent of the groundwater contaminant plume for PCE measured in Site groundwater. As shown on Figures 3 and 4, PCE had already migrated beyond the Point of Compliance boundary in several soil and bedrock layers before the groundwater extraction system was turned on in 1994. This migration beyond the Point of Compliance boundary was reflected in the 1991 ESD. The ESD's objective was to "pull back" the migrating PCE using the groundwater recovery system in an effort to achieve cleanup levels within the "Attainment Areas."

As described in the UFFS, analyses performed in 2007 and 2008 concluded that: (1) a significant portion of the PCE in groundwater in the downgradient Site area was not being recovered; (2) even after many years of extraction system operation, the horizontal extent of the plumes had generally not diminished; and (3) PCE mass in the lower bedrock layers had actually increased in places. Evidence supporting these findings includes the following:

- Downgradient PCE concentration contours had not improved since startup of the groundwater extraction system in 1994. Refer to Figures 6, 7 and 8 which indicate negative head differences or downward vertical gradients for monitoring well pairs MW-65-1/MW-65, MW-83B/MW-83C and MW-101C/MW-101D, respectively.

- PCE concentrations in groundwater monitoring wells have not shown a consistent downward trend. Examples of this are presented in Appendix B. Specifically, extraction wells EW-3a and EW-11a in Figure 2 of Appendix B and MW-116A in Figure 3 of Appendix B evidence this.
- PCE concentrations in deeper monitoring wells, in the Farmers Creek, Lower Hopkinton and Blanding stratigraphic layers, had often increased, indicating that groundwater extraction was pulling PCE-impacted groundwater deeper into the aquifer. Examples of this are evident in review of Appendix B. Refer to monitoring wells MW-109C, EW-14c and MW-73 on Figures 4, 5 and 6 of Appendix B, respectively.

As discussed above in Section 3.1, impacted groundwater has been migrating past the Point of Compliance boundary due to fractures present in the dolomite bedrock. These fractures, which run both horizontally and vertically, are partially interconnected, providing a preferential flow path for migrating groundwater. As previously discussed, dead-end or narrow fractures likely also provide a collection point for contamination.

As shown by years of groundwater monitoring data, the Site's groundwater extraction system has affected the movement of PCE-containing groundwater in downgradient areas. In particular, the "cones of depression" created by the extraction wells have affected the PCE migration in several ways. First, PCE-containing groundwater has moved laterally, such that PCE is found in areas where it was not encountered before. Second, vertical migration, either upward or downward, has been induced between rock layers. Third, groundwater extraction wells have drawn in clean groundwater from outside the plume, further affecting PCE levels. This clean water contains dissolved oxygen, which can inhibit the microbial "reductive dehalogenation" of PCE, an anaerobic (non-oxygen) process that serves to break down PCE biologically into daughter products.

The groundwater extraction and treatment system was placed into standby operation on September 29, 2008, as part of an EPA-approved Performance Test of the "Exposure Control" remedial alternative presented in the UFFS. Figure 3 illustrates the downgradient extent of the PCE plumes in 2008 and again in 2011. The figure indicates that the lateral extent of the PCE plumes has remained nearly stable during the Performance Test.

3.3 Intrinsic Bioremediation and "Hot Spot" Pilot Testing

Biological transformation of VOCs by indigenous bacteria can occur under aerobic (oxygen-containing) conditions or under anaerobic (non-oxygen) conditions. PCE, which does not break down aerobically—that is, in the presence of oxygen—can be degraded under anaerobic conditions by a bacterial process called "reductive dehalogenation" or "reductive dechlorination."

An investigation performed in 1997 and 1998 established that reductive dechlorination under anaerobic conditions is transforming PCE in the upper bedrock layers in the Site's West Region. In this area, hydrocarbons emanating from the Chemplex Landfill serve as an energy source, called "electron donor," for bacteria. This electron donor energy source was found to be available in the West Region groundwater in sufficient quantities such that microorganisms are completely dechlorinating the PCE, eventually creating the non-chlorinated daughter products ethene and ethane.

In an effort to supplement the PCE breakdown by these ongoing biological transformation processes, a pilot test of the treatment of localized "hot spots" of PCE in Site groundwater was conducted in 2009.

The pilot test applied permanganate, a strong chemical oxidant, at one well and vegetable oil, a supplemental "electron donor" that promotes the biological breakdown of PCE, at five other wells. The pilot test results were summarized in a Hot Spot Evaluation Report submitted to the EPA in 2010, which is included in Appendix A of the UFFS. This report indicated that hot spot treatment, using either permanganate to chemically oxidize chlorinated ethenes, or vegetable oil as a supplemental electron donor, was effective in remediating these local PCE hot spots. Based on these results, in situ treatment using vegetable oil or permanganate, or these two agents in sequence was included as a component of a revised groundwater remedy for this Site. More detail regarding the implementation of the hot spot treatment component of the remedy is discussed in Section 4.1.

3.4 Engineering Controls to Mitigate Potential Exposures

During 2009 and 2010, as part of the Performance Test of the revised remedy, an extension of the city of Camanche municipal water system was constructed to serve residences located south of the Site or downgradient of the contaminant plume. The residents had been using private wells for their water supply, thereby creating a potential path for future human exposure to Site COCs. A total of 20 properties, located downgradient of the contaminant plume, were connected to the expanded water system and the existing private wells were removed. Additional properties could be connected to the expanded water system in the future. The location of the municipal water system extension is shown by the orange line on Figure 4.

The water system extension provides additional protection of human health for residents connected to the expanded water system by reducing the risk of exposure to Site COCs in well water.

4. DESCRIPTION OF REVISED REMEDY

Table 1 summarizes the components of the OU1 groundwater remedy and the revised remedy. The components of the 1989 remedy included the following:

- Institutional controls to restrict the use of groundwater within the Point of Compliance Boundary.
- Groundwater recovery by operation of extraction wells in and around the groundwater plumes.
- Treatment of extracted groundwater at a groundwater treatment plant.
- Discharge of the treated groundwater to the Mississippi River through a permitted outfall under a National Pollutant Discharge Elimination System (NPDES) permit.

The revised groundwater remedy includes the following:

- Surface water and groundwater sampling and gauging using an expanded monitoring well network.
- Contingency measures if detected contaminant concentrations exceed certain trigger levels.
- Institutional controls consisting of:

- Environmental covenants prohibiting construction of potable water supply wells screened above the Maquoketa Shale in the area south of the Chemplex Site.
- A city of Camanche ordinance that requires connection of new water services to the city municipal water system in locations where municipal water main connections are available.
- Shutdown and decommissioning of the existing groundwater extraction and treatment system.
- Localized “hot spot” treatment with permanganate or vegetable oil “electron donor” as determined by the EPA to be appropriate based on monitoring data. Implementation of this component of the remedy is discussed in Section 4.1.
- Extension of the city of Camanche municipal water line along 9th Street and 31st Avenue and connection of designated residences to this extension as discussed in Section 3.4.
- Establishment of a “Technical Impracticability Zone” (TI Zone) with the boundary shown on Figure 5. Within this zone, certain groundwater cleanup standards, called “Applicable or Relevant and Appropriate Requirements” or “ARARs,” are subject to a “technical impracticability waiver” or “TI Waiver,” including selected Maximum Contaminant Levels³ (“MCLs”) for drinking water.

The revised remedy has been determined to be protective of human health and the environment, compliant with ARARs, except to the extent waived and cost-effective. The revised remedy utilizes permanent solutions. CERCLA contains a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity or mobility of contamination as a principal element. In this instance, hot spot treatment will be utilized (see below). While a significant quantity of contaminant mass has already been removed from the groundwater through treatment, additional groundwater extraction will have limited and diminishing effects and is expected to spread the contamination. Accordingly, groundwater treatment through extraction is not a component of the revised remedy.

The following sections of this ROD Amendment compare the original remedy and the revised remedy.

4.1 Treatment, Containment, and Storage Components

The 1989 OU1 remedy included a groundwater extraction system with 50 extraction wells screened at various depths in the soil overburden and underlying bedrock layers. When this recovery system was in operation, extracted groundwater was conveyed to the on-Site groundwater treatment system and treated by air stripping and granular activated carbon adsorption. After treatment, the groundwater was discharged to the Mississippi River through an NPDES-permitted outfall shared with the neighboring Equistar polyethylene plant.

The revised remedy includes treatment as well as “institutional controls.” Under the revised remedy, treatment is provided by “hot spot” injections, where a strong oxidant, such as permanganate, or an

³ MCLs are maximum permissible levels of contaminants in water which is delivered to users of a public water system. MCLs are promulgated by the EPA pursuant to the Safe Drinking Water Act.

electron donor, such as vegetable oil, is applied to the targeted groundwater area through wells. A pilot test of hot spot treatment performed in 2009 and 2010 proved effective in mitigating local areas having elevated PCE concentrations in groundwater. The results of the pilot test are discussed in more detail in Appendix A of the UFFS. Figures 2, 3, 4 and 8 of Appendix B indicate the change in concentration levels of the monitoring wells that were injected with vegetable oil or permanganate during the pilot test.

Under the revised remedy, hot spot areas will be identified on a case-by-case basis after evaluating data from the groundwater monitoring network. It is expected that the EPA and settling defendants will discuss each year's monitoring data, considering concentration trends, location and the potential for exposure. For each potential hot spot identified by the EPA, settling defendants will submit a workplan. The contents of the workplan will include a compilation of available data, the injection location(s), the composition of the oxidant or electron donor, a schedule for performing the work and a proposal for follow-up monitoring.

The already-implemented extension of the city of Camanche municipal water pipeline extension to residences located downgradient of the Site reduced the potential for future PCE exposure. During 2009 and 2010, this extension of the city of Camanche municipal water system was constructed to serve downgradient residences as part of the Performance Test. Residential water supply wells were removed and abandoned in accordance with state procedures. Under a city of Camanche ordinance, no new water supply wells may be constructed on these properties. A total of 20 properties were connected to the expanded water system, including all identified residences along 31st Avenue. Residences along this street are located downgradient of the East Region plume and are also south of the former fertilizer manufacturing plant. The orange line on Figure 4 shows the pipeline's location.

4.2 Institutional Control Components

The revised remedy includes the following institutional controls outlined in the Institutional Control Plan (MWH, 2009):

- An ordinance enacted by the city of Camanche that prohibits new private water supply wells in the area downgradient of the Site;
- Environmental covenants on certain properties, including the Equistar polyethylene plant property, the Cross Roads Property which encompasses the former PCS Nitrogen fertilizer plant, and the Chemplex Landfill and lands owned by ACC/GCC. These environmental covenants will:
 - Prohibit the construction of groundwater wells screened above the Maquoketa Shale layer to supply water for human consumption, livestock watering or agricultural use;
 - Require that all new groundwater wells constructed through the Maquoketa Shale formation and screened within underlying layers be sealed during construction and operation to the satisfaction of the EPA and the Iowa Department of Natural Resources (IDNR);
 - Require the written permission of IDNR and the EPA prior to abandoning or removing a groundwater well from the Site or from the Chemplex groundwater monitoring network;

- Prohibit residential use of the referenced properties;
- Prohibit extraction from dewatering groundwater wells or sumps, as well as any activity that may interfere with monitoring or remedial action required by governmental authority; and
- Grant access to EPA, IDNR, ACC/GCC and their authorized contractors to conduct monitoring and other activities required by the EPA or IDNR.

All of these institutional controls have now been implemented.

Figure 4 shows the areas covered by the environmental covenants and by the city of Camanche well ordinance.

4.3 Other Components of the Revised Remedy

Table 2 describes the monitoring program under the revised remedy, as set forth in the Performance Monitoring Evaluation Plan (the "PME Plan") and PME Plan Addendum No. 3. These documents describe monitoring locations and analytical methods.

The revised remedy incorporates contingency measures that can be implemented if detected VOC concentrations exceed certain "trigger" levels. The Site has been divided into monitoring zones as depicted on Figure 9. Table 3 includes the trigger levels. Contingency measures will be implemented as approved by the EPA and IDNR based on consideration of monitoring data and, in certain cases, a Technical Memorandum or focused feasibility study. Potential contingency measures can include one or more of the following:

- Construction of additional monitoring wells,
- Increasing the monitoring frequency at existing monitoring wells,
- Hot-spot injections of electron donor, oxidant, or both, or
- Fencing off or aerating impacted stream segments and posting warning signs.

Section 4.7.2.5 of the UFFS describes these measures in more detail.

4.4 ARARs

The ARARs for the Chemplex groundwater remediation, along with standards "to be considered" (called "TBCs"), were initially identified in Section 5.2 of the 1989 OU1 ROD and in Tables 3A, 3B, 3C, 4A, 4B and 4C of this ROD Amendment. The ARARs tables, labeled "A," "B" and "C" respectively, discuss three types of ARARs, namely "Chemical-Specific," "Location-Specific" and "Action-Specific," for each alternative.

The revised remedy incorporates a "technical impracticability waiver," also called a "TI waiver," of certain drinking water MCLs considered to be chemical-specific ARARs. This TI waiver is established

in recognition that achieving these MCLs within a specific area is technically impracticable from an engineering perspective.

The area within which the waiver is granted, called the TI Zone, is shown on Figure 5. The zone boundaries have been set based on the EPA's review of groundwater monitoring data, particularly in the area downgradient of the Site. The TI zone extends vertically from the ground surface down to the Maquoketa Shale layer.

Table 5 specifies the analytes for which certain ARARs—that is, drinking water MCLs—are waived within the TI Zone. This list is limited to those analytes for which a record of non-attainment is indicated by the monitoring data.

4.5 Effects on Remedial Action Objectives and Expected Outcomes

Remedial Action Objectives, or "RAOs," help guide the development and implementation of remedial approaches. As described in the UFFS, the OUI Remedial Action Objectives are hereby updated to reflect developments at the Site:

Remedial Action Objective 1: Prevent human exposure to VOCs in groundwater and accessible surface waters at levels greater than a cumulative Hazard Index of 1.0 for non-carcinogenic risks and a cumulative incremental lifetime cancer risk exceeding the range of 10^{-4} (one in ten thousand) to 10^{-6} (one in one million).

- The Hazard Index is defined as the sum of the Hazard Quotients or estimated non-carcinogenic risks for each VOC to which an individual may be exposed in the form of groundwater. Each VOC's contribution to the Hazard Index is the estimated potential dosage divided by the "reference dose," for drinking water exposures and other oral exposures, or by the "reference concentration," for inhalation exposures.
- Carcinogenic risks are estimated by multiplying the projected dosage for each VOC by either (1) the Cancer Slope Factor, for drinking water exposures and other oral exposures, or (2) the Unit Risk Factor, for inhalation exposures.

Remedial Action Objective 2: Limit exposure by potential ecological receptors in Rock Creek and downgradient surface waters to:

- PCE at levels exceeding 98 $\mu\text{g/L}$ in designated surface waters,
- Trichloroethene (TCE) at levels exceeding 80 $\mu\text{g/L}$,
- 1,2-Dichloroethene (1,2-DCE) at levels exceeding 590 $\mu\text{g/L}$, and
- Vinyl chloride (VC) at levels exceeding 930 $\mu\text{g/L}$.

Remedial Action Objective 3: Prevent migration of Site-related COCs, above the health-based concentrations described in Remedial Action Objective 1, to those portions of downgradient areas where groundwater is being used as a potable water supply.

If cancer-related risks are projected to exceed the 10^{-4} level based on the assessment of the potential risk posed by Site conditions, then additional response actions would be required and the 10^{-6} level is used as the "point of departure" for evaluating remedial alternatives. If the cancer-related risk is between 10^{-4} and 10^{-6} , the EPA will determine if additional response actions are necessary. Cleanup is generally not required if the cancer-related risk is less than 10^{-6} .

Based on the assessments documented in the UFFS and after review of Site monitoring data, the revised remedy satisfies all Remedial Action Objectives. The OU1 remedy, which relies on an extraction and treatment remedial approach, would not meet Remedial Action Objective 3 in the long term because effective and reliable VOC capture was not found to be feasible in the fractured bedrock. The revised remedy provides long-term protection of human health by extending the municipal water system to downgradient residences and by expanding the groundwater and surface water monitoring network.

Table 5 compiles the previous and the revised groundwater cleanup levels for areas outside the TI Zone. The UFFS presents rationale for updating certain groundwater cleanup goals.

5. EVALUATION OF ALTERNATIVES

The NCP requires that the original remedy and the revised remedy be compared using the following nine criteria:

- Overall protection of human health and the environment
- Compliance with ARARs
- Long-term effectiveness and permanence
- Reduction of toxicity, mobility or volume through treatment
- Short-term effectiveness
- Implementability
- Cost
- State acceptance
- Community acceptance

Table 6 summarizes this comparison. Each criterion is also discussed below.

5.1 Overall Protection of Human Health and the Environment

The 1989 groundwater remedy implementing groundwater extraction and treatment does not effectively protect human health because of the potential for future exposure to PCE-contaminated groundwater and the impossibility of complete capture of PCE-containing groundwater due to the fractured bedrock conditions. Under these conditions, neither extracting from the Chemplex groundwater recovery system at a greater flowrate nor adding more recovery wells would result in effective and reliable VOC capture.

The potential for human exposure to VOCs in groundwater, in particular from the use of private water supply wells, would thus remain if the groundwater remedy selected in 1989 continues to be implemented.

The revised remedy will increase protection of human health because it reduces the potential risk of future exposure to PCE through (1) the already-completed construction of the municipal waterline extension, and (2) a prohibition, by city ordinance, on the use of private wells. Further protection will be provided by natural attenuation processes, hot spot treatment through oxidant or electron donor application and groundwater and surface water monitoring. Based on the results of the EPA-approved Performance Test conducted from 2008 to 2011, PCE concentrations are not expected to pose a risk to ecological receptors in surface water.

The groundwater monitoring data indicate multiple lines of evidence that natural attenuation processes including microbial reductive dehalogenation, dispersion and advection are working at the Site. The most recent groundwater monitoring data from the April/May 2012 sampling event are included as Appendix B of this ROD Amendment. As shown on Figure 8 of Appendix B, the daughter products of PCE which are TCE, cis-1,2-DCE and VC, are being produced. The presence of these daughter products indicates that dehalogenation processes are working at the Site. As shown on Figures 1 through 6 of Appendix B, PCE concentrations in the downgradient areas of the groundwater monitoring network are typically low and stable or decreasing. (Refer to more discussion of this in Section 3.2). As shown on Figure 3, the downgradient extent of the PCE plume has been stable from 2008 to 2011. Review of the figures from Appendix B indicates that the plume is still stable. Dehalogenation and plume stability are the lines of evidence that indicate natural attenuation processes are working.

Institutional controls have also been established, including the city of Camanche well ordinance, environmental covenants and land owner agreements. These controls provide additional protection of human health and the environment through land and groundwater use restrictions.

5.2 Compliance with ARARs

Drinking water MCLs established pursuant to the Safe Drinking Water Act are chemical-specific ARARs for the Site. The groundwater cleanup levels established in this ROD Amendment continue to be based on drinking water MCLs. The EPA has determined that it is technically impracticable from an engineering perspective to restore groundwater to such cleanup levels within the TI Zone using any current technology. Given the conditions at the Site and upon review of the Site's monitoring data, the EPA has determined that a technical impracticability waiver of certain chemical-specific ARARs is appropriate for the Site. Figure 5 shows the delineation of the TI Zone and Table 5 identifies the specific cleanup levels that have been waived within the TI Zone.

EPA has further determined that compliance with cleanup levels outside the TI Zone will be assessed by monitoring groundwater along and upgradient from the TI Zone boundary.

5.3 Long-Term Effectiveness and Permanence

The existing OU1 groundwater remedy does not effectively, on a long-term basis, prevent possible future migration of PCE-containing groundwater and cannot achieve cleanup goals downgradient of the Site.

The revised remedy, which does not include the continued operation of the OU1 groundwater extraction system, will provide more long-term effectiveness and permanence than operation of the extraction system because it allows for flattening of the gradients and natural attenuation of the COCs. The hot spot treatment component of the revised remedy will provide further treatment of the COCs in areas with elevated concentrations.

The revised remedy will control long-term exposure as most downgradient residences have been connected to the municipal water system and private residential water wells have been properly removed and abandoned. Future drilling of drinking water wells will be prohibited under the city of Camanche ordinance. Thus, residents in the long term will be protected against potential exposure to PCE-containing groundwater.

5.4 Reduction of Toxicity, Mobility or Volume through Treatment

Under the 1989 OU1 groundwater remedy, VOCs in extracted groundwater were removed by the groundwater treatment system. In addition, as demonstrated during field investigations (EKI, 1998), biodegradation is occurring in the West Region, with limited biodegradation in the East Region. However, the OU1 remedy appeared to interfere with the natural biodegradation processes by increasing groundwater velocities and by drawing in oxygen-containing groundwater into the extraction well network. The extraction well system also pulled chemical mass down into deeper bedrock zones.

The revised remedy will reduce VOC toxicity, mobility and volume through localized treatment of VOC "hot spots" by adding an electron donor or a strong oxidant. By restoring pre-pumping groundwater flow patterns, the revised remedy will also help restore natural biodegradation processes, promoting additional reduction of contaminant toxicity, mobility and volume.

5.5 Short-Term Effectiveness

The OU1 groundwater remedy may have been effective in the short term, as Site chemicals have not been found in private water supply wells at levels of concern.

The revised remedy will be effective in the short term and the long term, since residents connected to the municipal water system are protected against potential exposure to PCE-containing groundwater.

5.6 Implementability

The revised remedy has also been shown to be implementable as reflected by the Performance Test of the remedy conducted from 2008 to 2011.

5.7 Cost

As described in the UFFS, continuing the 1989 OU1 remedy does not require the expenditure of further capital costs, but does require expenditure of estimated total operation and maintenance costs of \$51.9 million through 2039, equivalent to \$27.9 million on a present worth basis.

The revised remedy will require the expenditure of \$8,000,000 of estimated capital costs and \$19.7 million of operation and maintenance costs, equivalent to a total present worth of \$18.6 million.

The present worth costs were calculated based on an Equivalent Uniform Annual Interest Rate of five percent. Detailed cost tables are included on Tables 5-2 through 5-10 of the UFFS.

5.8 Support Agency Acceptance

IDNR has participated with the EPA over the past several years in the development of the revised remedy and in the assessment of regional groundwater conditions. IDNR supports the revised remedy and considers it preferable to the 1989 OU1 remedy.

5.9 Community Acceptance

The EPA sought public comment on the Proposed Plan, with a public comment period extending from February 17 through March 19, 2012. A public meeting was held in Camanche on February 27, 2012. Relevant documents were available for review at the EPA Records Center in Lenexa, Kansas and at the Camanche Public Library.

Comments received during this public comment period were considered in the development of this ROD Amendment. A responsiveness summary showing public comments and the EPA's responses is provided as Appendix A to this ROD Amendment. Public comments on the Proposed Plan were generally focused on potential surface water impacts. It is the EPA's judgment that surface waters will be adequately protected through implementation of the revised remedy. The lack of other comments on the revised remedy suggests that the community is not unsupportive of the revised remedy.

6. SUPPORT AGENCY COMMENTS

This ROD Amendment has been prepared in consultation with the IDNR. Support agency concerns were addressed through an informal consultation process. An email indicating IDNR's concurrence on the ROD Amendment is included in Appendix C and in the Administrative Record for this ROD Amendment.

7. STATUTORY DETERMINATIONS

Under Section 121 of CERCLA and under the NCP, the lead regulatory agency must select remedies that: (1) are protective of human health and the environment; (2) comply with ARARs (unless a statutory waiver such as a TI waiver is obtained); (3) are cost effective; and (4) utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment to permanently and significantly reduce the volume, toxicity or mobility of wastes as a principal element and a bias against off-site disposal of untreated wastes.

The following sections discuss how the revised remedy meets these statutory requirements.

7.1 Protection of Human Health and the Environment

The revised remedy will be protective of human health by providing a municipal water source to downgradient residents for domestic use, thereby preventing potential future exposure to contaminated groundwater via domestic use of private wells. The municipal waterline extension and individual residential connections have been completed.

Further protection will be provided through natural attenuation, treatment through oxidant or electron donor application at identified VOC "hot spots" and groundwater and surface water monitoring. The presence of multiple lines of evidence to support natural attenuation is discussed in more detail in Section 5.1 of this ROD Amendment. Institutional controls, consisting of a city ordinance, environmental covenants and land owner agreements, will provide additional protection of human health by minimizing residential exposure to impacted groundwater obtained from private wells.

7.2 Compliance with ARARs

The revised remedy will comply with ARARs with the exception of certain chemical-specific ARARs waived within the TI Zone by means of a TI Waiver. Outside the TI Zone, ARARs are anticipated to be met, including MCLs set forth by the Safe Drinking Water Act. Federal and state surface water quality standards are also expected to be met. Remedial Action Objectives pertaining to protection of potential human and ecological receptors will be achieved.

7.3 Cost Effectiveness

Section 300.430 of the NCP states that: "a remedy shall be cost-effective if costs are proportional to its overall effectiveness." The revised remedy will allow a more cost-effective approach to protecting human health and the environment.

7.4 Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

The revised remedy, due to extension of the municipal water system westward along 9th Street, represents a permanent solution to potential exposure to contaminated groundwater for the serviced downgradient residences. The remedy will also include localized treatment and destruction of VOC mass through chemical oxidation or using enhanced biodegradation technologies such as addition of supplemental electron donor.

7.5 Preference for Treatment as a Principal Element

Under the revised remedy, localized "hot spot" treatment through oxidation or electron donor addition will satisfy the statutory preference for remedies that employ treatment as a principal element. The revised remedy is also anticipated to restore conditions conducive to promoting biodegradation and other natural attenuation processes.

7.6 Treatment of Principal Threat Wastes

The NCP establishes an expectation that the EPA will use treatment to address the principal threats posed by a site, whenever practicable (NCP § 300.430[a][1][iii][A]). The “principal threat” concept is applied to the characterization of “source materials” at a Superfund site. A source material is a material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater, to surface water, to air or acts as a source for direct exposure. Contaminated groundwater generally is not considered to be a source material; however, non-aqueous phase liquids (NAPLs) in groundwater may be viewed as source material.

As discussed in Section 2.3, source contamination exists in the West Region and East Region of the Site as depicted on Figure 1. Contamination in these areas, which include contaminated source soils and DNAPL in fractured bedrock, could potentially be considered principal threat wastes. These wastes have been and it is expected that they will continue to be, sources of groundwater contamination. As discussed in Section 2.4.2, operation of the OU2 LGE was effective in substantially removing contaminated source materials in the Landfill Area in the West Region of the Site. Section 2.3 explains the rationale for not conducting further investigation and remediation in the Eastern Region source area. The preference for treatment of principal threat waste has been satisfied through the operation of the LGE system and will be further satisfied through the hot spot treatment which is a component of the revised remedy.

7.7 Five-Year Review Requirement

Because the revised remedy will result in contaminants remaining on the Site above levels that allow for unlimited groundwater use and unrestricted exposure, a statutory review will be conducted within five years after completion of the 2009 Five-Year Review to ensure that the remedy is and will remain protective of human health and the environment. The due date for the next Five-Year Review is June 5, 2014.

8. PUBLIC PARTICIPATION COMPLIANCE

The Proposed Plan for this ROD Amendment was issued for public comment in accordance with Section 117 of CERCLA, as amended, and Paragraph 300.435(c)(2)(ii) of the NCP. The Proposed Plan was made available on February 17, 2012, in the Administrative Record file at the following locations:

Camanche Public Library
102 12th Avenue
Camanche, Iowa 52730
(563) 259-1106

U.S. EPA Records Center
Region 7
11201 Renner Boulevard
Lenexa, Kansas 66219

A public notice was published in the Clinton Herald on February 17, 2012, announcing the commencement and duration of the public comment period and the availability of the Administrative Record file for public review. The public comment period extended from February 17 through March 19, 2012.

A public meeting was held on February 27, 2012, at Garner Hall in Camanche, Iowa to present details related to the Proposed Plan and to solicit public comments. The Responsiveness Summary provided in Appendix A addresses comments received on the Proposed Plan.

9. DOCUMENTATION OF CHANGES FROM PROPOSED PLAN

There are no material changes to the revised remedy from the description provided in the Proposed Plan.

10. REFERENCES⁴

EKI. 17 March 1998. *Natural Attenuation Investigation: Summary of August 1997 In-Situ Groundwater Sampling, First Operable Unit, Chemplex Site, Clinton, Iowa*. Letter to Nancy Swyers, P.E., EPA, Region VII, from James E. Anderson, Ph.D, and Thomas J. Belick.

EKI. 8 February 2012. *Updated Focused Feasibility Study, Operable Unit No. 1 for Groundwater, Chemplex Site, Clinton, Iowa*. Erler & Kalinowski, Inc,

EPA. September 1989 (1989a). *Record of Decision – The Landfill and DAC Areas – Groundwater Operable Unit, Chemplex Site, Clinton, Iowa*. EPA, Region 7, Kansas City, Kansas.

EPA. 28 September 1989 (1989b). *Consent Decree for the Remedial Design/Remedial Action*. (Entered 1991.)

EPA. 13 May 1993 (1993). *Record of Decision – Soils and Wastes Operable Unit, Chemplex Site, Clinton, Iowa (OU 2)*.

EPA. 6 February 1995. *Consent Decree for the Remedial Design/Remedial Action – Chemplex Site, Clinton, Iowa (OU 2)*.

Golder Associates. 31 December 1998. *Final Construction Completion Report, Chemplex Site, Operable Unit No. 2*.

MWH, February 2009. *Institutional Control Plan for Chemplex Site*.

MWH, December 2010. *Hot Spot Pilot Test Evaluation Report for Chemplex Site in Clinton, Iowa*.

MWH, 2 April 2012. *PME Plan Addendum 3, Chemplex Site – 2012 Sampling and Gauging Schedule*.

⁴ The referenced documents are included in the Administrative Record for the Site or through the EPA's Regional Records Center. All documents are publicly available upon request.

Tables

TABLE 1
Summary of Remedy Options

Component	1989 OU-1 Remedy (Pump and Treat)	Revised Remedy (Enhanced Exposure Control)
Institutional Controls	<ul style="list-style-type: none"> • Maintain existing signs around Chemplex Landfill and other Second Operable Unit (OU-2) areas • Maintain existing Point of Compliance (POC) boundary 	<ul style="list-style-type: none"> • Establish covenants restricting construction of potable water supply wells screened above the Maquoketa Shale. • Promugate an ordinance to require connection of new water services to the City of Camanche municipal water system in downgradient areas where municipal water main connections are available (such an ordinance has already been implemented as part of the Performance Test of a potential new groundwater remedy). • Maintain existing signs around Chemplex Landfill and other Second Operable Unit (OU-2) areas
Active Remediation	<ul style="list-style-type: none"> • Operate groundwater extraction for containment purposes in accordance with the First Operable Unit (OU-1) Consent Decree and Explanation of Significant Differences. 	<ul style="list-style-type: none"> • Permanently shut down the existing groundwater recovery and treatment system. • Perform localized "hot spot" treatment as required by EPA based on monitoring monitoring data.
Engineering Controls	<ul style="list-style-type: none"> • Maintain the Chemplex Landfill and Second OU-2 study area vegetative covers • ACC/GCC and Lyondell/Equistar to maintain existing fencing around Chemplex Landfill and other OU-2 areas 	<ul style="list-style-type: none"> • ACC/GCC and Lyondell/Equistar to maintain existing fencing around Chemplex Landfill and other OU-2 areas. • Extend City of Camanche municipal water pipeline extension along 9th Street, 31st Avenue, and 37th Avenue; connect designated residences located potentially downgradient of groundwater plumes (already implemented as part of Performance Test). • Maintain the Chemplex Landfill and Second OU-2 study area vegetative covers

TABLE 1
Summary of Remedy Options

Component	1989 OU-1 Remedy (Pump and Treat)	Revised Remedy (Enhanced Exposure Control)
Monitoring	<ul style="list-style-type: none"> • Continue quarterly groundwater level gauging in accordance with the Project Monitoring Evaluation Plan (PME Plan) • Continue monitoring groundwater treatment system performance in accordance with the current National Pollutant Discharge Elimination System (NPDES) permit • Continue annual monitoring of in-situ groundwater and the Western Un-Named Tributary in accordance with the PME Plan, and monitoring of Lyondell/Equistar Production Well Nos. 1, 4, 6, and 7 every two years for VOCs 	<ul style="list-style-type: none"> • Conduct monitoring in accordance with the plans described in Table 2 and in the PME Plan, including construction of new monitoring wells (already implemented as part of Performance Test). • Monitor Lyondell/Equistar Production Well Nos. 1, 4, 6, and 7 every two years for VOCs
Potential Contingency Measures	<ul style="list-style-type: none"> • Additional groundwater extraction wells could be constructed in the downgradient East Plume area, with the permission of affected landowners. • If surface water chemical levels exceed applicable water quality criteria, affected areas could be fenced off and warning signs posted. Localized aeration of stream segments could also be considered. 	<p>Contingency Measures could consist of one or more of the following potential measures:</p> <ul style="list-style-type: none"> • Specific contingency measures would be implemented based on consideration of submitted monitoring data and, in certain cases, a Technical Memorandum, in accordance with the procedure described in the Updated Focused Feasibility Study (UFFS). If deemed appropriate, ACC/GCC could also be required to prepare a focused feasibility study to further evaluate available data and potential responses. • If VOC levels in surface water exceed applicable water quality criteria or human health risk levels, affected areas can be fenced off and warning signs posted. Localized aeration of stream segments could also be considered. • Construct additional monitoring wells if VOC levels are confirmed to be elevated. • Implement localized "hot-spot" treatment with permanganate or electron donor such as vegetable oil (pilot study has been successfully completed) • Further extend the City of Camanche municipal water system within the potentially downgradient area.
Technical Impracticability Zone	<ul style="list-style-type: none"> • Continue to monitor groundwater outside the existing Point of Compliance boundary. 	<ul style="list-style-type: none"> • Establish a Technical Impracticability (TI) Zone, with the approximate boundaries shown on Figure 5. Within the TI Zone, chemical-specific ARARs (Applicable or Relevant and Appropriate Requirements), including drinking water primary Maximum Contaminant Levels (MCLs) indicated in Table 5, would be waived. MCLs would still be applicable and enforceable outside the TI Zone. • The existing Point of Compliance boundary would no longer be in effect.

TABLE 2
Summary of Monitoring Plan Under Revised Remedy

Sample Location	Stratigraphic Layer	Gauging Frequency	Sampling Frequency (VOCs)	Monitoring Zone
3	OVB	Semiannual	Semiannual	Routine Monitoring Zone
3A	OVB	Semiannual	None	-
4	OVB	Semiannual	None	-
ARC MW-1	OVB	Semiannual	None	-
ARC MW-2	OVB	Semiannual	None	-
ARC MW-8	OVB	Semiannual	None	-
ARC MW-14	OVB	Semiannual	None	-
ARC MW-200B	LSG	Semiannual	Semiannual	Routine Monitoring Zone
ARC MW-200C	FC	Semiannual	Semiannual	Routine Monitoring Zone
ARC MW-200D	LH	Semiannual	Semiannual	Routine Monitoring Zone
ARC MW-201B	LSG	Semiannual	Annual	Contingency Well Trigger Zone
ARC MW-201C	FC	Semiannual	Annual	Contingency Well Trigger Zone
ARC MW-205B	LSG	Semiannual	Annual	Contingency Well Trigger Zone
ARC MW-205C	FC	Semiannual	Annual	Contingency Well Trigger Zone
ARC MW-205D	BL	Semiannual	Annual	Contingency Well Trigger Zone
ARC MW-206B	LSG	Semiannual	Annual	Contingency Well Trigger Zone
ARC MW-207B	LSG	Semiannual	Annual	Heightened Awareness Zone
ARC MW-207C	FC	Semiannual	Semiannual	Heightened Awareness Zone
ARC MW-208B	LSG	Semiannual	Annual	Heightened Awareness Zone
ARC MW-208C	FC	Semiannual	Annual	Heightened Awareness Zone
ARC MW-209BC	LSG/FC	Semiannual	Semiannual	Heightened Awareness Zone
ARC MW-210BC	LSG/FC	Semiannual	None	-
ARC MW-211B	LSG	Semiannual	None	-
ARC MW-211C	FC	Semiannual	Semiannual	Contingency Well Trigger Zone
ARC MW-212B	LSG	Semiannual	None	-
ARC MW-212C	FC	Semiannual	None	-
DAC-1	OVB/USG	Semiannual	None	-
DG-16	USG	Semiannual	Annual	Routine Monitoring Zone
DG-17B	USG	Semiannual	None	-
DG-18B	LSG	Semiannual	Semiannual	Routine Monitoring Zone
DG-19B	USG	Semiannual	None	-
DG-21B	USG	Semiannual	Semiannual	Routine Monitoring Zone
DG-21C	LSG	Semiannual	Semiannual	Routine Monitoring Zone
EW-3a	USG	Once in 2012	Once in 2012	Routine Monitoring Zone
EW-6b	FC	Semiannual	None	-
EW-6c	LH	Semiannual	Semiannual	Routine Monitoring Zone
EW-7a	USG	Semiannual	Semiannual	Routine Monitoring Zone
EW-7b	FC	Once in 2012	Once in 2012	Routine Monitoring Zone
EW-7c	LH	Semiannual	None	-
EW-8a	USG	Semiannual	None	-
EW-10a	USG	Semiannual	None	-
EW-11a	USG	Semiannual	Annual	Routine Monitoring Zone
EW-11b	FC	Semiannual	Semiannual	Routine Monitoring Zone
EW-11c	LH	Semiannual	Annual	Routine Monitoring Zone
EW-13b	FC	Semiannual	Annual	Routine Monitoring Zone

TABLE 2
Summary of Monitoring Plan Under Revised Remedy

Sample Location	Stratigraphic Layer	Gauging Frequency	Sampling Frequency (VOCs)	Monitoring Zone
EW-13c	LH	Semiannual	None	-
EW-14b	FC	Semiannual	Annual	Routine Monitoring Zone
EW-14c	LH	Semiannual	Semiannual	Routine Monitoring Zone
EW-15a	USG	Semiannual	None	-
EW-16c	LH	Semiannual	None	-
EW-18a	USG	Semiannual	None	-
EW-19a	USG	Semiannual	None	-
LF-2	OVB/USG	Semiannual	None	-
LF-4	OVB/USG	Semiannual	None	-
LF-6	OVB/USG	Semiannual	None	-
Munck Residence	Unknown	None	Annual	Routine Monitoring Zone
MW-4	OVB	Semiannual	None	-
MW-18B	USG	Semiannual	Annual	Routine Monitoring Zone
MW-18C	LSG	Semiannual	Semiannual	Routine Monitoring Zone
MW-19B	USG	Semiannual	None	-
MW-30B	USG	Semiannual	None	-
MW-53A	OVB	Semiannual	Semiannual	Routine Monitoring Zone
MW-56	FC	Semiannual	None	Routine Monitoring Zone
MW-56-1	USG	Semiannual	None	Routine Monitoring Zone
MW-57	BL	Semiannual	None	Routine Monitoring Zone
MW-57-1	USG	Semiannual	Semiannual	Routine Monitoring Zone
MW-58	USG	Semiannual	None	-
MW-70	BL	Semiannual	Annual	Routine Monitoring Zone
MW-73	BL	Semiannual	Semiannual	Routine Monitoring Zone
MW-73-1	FC	Semiannual	None	-
MW-73-2	LSG	Semiannual	None	-
MW-74-1	LSG	Semiannual	None	-
MW-81B	LSG	Semiannual	None	-
MW-81C	FC	Semiannual	None	-
MW-82B	LSG	Semiannual	Annual	Routine Monitoring Zone
MW-82C	FC	Semiannual	Annual	Routine Monitoring Zone
MW-83B	LSG	Semiannual	None	-
MW-83C	FC	Semiannual	None	-
MW-85B	LSG	Semiannual	Annual	Routine Monitoring Zone
MW-85C	FC	Semiannual	Annual	Routine Monitoring Zone
MW-85D	BL	Semiannual	None	-
MW-87A	USG	Semiannual	None	-
MW-94A	OVB	Semiannual	Annual	Routine Monitoring Zone
MW-97A	USG	Semiannual	Semiannual	Routine Monitoring Zone
MW-97B	LSG	Semiannual	None	-
MW-97C	FC	Semiannual	Annual	Routine Monitoring Zone
MW-99A	OVB	Semiannual	Semiannual	Routine Monitoring Zone
MW-102E	BL	Semiannual	None	-
MW-103B	LSG	Semiannual	Semiannual	Routine Monitoring Zone
MW-103C	FC	Semiannual	Semiannual	Routine Monitoring Zone

TABLE 2
Summary of Monitoring Plan Under Revised Remedy

Sample Location	Stratigraphic Layer	Gauging Frequency	Sampling Frequency (VOCs)	Monitoring Zone
MW-103D	BL	Semiannual	Semiannual	Routine Monitoring Zone
MW-104B	LSG	Semiannual	Annual	Heightened Awareness Zone
MW-104C	FC	Semiannual	Annual	Heightened Awareness Zone
MW-104D	BL	Semiannual	None	Heightened Awareness Zone
MW-105B	LSG	Semiannual	Semiannual	Contingency Well Trigger Zone
MW-105C	FC	Semiannual	Semiannual	Contingency Well Trigger Zone
MW-105D	BL	Semiannual	None	-
MW-106A	USG	Semiannual	Semiannual	Routine Monitoring Zone
MW-106B	LSG	Semiannual	Semiannual	Routine Monitoring Zone
MW-106C	FC	Semiannual	Semiannual	Routine Monitoring Zone
MW-107A	OVB	Semiannual	Semiannual	Routine Monitoring Zone
MW-107B	LSG	Semiannual	Semiannual	Routine Monitoring Zone
MW-107C	FC	Semiannual	Semiannual	Routine Monitoring Zone
MW-108B	LSG	Semiannual	Annual	Routine Monitoring Zone
MW-108C	FC	Semiannual	Annual	Routine Monitoring Zone
MW-109B	LSG	Semiannual	Semiannual	Routine Monitoring Zone
MW-109C	FC	Semiannual	Semiannual	Routine Monitoring Zone
MW-110B	LSG	Semiannual	Semiannual	Routine Monitoring Zone
MW-111B	LSG	Semiannual	None	-
MW-112A	LSG	Semiannual	Annual	Routine Monitoring Zone
MW-113A	LSG	Semiannual	Semiannual	Routine Monitoring Zone
MW-115A	LSG	Semiannual	None	-
MW-116A	LSG	Semiannual	Semiannual	Routine Monitoring Zone
MW-117B	LSG	Semiannual	Annual	Contingency Well Trigger Zone
MW-117C	FC	Semiannual	Semiannual	Contingency Well Trigger Zone
MW-118C	FC	Semiannual	Annual	Routine Monitoring Zone
MW-119A	OVB	Semiannual	Semiannual	Expedited Contingency Zone
MW-119B	LSG	Semiannual	Semiannual	Routine Monitoring Zone
MW-119C	FC	Semiannual	Semiannual	Routine Monitoring Zone
MW-120A	OVB	Semiannual	Annual	Heightened Awareness Zone
MW-120B	LSG	Semiannual	Annual	Heightened Awareness Zone
MW-121A	OVB	Semiannual	Annual	Expedited Contingency Zone
MW-121B	LSG	Semiannual	Annual	Expedited Contingency Zone
MW-121C	FC	Semiannual	Annual	Expedited Contingency Zone
MW-122A	OVB	Semiannual	Annual	Heightened Awareness Zone
MW-122B	LSG	Semiannual	Annual	Heightened Awareness Zone
MW-122C	FC	Semiannual	Annual	Heightened Awareness Zone
MW-129A	LSG	Semiannual	Semiannual	Routine Monitoring Zone
PB-2	OVB	Semiannual	None	-
PT/RW-1	OVB	Semiannual	None	-
SW-1	-	None	Semiannual	-
SW-2	-	None	Semiannual	-
SW-3	-	None	Semiannual	-
SW-4	-	None	Semiannual	-
WELL1Q	OD	None	Odd Years Only	Routine Monitoring Zone

TABLE 2
Summary of Monitoring Plan Under Revised Remedy

Sample Location	Stratigraphic Layer	Gauging Frequency	Sampling Frequency (VOCs)	Monitoring Zone
WELL4Q	OD	None	Odd Years Only	Routine Monitoring Zone
WELL6Q	OD	None	Odd Years Only	Routine Monitoring Zone
WELL7Q	OD	None	Odd Years Only	Routine Monitoring Zone

Abbreviations:

BL = Blanding

FC = Farmers Creek

LH = Lower Hopkinton

LSG = Lower Scotch Grove

OD = Ordovician Dolomites and sandstones, located below the Maquoketa Shale layer.

OVB = Overburden

SG = Scotch Grove

USG = Upper Scotch Grove

VOCs = volatile organic compounds

Notes:

- (1) As described in the Updated Focused Feasibility Study (UFFS), additional monitoring wells may be required based on sampling results in designated upgradient wells. If constructed, these additional monitoring wells, called "contingency wells", would be sampled semiannually for VOC analysis.
- (2) Depending on reported analytical results, the frequency of sampling or groundwater elevation gauging at a particular well may be revised if satisfactory to EPA.
- (3) The sampling plan is based on Addendum 3 to the Performance Monitoring Evaluation Plan and will be reviewed by EPA annually.

TABLE 3
Trigger Levels for Contingency Measures
 Chemplex Site -- Clinton, Iowa

Sampling Point Type and Location	Trigger Levels (ug/L) (a)				Contingency Actions if Trigger Levels Exceeded
	PCE	TCE	cis-1,2-DCE	VC	
Well located in Contingency Well Trigger Zone	10	10	140	1	Contingency Level 1 actions
Well located in Heightened Awareness Zone	5	5	70	0.5	Contingency Level 2 actions
Well located in Expedited Contingency Zone	5	5	70	0.5	Contingency Level 3 actions
Surface water sampling location	98	80	590	25	Surface Water Contingency actions

Notes:

(a) The rationale for the proposed trigger levels is described in the Contingency Plan (EKL, 2008b).

Abbreviations:

cis-1,2-DCE = cis-1,2-Dichloroethene

MCL = Maximum Contaminant Level

ug/L = micrograms per liter

PCE = Tetrachloroethene

TCE = Trichloroethene

VC = Vinyl Chloride

TABLE 3A
Chemical-Specific Applicable or Relevant and Appropriate Requirements for
1989 OU-1 Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
FEDERAL			
<u>Safe Drinking Water Act</u>			
National Primary Drinking Water Standards	42 United States Code (USC) §§ 300F-300j-26; 40 Code of Federal Regulations (CFR) Part 141	Establishes maximum contaminant levels (MCLs), which are standards for public water systems.	Relevant and appropriate. The MCLs for organic and inorganic contaminants are applicable to Site groundwater contaminants.
National Secondary Drinking Water Standards	42 USC §§ 300F -300j-26; 40 CFR Part 143	Establishes secondary maximum contaminant levels (SMCLs), which are non-enforceable guidelines for water systems to promote the aesthetic quality of the water.	Not applicable or relevant and appropriate.
<u>Clean Water Act</u>			
Ambient Water Quality Criteria (AWQC)	33 USC §§ 1251-1376; 40 CFR Part 131, Quality Criteria for Water	Requires the states to set ambient water quality criteria (AWQC) based on use classifications and the criteria developed under Section 304(a) of the Clean Water Act.	Applicable. AWQC have been developed for several organic and inorganic contaminants in Site groundwater.

TABLE 3A
Chemical-Specific Applicable or Relevant and Appropriate Requirements for
1989 OU-1 Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
FEDERAL (CONTINUED)			
<u>National Pollutant Discharge Elimination System Permit</u>			
Regulations	33 USC §§ 1251-1376; 40 CFR Parts 122 and 125	Requires permits for the discharge of pollutants from any point source into waters of the United States.	Applicable. The existing groundwater recovery system would continue to operate under its existing NPDES Permit 2300108.
National Pretreatment Standards	33 USC §§ 1251-1376; 40 CFR Part 403 and 414	Sets standards to control pollutants that pass through or interfere with treatment processes in Publicly-Owned Treatment Works (wastewater treatment plants) or that may contaminate sewage sludge.	Not applicable or relevant and appropriate. There will be no discharge into a POTW.
<u>Clean Air Act</u>			
National Primary and Secondary Ambient Air Quality Standards	42 USC §§ 7401-7642; 40 CFR Part 50	Establishes standards for ambient air quality to protect public health and welfare.	This is applicable if contaminants are discharged to the air during the groundwater treatment.
<u>Resource Conservation and Recovery Act</u>	40 CFR Part 265, Subpart AA	Establishes exhaust criteria and treatment-based influent criteria.	Subpart AA is applicable if the influent groundwater has a concentration of total organics exceeding 10 milligrams per liter (mg/L), and the volatile organic compounds (VOCs) emitted from the air stripping towers exceed an annual average of 3.1 tons per year. If both of these conditions are met, then the tower exhaust gas must be treated.

TABLE 3A
Chemical-Specific Applicable or Relevant and Appropriate Requirements for
1989 OU-1 Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
STATE			
<u>Iowa Air Pollution Control Regulations</u>	Iowa Code § 567-28.1(455B)	Ambient Air Quality Standards (Adopts 40 CFR 50).	See National Primary and Secondary Ambient Air Quality Standards. The State of Iowa does not require air permits for remediation systems.
	Iowa Code § 567-23.1(455B)	This chapter pertains to emissions from on-site treatment processes.	Not applicable to on-site emission sources at the Chemplex Site. This Site is governed by 40 CFR Part 265, Subpart AA. The State of Iowa does not require air permits for remediation systems.
<u>Iowa Water Pollution Control Regulation</u>	Iowa Code § 567 Chapters 60-61	General definitions; water quality standards, including classification of surface waters;	Applicable to protection of water quality within the Eastern and Western Un-named Tributaries and Rock Creek.
<u>Iowa Water Pollution Control Regulation</u>	Iowa Code § 567 Chapters 62-63	Discharge of pollutants; monitoring, analytical, and reporting requirements pertaining to water disposal systems.	Applicable to protection of water quality within the Eastern and Western Un-named Tributaries and Rock Creek.
<u>Iowa Water Pollution Control Regulation</u>	Iowa Code § 567 Chapter 64	Wastewater construction and operation permits.	Not applicable or relevant and appropriate because the 1989 OU-1 remedy will not encompass construction or operation of a wastewater system.

TABLE 3A
Chemical-Specific Applicable or Relevant and Appropriate Requirements for 1989 OU-1 Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
<u>Iowa Responsible Parties Cleanup Regulations</u>	Iowa Code § 567 Chapter 133	These rules establish the procedures and criteria to determine the parties responsible and the cleanup actions necessary to meet the state's groundwater protection goals. These rules pertain to the cleanup of groundwater itself and to soils and surface water areas where groundwater may be impacted.	Applicable to pollutant concentrations in soil or groundwater above State of Iowa Action Levels.
<u>Iowa Land Recycling Program and Response Action Standards</u>	Iowa Code § 567 Chapter 137	Policies and procedures for the voluntary enrollment of contaminated property in the "land recycling program". Response action standards that participants must meet to qualify for a no further action (NFA) certificate, and the statutory protections and immunities that are associated with the NFA.	This is not an Applicable or Relevant and Appropriate Requirement, but is a "To Be Considered" (TBC) guidance standard for the State of Iowa relating to environmental covenants.

TABLE 3B
Location-Specific Applicable or Relevant and Appropriate Requirements for
1989 OU-1 Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
FEDERAL			
<u>Clean Water Act</u>	33 USC §§ 1251-1387	Establishes a permit program administered by the U.S. Army Corps of Engineers to regulate the nonpoint source discharges of dredged or fill material into waters of the U.S.	Not applicable or relevant and appropriate. There will not be any nonpoint source discharges.
Protection of Floodplains		Establishes requirements for constructing in floodplains.	Not applicable or relevant and appropriate. There will be no floodplain construction.
Fish and Wildlife Protection		Requires actions that will control or modify a body of water be evaluated to mitigate or compensate for losses of wildlife resources.	Not applicable or relevant and appropriate. Remedy will not significantly affect wildlife resources as long as project-specific surface water criteria are met.
<u>Resource Conservation and Recovery Act</u>	42 USC §§ 6901-6992k	Establishes building criteria for treatment, storage, and disposal (TSD) facilities located in a floodplain.	Not applicable or relevant and appropriate. Remedy will not operate a TSD facility.
STATE			
<u>Clean Water Act</u>	Iowa Code § 567 Chapter 61	CWA Section 401 water quality certification is mandatory for projects requiring a Federal CWA Section 404 permit. Section 401 certification is a state's concurrence that a project is consistent with that state's water quality standards. Also establishes criteria for wetlands.	Not applicable or relevant and appropriate. Remedy will not require a Section 404 permit.

TABLE 3B
Location-Specific Applicable or Relevant and Appropriate Requirements for
1989 OU-1 Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
STATE (CONTINUED)			
<u>Floodplain Development</u>	Iowa Code § 567 Chapters 70-76	The State has authority to regulate construction within floodplains and floodways. Chapters 70-76 explain how and when a permit must be obtained for various types of development.	Not applicable or relevant and appropriate. There will be no floodplain construction.
<u>Protected Water Sources</u>	Iowa Code § 567 Chapter 53	The State has authorization to designate protected groundwater sources to restrict the movement of groundwater contaminants.	Not applicable or relevant and appropriate. A groundwater management zone was determined by the State not to be appropriate for this site.

TABLE 3C
Action-Specific Applicable or Relevant and Appropriate Requirements for
1989 OU-1 Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
FEDERAL			
<u>Resource Conservation and Recovery Act</u>	42 USC §§ 6901-6992k		
Identification and Listing of Hazardous Wastes	40 CFR Part 261	Defines those solid wastes that are subject to regulation as hazardous wastes under 40 CFR Parts 263-265, 268 and Parts 124, 270 and 271.	Applicable. Identifies wastes considered to be hazardous. Spent granular activated carbon has been generated at the Site and transported off-site under manifest as F002 hazardous waste for off-site reactivation.
Standards Applicable to Generators of Hazardous Waste	40 CFR Part 262	Establishes standards that apply to generators of hazardous waste.	Applicable. Spent granular activated carbon has been generated at the Site and transported off-site under manifest as F002 hazardous waste for off-site reactivation.
Standards Applicable to Transporters of Hazardous Waste	40 CFR Part 263	Establishes standards that apply to transporters of hazardous waste within the U.S. if the transportation requires a manifest under 40 CFR Part 262.	In the event of off-site transportation of hazardous wastes, these standards would be applicable.

TABLE 3C
Action-Specific Applicable or Relevant and Appropriate Requirements for
1989 OU-1 Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
FEDERAL: SWDA (CONTINUED)			
Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities	40 CFR Part 264	Establishes national standards that define the acceptable management of hazardous waste for owners and operators of facilities that treat, store or dispose hazardous waste.	Applicable. Hazardous wastes must be managed in accordance with the Resource Conservation and Recovery Act (RCRA).
Land Disposal Restrictions	40 CFR Part 268	Identifies hazardous wastes that are restricted or prohibited from land disposal.	Applicable to off-site land disposal of specific and characteristic hazardous wastes. Spent granular activated carbon, at the Chemplex groundwater treatment facility has been determined to be a listed waste. Spent carbon has been managed by transportation under manifest for off-site reactivation in a furnace.
Hazardous Waste Permit Program	40 CFR Part 270	Covers basic EPA permitting requirements.	A permit is not required for on-site CERCLA response actions. A permit is required for off-site actions if hazardous wastes are to be managed.

TABLE 3C
Action-Specific Applicable or Relevant and Appropriate Requirements for
1989 OU-1 Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
FEDERAL (CONTINUED)			
<u>Clean Air Act</u>			
National Ambient Air Quality Standards	42 USC §§ 7401-7671q; 40 CFR Part 50	National primary and secondary ambient air quality standards and treatment technology standards for emissions to air from: <ul style="list-style-type: none"> • incinerators • surface impoundments • waste piles • treatment units • landfills • fugitive emissions 	Applicable. The exhaust gas from the air stripping towers is governed by 40 CFR Part 265, Subpart AA.
<u>Resource Conservation and Recovery Act</u>	40 CFR Part 265, Subpart AA	Establishes treatment system exhaust criteria.	Subpart AA is applicable if the influent groundwater has a concentration of total organics exceeding 10 milligrams per liter (mg/L), and the volatile organic compounds (VOCs) emitted from the air stripping towers exceed an annual average of 3.1 tons per year. If these conditions are met, then the tower exhaust gas must be treated.
<u>Transportation</u>			
Hazardous Materials Regulations	40 CFR Parts 171-173 and 177	Establishes requirements for transportation of hazardous materials.	Applicable to off-site transportation of hazardous materials.

TABLE 3C
Action-Specific Applicable or Relevant and Appropriate Requirements for
1989 OU-1 Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
STATE			
<u>Iowa Solid Waste Disposal Regulations</u>	Iowa Code § 567 Chapters 100-121	Establishes standards for sanitary disposal projects and by regulating the disposal of solid waste through a system of general rules and specific permits. Deals with excavation of closed landfills, and the operation, cover, and monitoring of landfills.	Not applicable or relevant and appropriate to groundwater remedy.
<u>Iowa Air Pollution Control Regulations</u>	Iowa Code § 567 Chapter 23	Sets the emissions standards for contaminants and governs the release of fugitive dust in quantities creating a nuisance during site activities and emissions from a treatment system.	Not applicable (see 40 CFR Part 265, Subpart AA).
	Iowa Code § 567 Chapter 25	Governs continuous monitoring systems.	Not applicable (see 40 CFR Part 265, Subpart AA).
	Iowa Code § 567 Chapter 28	Ambient Air Quality Standards (adopts 40 CFR Part 50).	Not applicable (see 40 CFR Part 265, Subpart AA)

TABLE 3C
Action-Specific Applicable or Relevant and Appropriate Requirements for
1989 OU-1 Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
STATE (CONTINUED)			
<u>Iowa Water Pollution Control Regulations</u>	Iowa Code § 567 Chapter 38	Private water well construction permits.	Applicable for the installation of private water wells for groundwater extraction.
	Iowa Code § 567 Chapter 39	Well abandonment requirements.	Applicable when monitoring or extraction wells are abandoned.
	Iowa Code § 567 Chapter 40	Water supply definitions. Defines the MCLs that Chapter 133 pertains to.	Not applicable or relevant and appropriate. Remedy will not affect drinking water.
	Iowa Code § 567 Chapter 49	These rules refer to nonpublic water wells, setting forth well construction standards, materials standards, and abandonment guidelines.	Applicable for the construction of private water wells for groundwater extraction.
<u>Water Withdrawals</u>	Iowa Code § 567 Chapters 50-54	These rules address water withdrawal permits. Permits are required for withdrawals greater than 25,000 gallons per day.	Applicable for the pump-and-treat alternative because extraction rates exceed 25,000 gallons per day.
	Iowa Code § 567 Chapter 82	Establishes certification requirements for well contractors.	Applicable for well drilling or abandonment. Extraction and monitoring well construction must be completed by a certified well driller.
<u>Solid Waste Management and Disposal</u>	Iowa Code § 567 Chapters 102, 103, 104, and 110	Permitting of solid waste processing and disposal facilities.	Applicable for process or disposal of solid waste.

TABLE 3C
Action-Specific Applicable or Relevant and Appropriate Requirements for
1989 OU-1 Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
STATE (CONTINUED)			
<u>Iowa Responsible Parties Cleanup Regulations</u>	Iowa Code § 567 Chapter 133	These rules establish the procedures and criteria to determine the parties responsible and the cleanup actions necessary to meet the state's groundwater protection goals. These rules pertain to the cleanup of groundwater itself and to soils and surface water where groundwater may be impacted.	Applicable to groundwater constituents of concern in excess of State of Iowa Action Levels. Action levels are developed through MCLs or other Health-Based Standards.

TABLE 4A
Chemical-Specific Applicable or Relevant and Appropriate Requirements for Revised Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
FEDERAL			
<u>Safe Drinking Water Act</u>			
National Primary Drinking Water Standards	40 USC §§ 300F-300j-26; 40 CFR Part 141	Establishes maximum contaminant levels (MCLs), which are standards for public and certain private water systems.	Relevant and appropriate. The MCLs for organic and inorganic contaminants are applicable to Site groundwater contaminants unless an area has been designated as a Technical Impracticability Zone or otherwise designate as not being a potential source of drinking water. They are applicable to the City's operation of the Camanche municipal water system.
National Secondary Drinking Water Standards	40 CFR Part 143	Establishes secondary maximum contaminant levels (SMCLs), which are non-enforceable guidelines for water systems to promote the aesthetic quality of the water.	SMCLs are relevant and appropriate for the City's operation of the Camanche water system.
<u>Clean Water Act</u>			
Ambient Water Quality Criteria (AWQC)	33 USC §§ 1251-1376; 40 CFR Part 131, Quality Criteria for Water	Requires the states to set ambient water quality criteria (AWQC) based on use classifications and the criteria developed under Section 304(a) of the Clean Water Act.	Applicable. AWQC have been developed for several organic and inorganic contaminants in Site groundwater.

TABLE 4A
Chemical-Specific Applicable or Relevant and Appropriate Requirements for Revised Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
FEDERAL (CONTINUED)			
<u>National Pollutant Discharge Elimination System Permit</u>			
Regulations	33 USC §§ 1251-1376; 40 CFR Parts 122 and 125	Requires permits for the discharge of pollutants from any point source into waters of the United States.	Not applicable or relevant and appropriate. The revised remedy will not discharge to waters of the United States.
National Pretreatment Standards	33 USC §§ 1251-1376; 40 CFR Part 403 and 414	Sets standards to control pollutants that pass through or interfere with treatment processes in Publicly-Owned Treatment Works (wastewater treatment plants) or that may contaminate sewage sludge.	Not applicable or relevant and appropriate. Remedy will not discharge to a POTW.
<u>Clean Air Act</u>			
National Primary and Secondary Ambient Air Quality Standards	42 USC §§ 7401-7642; 40 CFR Part 50	Establishes standards for ambient air quality to protect public health and welfare.	Not applicable or relevant and appropriate, since contaminants will not be discharged to the air.

TABLE 4A
Chemical-Specific Applicable or Relevant and Appropriate Requirements for Revised Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
FEDERAL (CONTINUED)			
<u>Resource Conservation and Recovery Act</u>	40 CFR Part 265, Subpart AA	Establishes exhaust criteria and treatment-based influent criteria.	Subpart AA is applicable if the influent groundwater has a concentration of total organics exceeding 10 milligrams per liter (mg/L), and the volatile organic compounds (VOCs) emitted from the air stripping towers exceed an annual average of 3.1 tons per year. If these conditions are met, then the tower exhaust gas must be treated.
STATE			
<u>Iowa Air Pollution Control Regulations</u>	Iowa Code § 567 Chapter 28	Ambient Air Quality Standards (Adopts 40 CFR Part 50).	See 40 CFR Part 265, Subpart AA.
	Iowa Code § 567 Chapter 30	This chapter pertains to emissions from on-site treatment process.	This Site is governed by 40 CFR Part 265, Subpart AA if the groundwater treatment equipment is operating.
<u>Iowa Water Pollution Control Regulation</u>	Iowa Code § 567 Chapters 60-64	General definitions; water quality standards, including classification of surface waters; discharge of pollutants; and monitoring, analytical, and reporting requirements pertaining to water disposal systems.	Water quality standards for the state are applicable.

TABLE 4A
Chemical-Specific Applicable or Relevant and Appropriate Requirements for Revised Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
STATE (CONTINUED)			
<u>Iowa Responsible Parties Cleanup Regulations</u>	Iowa Code § 567 Chapter 133	These rules establish the procedures and criteria to determine the parties responsible and the cleanup actions necessary to meet the state's groundwater protection goals. These rules pertain to the cleanup of groundwater itself and to soils and surface water where groundwater may be impacted.	Applicable to pollutant concentrations in soil or groundwater above State of Iowa Action Levels.
<u>Iowa Land Recycling Program and Response Action Standards</u>	Iowa Code § 567 Chapter 137	Policies and procedures for the voluntary enrollment of contaminated property in the "land recycling program". Response action standards that participants must meet to qualify for a no further action (NFA) certificate, and the statutory protections and immunities that are associated with the NFA.	Not an Applicable or Relevant and Appropriate Requirement, but a "To Be Considered" (TBC) guidance standard for the State of Iowa relating to environmental covenants.

TABLE 4B
Location-Specific Applicable or Relevant and Appropriate Requirements for Revised Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
FEDERAL			
<u>Clean Water Act</u>	33 USC §§ 1251-1387	Establishes a permit program administered by the U.S. Army Corps of Engineers to regulate the nonpoint source discharges of dredged or fill material into waters of the U.S.	Not applicable or relevant and appropriate. Remedy will not involve a nonpoint source discharge to waters of the U.S.
Protection of Floodplains		Establishes requirements for constructing in floodplains.	Not applicable or relevant and appropriate. There will be no construction in floodplains.
Fish and Wildlife Protection		Requires actions that will control or modify a body of water be evaluated to mitigate or compensate for losses of wildlife resources.	Not applicable or relevant and appropriate. Remedy will not cause a loss to wildlife resources.
<u>Resource Conservation and Recovery Act</u>	40 CFR 270.14(b)(11)(iii) and (iv)	Establishes building criteria for treatment, storage, and disposal (TSD) facilities located in a floodplain.	Not applicable or relevant and appropriate. There will be no TSD facility in a floodplain.
STATE			
<u>Clean Water Act</u>	Iowa Code § 567 Chapter 61	Section 401 water quality certification is mandatory for projects requiring a Federal Section 404 permit. Section 401 certification represents a state's concurrence that a project is consistent with that state's water quality standards. Also establishes criteria for wetlands.	Not applicable or relevant and appropriate. Remedy will not require a Section 404 permit.
<u>Floodplain Development</u>	Iowa Code § 567 Chapters 70-76	The State has authority to regulate construction on all floodplains and floodways in the State. Chapters 70-76 explain how and when a permit must be obtained for various types of development.	Not applicable or relevant and appropriate. Remedy will not require construction in a floodplain.

TABLE 4B
Location-Specific Applicable or Relevant and Appropriate Requirements for Revised Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
STATE (CONTINUED)			
<u>Protected Water Sources</u>	Iowa Code § 567 Chapter 53	The State has authorization to designate protected groundwater sources to restrict the movement of groundwater contaminants.	May be applicable to groundwater contaminated above State of Iowa Action Levels. However, application for a Chapter 53 designation was not approved.

TABLE 4C
Action-Specific Applicable or Relevant and Appropriate Requirements for Revised Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
FEDERAL			
<u>Resource Conservation and Recovery Act</u>	42 USC §§ 6901-6987		
Identification and Listing of Hazardous Wastes	40 CFR Part 261	Defines those solid wastes that are subject to regulation as hazardous wastes under 40 CFR Parts 263-265 and Parts 124, 270 and 271.	Not applicable or relevant and appropriate.
Standards Applicable to Generators of Hazardous Waste	40 CFR Part 262	Establishes standards that apply to generators of hazardous waste.	Not applicable or relevant and appropriate.
Standards Applicable to Transporters of Hazardous Waste	40 CFR Part 263	Establishes standards that apply to transporters of hazardous waste within the U.S. if the transportation requires a manifest under 40 CFR Part 262.	Not applicable or relevant and appropriate.
Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities	40 CFR Part 264	Establishes national standards that define the acceptable management of hazardous waste for owners and operators of facilities that treat, store or dispose hazardous waste.	Not applicable or relevant and appropriate.
Land Disposal Restrictions	40 CFR Part 268	Identifies hazardous wastes that are restricted or prohibited from land disposal.	Not applicable or relevant and appropriate.
Hazardous Waste Permit Program	40 CFR Part 270	Covers basic EPA permitting requirements.	Not applicable or relevant and appropriate.

TABLE 4C
Action-Specific Applicable or Relevant and Appropriate Requirements for Revised Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
FEDERAL (CONTINUED)			
<u>Clean Air Act</u>			
National Ambient Air Quality Standards	42 USC §§ 7401-7671q; 40 CFR Part 50	National primary and secondary ambient air quality standards and treatment technology standards for emissions to air from: <ul style="list-style-type: none"> • treatment units • landfills • fugitive emissions • incinerators • surface impoundments • waste piles 	Not applicable since there will be no discharge to air.
<u>Transportation</u>			
Hazardous Materials Regulations	40 CFR Parts 171-173 and 177	Establishes requirements for transportation of hazardous materials.	Applicable to transportation of hazardous materials as it relates to the injection of permanganate for "hot spot" treatment of elevated VOC concentrations.
<u>Safe Drinking Water Act</u> Underground Injection Control (UIC) Program	42 USC § 300f, 40 CFR Part 144	Requirements pertaining to injection of materials into the subsurface.	Applicable. Substantive requirements will be complied with if injection of a chemical oxidant or electron donor into the subsurface is performed.

TABLE 4C
Action-Specific Applicable or Relevant and Appropriate Requirements for Revised Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
STATE			
<u>Iowa Environmental Quality Act</u>	Iowa Code § 567	Defines the jurisdiction of the Department of State acceptance is to be considered during Natural Resources, and defines powers and duties of the Commission and the Director.	
<u>Iowa Solid Waste Disposal Regulations</u>	Iowa Code § 567 Chapters 100, 101, 102, 103, 110	Establishes standards for sanitary disposal projects and by regulating the disposal of solid waste through a system of general rules and specific permits. Deals with excavation of closed landfills, and the operation, cover and monitoring of landfills.	Not applicable to groundwater remedy.
<u>Iowa Air Pollution Control Regulation</u>	Iowa Code § 567 Chapter 23	Sets the emissions standards for contaminants and governs the release of fugitive dust in quantities creating a nuisance during site activities and emissions from a treatment system.	Not applicable or relevant and appropriate.
	Iowa Code § 567 Chapter 24	Applies to emissions from a permitted emission point. Could be applied to excess emissions of fugitive dust.	Not applicable or relevant and appropriate.
	Iowa Code § 567 Chapter 25	Governs continuous monitoring systems.	Not applicable (see 40 CFR Part 265, Subpart AA).
	Iowa Code § 567 Chapter 28	Ambient Air Quality Standards (Adopts 40 CFR Part 50).	Not applicable (see 40 CFR Part 265, Subpart AA).

TABLE 4C
Action-Specific Applicable or Relevant and Appropriate Requirements for Revised Remedy

Standard, Requirement, Criteria or Limitation	Citation	Description	Comment
STATE (CONTINUED)			
<u>Iowa Water Pollution Control Regulations</u>	Iowa Code § 567 Chapter 38	Private water well construction permits.	Applicable for construction of new monitoring wells.
	Iowa Code § 567 Chapter 39	Well abandonment requirements.	Applicable if extraction or monitoring wells are abandoned.
	Iowa Code § 567 Chapter 40	Water supply definitions. Defines MCLs that Chapter 133 pertains to.	Not applicable or relevant and appropriate. Remedy will not affect drinking water supply.
	Iowa Code § 567 Chapter 49	These rules refer to nonpublic water wells, setting forth well construction standards, materials standards, and abandonment guidelines.	May be applicable to abandonment of private wells.
<u>Water Withdrawals</u>	Iowa Code § 567 Chapters 50-54	These rules address water withdrawal permits. Permits are required for withdrawals greater than 25,000 gallons per day.	Not applicable or relevant and appropriate since groundwater extraction system will be demolished.
	Iowa Code § 567 Chapter 82	Registration of water well contractors. Established certification and requirements for well contractors	Applicable for well drilling or abandonment. Monitoring well construction must be completed by a certified well driller.
<u>Solid Waste Management and Disposal</u>	Iowa Code § 567 Chapters 102, 103, 104, and 110	Permitting of solid waste processing and disposal facilities.	Not applicable or relevant and appropriate. This is not a solid waste processing or disposal facility.
<u>Iowa Responsible Parties Cleanup Regulations</u>	Iowa Code § 567 Chapter 133	These rules establish the procedures and criteria to determine the parties responsible and the cleanup actions necessary to meet the state's groundwater protection goals. These rules pertain to the cleanup of groundwater itself and to soils and surface water where groundwater may be impacted.	Applicable to constituents of concern in excess of State of Iowa Action Levels. Action levels are developed through MCLs or other Health-Based Standards.

TABLE 5
Amended Groundwater Cleanup Goals

Analyte	Existing Groundwater Cleanup Goals (ug/L) (a)	New Groundwater Cleanup Goals (ug/L)	TI Waiver Proposed?	Concentrations North of 21st Street (h)	Concentrations South of 21st Street (h)
Volatile Organic Compounds					
Benzene	1	5	Yes	ND - 1,700 ug/L	ND - 0.38 ug/L
1,2-Dichlorobenzene	600	600	No	ND - 8.8	ND
1,1-Dichloroethene	7	7	Yes	ND - 130	ND - 10
1,2-Dichloroethene (sum of cis and trans isomers)	70	-- (b)	Yes (b)	(b)	(b)
cis-1,2-Dichloroethene	--	70	Yes	ND - 1,400	ND - 120
trans-1,2-Dichloroethene	--	100	No	ND - 5.9	ND - 0.9
Ethylbenzene	700	700	No	ND - 140	ND - 0.3
Methylene Chloride	5	5	No (c)	(c)	(c)
Styrene	100	100	No	ND - 14	ND
1,1,2,2-Tetrachloroethane	0.2	-- (d)	No	(d)	(d)
Tetrachloroethene	5	5	Yes	ND - 4,700	ND - 1,000
Toluene	2,000	1,000	No	ND - 59	ND - 0.68
1,1,1-Trichloroethane	200	200	No	ND - 76	ND - 1.7
Trichloroethene	3	5	Yes	ND - 390	ND - 55
Vinyl Chloride	0.015	2	Yes	ND - 260	ND
Xylenes	10,000	10,000	No	ND - 80	ND - 1.99
Polynuclear Aromatic Hydrocarbons					
Benzo(a)pyrene	0.2	0.2	No (e)	(h)	(h)
Naphthalene	20	1.4	No (f)	(h)	(h)
Metals					
Antimony	3	6	No	(g)	(g)
Arsenic	0.03	10	No (g)	(g)	(g)
Barium	2,000	2,000	No	(g)	(g)

TABLE 5
Amended Groundwater Cleanup Goals

Notes to Table 5:

- (a) Cleanup Standards are as shown in the Five Year Report for the Chemplex Site, dated 9 June 1999 and prepared by the Environmental Protection Agency, Region 7. The groundwater cleanup goals for the current remedy were established based on Chapter 133 of the Iowa Administrative Code, which became effective in 1989. These provisions set forth a hierarchical approach to set "action levels" that, if exceeded, would require identification of the nature and extent of a release. These action levels were not intended by the Iowa Department of Natural Resources to be established as cleanup levels. The hierarchy to select action levels was: (1) select the Lifetime Health Advisory Level (HAL), if one exists; (2) if no HAL exists, select the Negligible Cancer Risk Level (NRL); and (3) if no HAL or NRL exists, select the drinking water Maximum Contaminant Level (MCL). Under current regulatory practice in the State of Iowa, MCLs are now commonly applied for "protected" groundwater sources.
- (b) The Consent Decree for the Chemplex First Operable Unit, dated September 1990, set forth a Groundwater Cleanup Standard of 70 micrograms per liter (ug/L) for total 1,2-Dichloroethene (Total 1,2-DCE) based on the then-current Health Advisory Level (HAL). This standard was established for the total of the cis and trans isomers because the analytical instruments at that time could not readily separate and report the two isomers individually. Because modern instruments can report the concentration of each isomer, and because both isomers now have Federal Drinking Water Maximum Contaminant Levels (MCLs), a Groundwater Cleanup Goal will be established for each isomer that is equal to its MCL. A cleanup goal for Total 1,2-DCE is thus no longer needed.
- (c) Methylene chloride has been sporadically detected in Site groundwater analyses. These detections of methylene chloride, a common laboratory contaminant, in Chemplex groundwater are generally believed to result from laboratory contamination in view of repeated detections of this analyte in Site trip and field blanks. Methylene chloride will continue to be evaluated in the Chemplex groundwater monitoring network.
- (d) 1,1,2,2-tetrachloroethane was not detected above the current cleanup standard, and therefore does not appear to be a chemical of concern at this Site. This analyte's cleanup standard will be deleted for this site.
- (e) Benzo(a)pyrene is a polynuclear aromatic hydrocarbon (PAH) associated with historic releases of debutanized aromatic concentrate (DAC), a byproduct of ethylene production. As PAHs such as benzo(a)pyrene are generally less mobile in groundwater compared with volatile organic compounds (VOCs), their distribution at the Chemplex Site is not as widespread as PCE and its daughter products. Benzo(a)pyrene has occasionally been found in groundwater downgradient of the DAC management area of the polyethylene plant.
- (f) Naphthalene is a PAH associated with historic releases of DAC and potentially with wastes disposed of in the Chemplex Landfill. The 1990 Consent Decree used the HAL for naphthalene, 20 ug/L, as a surrogate for establishment of cleanup standards for a number of non-carcinogenic PAHs. EPA has not established an MCL for naphthalene. EPA has now determined that naphthalene may be a carcinogen, and has set a concentration of 1.4 ug/L, equivalent to a risk level of one-in-one hundred thousand (10^{-5}), as a presumptive groundwater cleanup goal. As PAHs such as naphthalene are generally less mobile in groundwater compared with VOCs, their distribution at the Chemplex Site is not as widespread as PCE and its daughter products. Naphthalene has occasionally been found at levels below 20 ug/L but above 1.4 ug/L in groundwater immediately downgradient of the DAC Management Area. Naphthalene has also been occasionally detected above 1.4 ug/L in the far downgradient area of the Chemplex groundwater monitoring network. Given this analyte's limited mobility and the lack of a discernible naphthalene plume emanating from the plant area, it is not believed these far-downgradient detections result from past plant operations.
- (g) Arsenic has been detected at the Chemplex Site at concentrations greater than the Proposed Groundwater Cleanup Goal. However, high background levels of arsenic are typical in Iowa. The Chemplex site is not a confirmed source of metals, including arsenic. Arsenic and other metals are no longer routinely sampled in Site groundwater.

TABLE 5
Amended Groundwater Cleanup Goals

Notes to Table 5 (continued):

(h) Reported concentration ranges for VOCs are taken from the April-May 2012 groundwater monitoring event. PAHs and metals were not analyzed in 2012.

Abbreviations:

HAL = Health Advisory Level
MCL = Maximum Contaminant Level
NRL = Negligible Risk Level

ug/L = micrograms per liter
ND = Non-detectable

TABLE 6
Comparative Analysis of 1989 OU-1 Remedy and Revised Remedy

		1989 OU-1 Remedy (Pump and Treat)	Revised Remedy (Exposure Control)
Threshold Criteria	Overall Protection of Human Health and the Environment	Remedy would not be protective of human health. Potential future exposure to PCE migrating downgradient may not be manageable by groundwater recovery, because impacted groundwater cannot be fully contained due to fractured bedrock. PCE that has migrated into the rock pores is back-diffusing into groundwater and is expected to continue to do so for several centuries. Under these conditions, neither extracting at a greater flowrate nor adding more wells would result in reliable capture. PCE concentrations in surface waters are not anticipated to be above levels of concern to potential ecological receptors.	Remedy would be protective of human health by providing a municipal water source to downgradient residents for domestic use, thereby preventing future exposure to potentially-contaminated groundwater via domestic use. Additional protectiveness would be provided by monitored natural attenuation, oxidant or electron donor application at localized "hot spots", and a program of institutional controls and monitoring. Based on a risk assessment performed as part of the July 2007 Final Focused Feasibility Study (FFFS), the risks to residents via the vapor intrusion scenario and the child wading in Rock Creek scenario are not expected to be significant. Based on the results of the Performance Test of this alternative as well as modeling performed as part of the feasibility studies, PCE concentrations are not expected to be above levels of concern for protection of ecological receptors.
	Compliance with ARARs	Remedy would not comply with drinking water MCLs because PCE has migrated, at levels of concern, outside of the existing Point of Compliance Boundary, and it is technically impracticable from an engineering perspective to restore groundwater PCE concentrations to drinking water MCLs under this remedy.	A monitoring program would keep track of VOC concentrations in groundwater within a Technical Impracticability Zone. Although certain ARARs, including selected MCLs, would be waived within this zone, Remedial Action Objectives for protectiveness of human and ecological receptors could be achieved.
Balancing Criteria	Long-term Effectiveness and Permanence	This remedy does not effectively, and on a long-term basis, prevent possible future migration of PCE-containing groundwater to achieve cleanup goals in the areas of non-attainment, due to the technical impracticability issues described in the UFFS.	Due to extension of the municipal water system westward along 9th Street and promulgation of a City well ordinance, residents connected to the municipal water system are permanently prevented from potential future exposure to PCE-containing groundwater.
	Reduction of Toxicity, Mobility, or Volume through Treatment	The OU-1 remedy included a groundwater extraction and treatment system. The extraction system reduced the volume of contaminants in the aquifer. The treatment system treated the extracted groundwater. Additional chemical mass beyond that provided by naturally-occurring biodegradation is removed by extracting a portion of the PCE that would otherwise leave the Point of Compliance boundary and migrate downgradient. In addition, as demonstrated during the Natural Attenuation Investigation (EKL, 1998), biodegradation is occurring in the West Region of the Site, with some limited potential for biodegradation in the East Region.	Reduction of localized "hot spot" VOC concentrations by oxidant or electron donor addition could reduce contaminant volume. Based on monitoring results to date, biodegradation is occurring in the West Region of the Site, with some limited potential for biodegradation in the East Region.

TABLE 6
Comparative Analysis of 1989 OU-1 Remedy and Revised Remedy

		1989 OU-1 Remedy (Pump and Treat)	Revised Remedy (Exposure Control)
Balancing Criteria	Short-term Effectiveness	Remedy is effective in the short term, as Site chemicals are not known to have reached private water supply wells at private residences at levels of concern.	Due to the extension of the municipal water system westward along 9th Street, coupled with the City well ordinance, residents connected to the municipal water system are protected against exposure to PCE-containing groundwater.
	Implementability	Remedy has already been implemented.	Alternative has been shown to be implementable through a performance test of the remedy from 2008 to present. The extension of the City municipal water system is already in place.
	Cost	\$27,900,000 Total Present Value.	\$18,600,000 Total Present Value.
Modifying Criteria	State Acceptance	Acceptable.	Acceptable.
	Community Acceptance	Acceptable, based on public information and meeting process.	Acceptable, based on public meeting and comments received on the Proposed Plan. See Appendix A, Responsiveness Summary.

Abbreviations:

MCLs = Maximum Contaminant Levels for drinking water





OU-1 = First Operable Unit for groundwater

OU-2 = Second Operable Unit for soil

Figures



Legend:

-  Approximate Chemplex Site Boundary
-  Assumed General Groundwater Gradient Direction
-  Creek Flow Direction
-  Estimated Source Zone

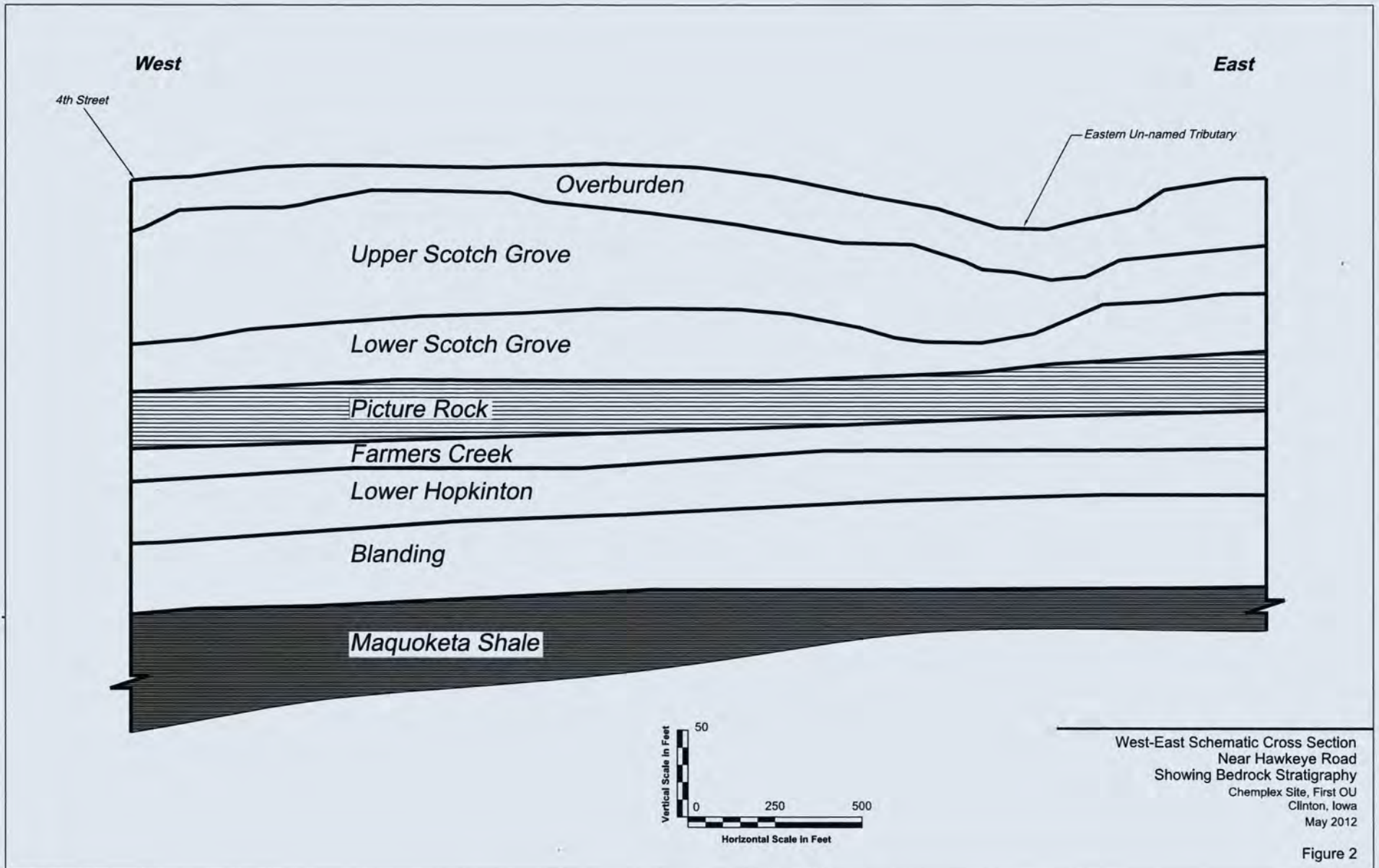
Notes:

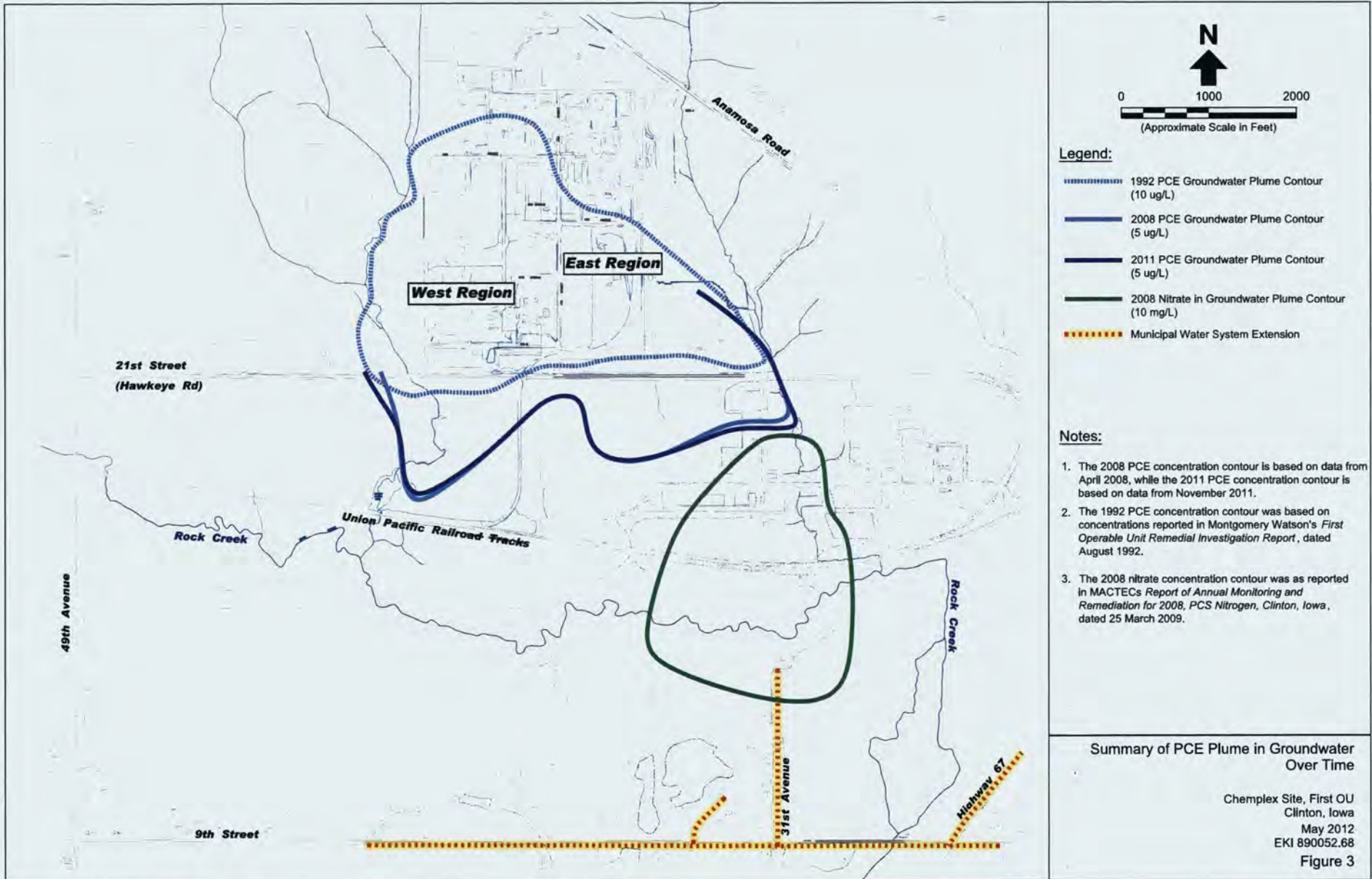
1. Basemap source: USGS 7.5 minute series topographic map, Camanche Quadrangle, Iowa-Illinois, 1991.

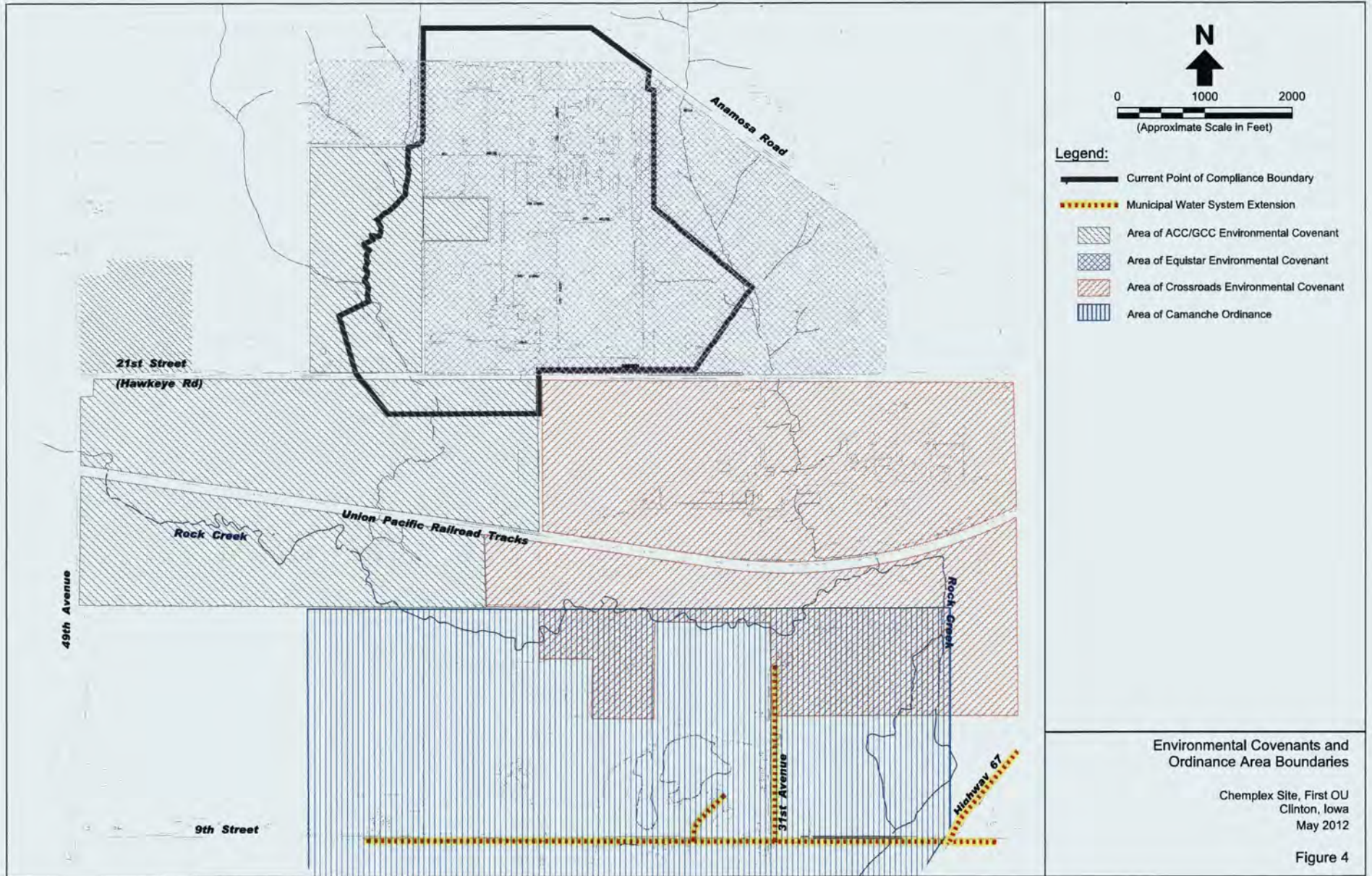
Chemplex Site and Vicinity Map

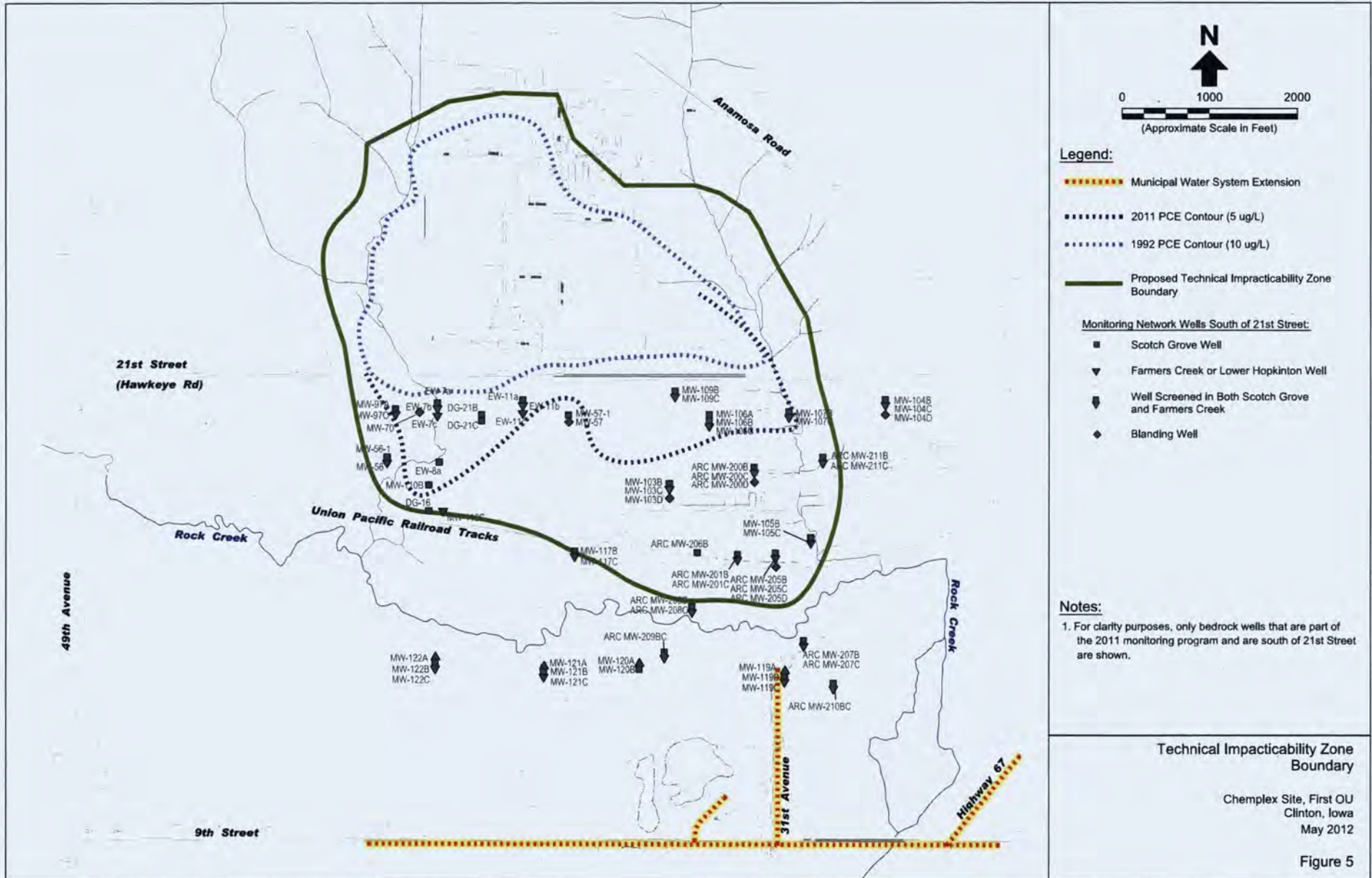
Chemplex Site
Clinton, Iowa
May 2012

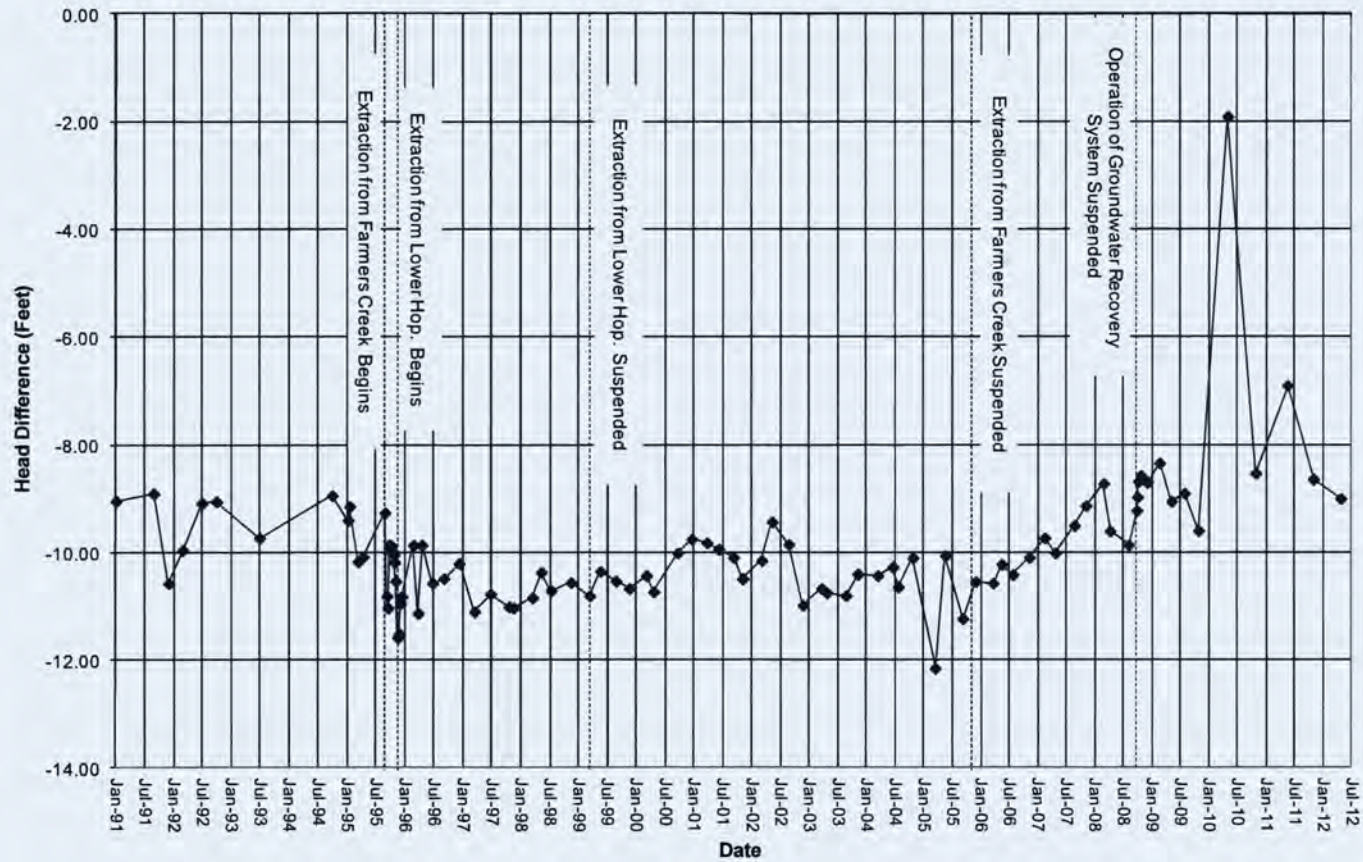
Figure 1











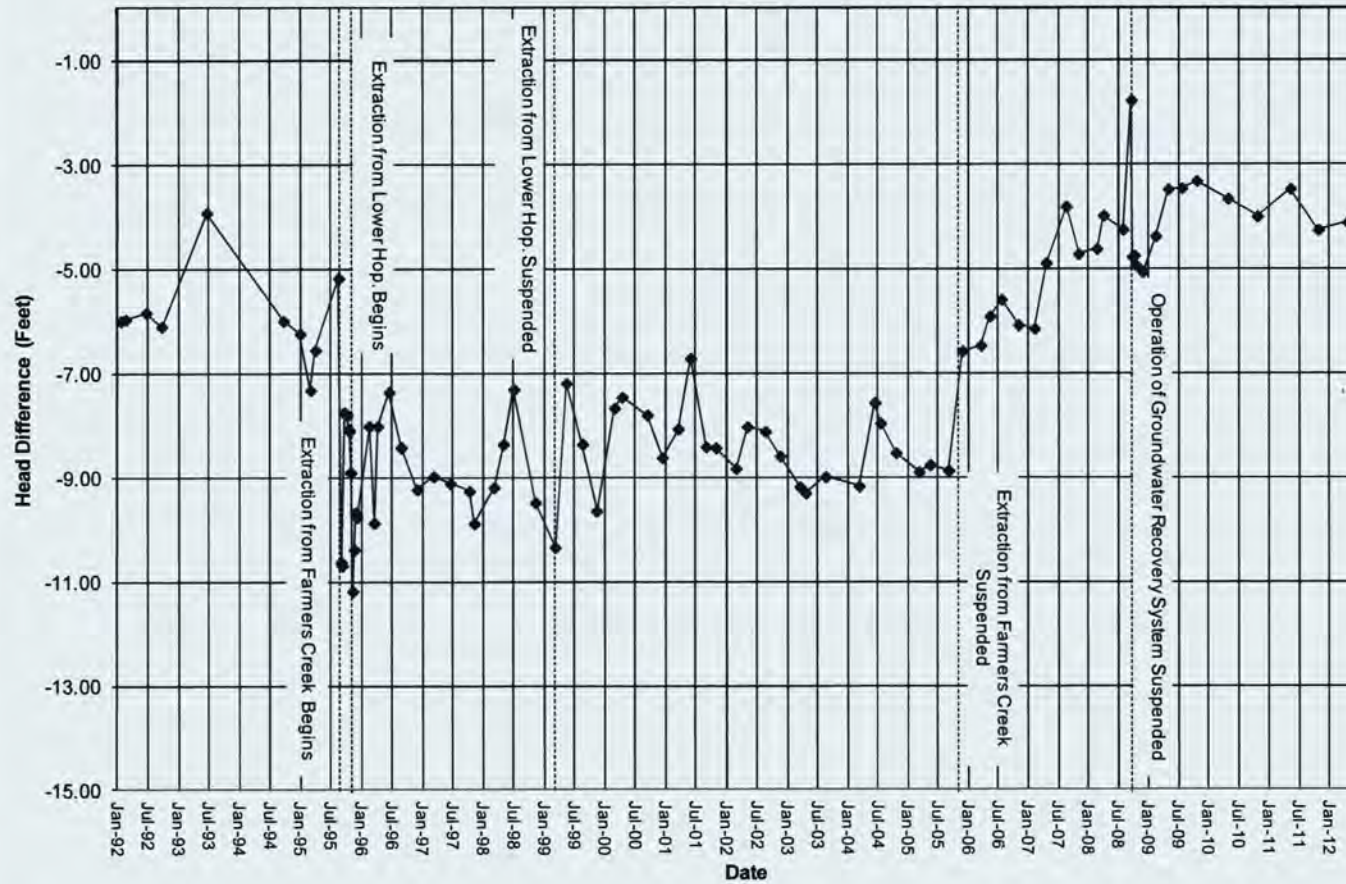
Notes:

1. Head difference shown is the difference between the groundwater elevation at Lower Scotch Grove well MW-65-1 and Blanding well MW-65. A positive head difference indicates an upward vertical gradient, while a negative head difference indicates a downward vertical gradient.

Historic Head Difference in
East Region Monitoring Well Pair
MW-65-1/MW-65

Chemplex Site
Clinton, Iowa
July 2012

Figure 6



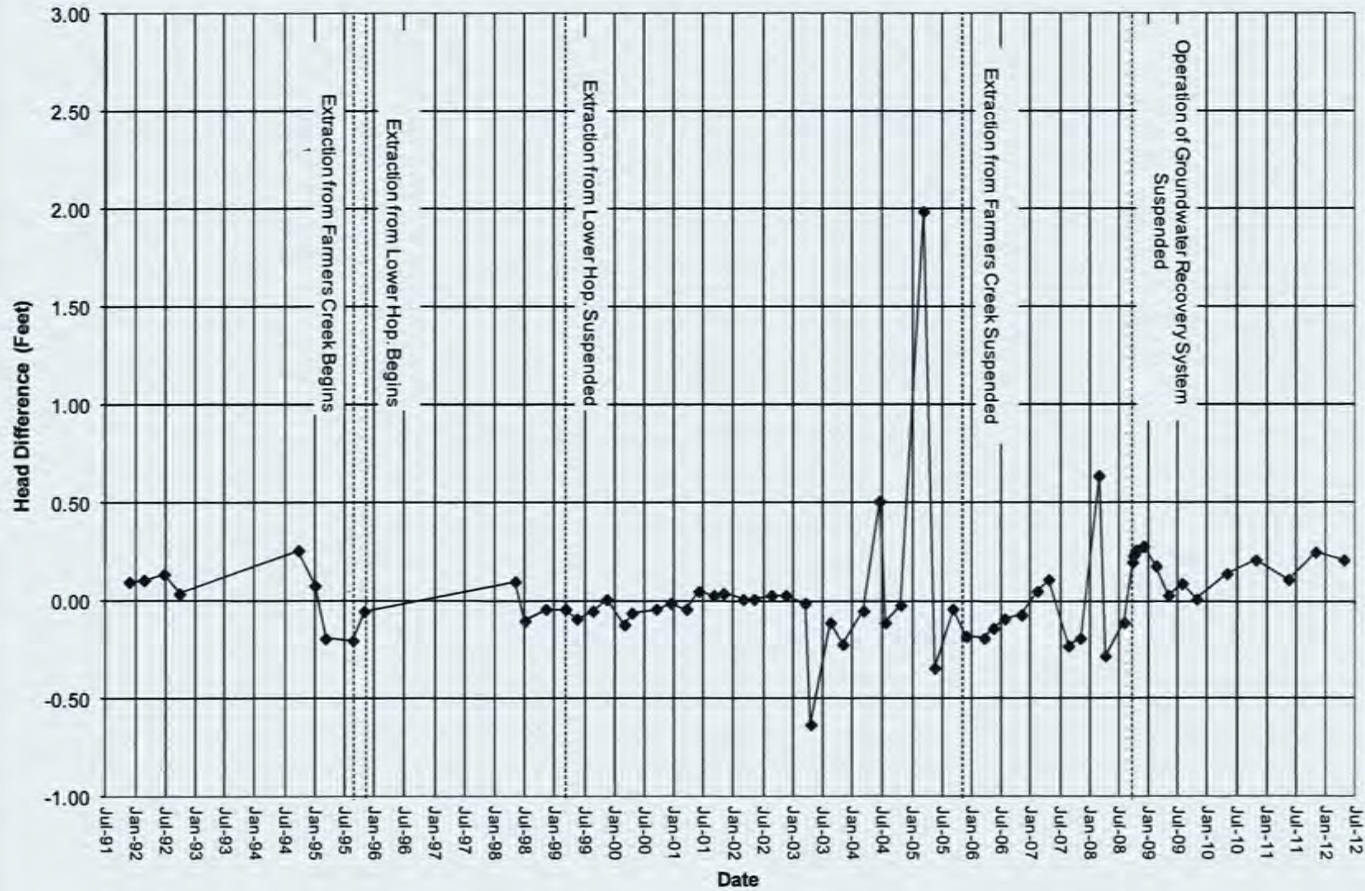
Notes:

1. Head difference shown is the difference between the groundwater elevation at Lower Scotch Grove well MW-83B and Farmers Creek well MW-83C. A positive head difference indicates an upward vertical gradient, while a negative head difference indicates a downward vertical gradient.

Historic Head Difference in
East Region Monitoring Well Pair
MW-83B/MW-83C

Chemplex Site
Clinton, Iowa
July 2012

Figure 7



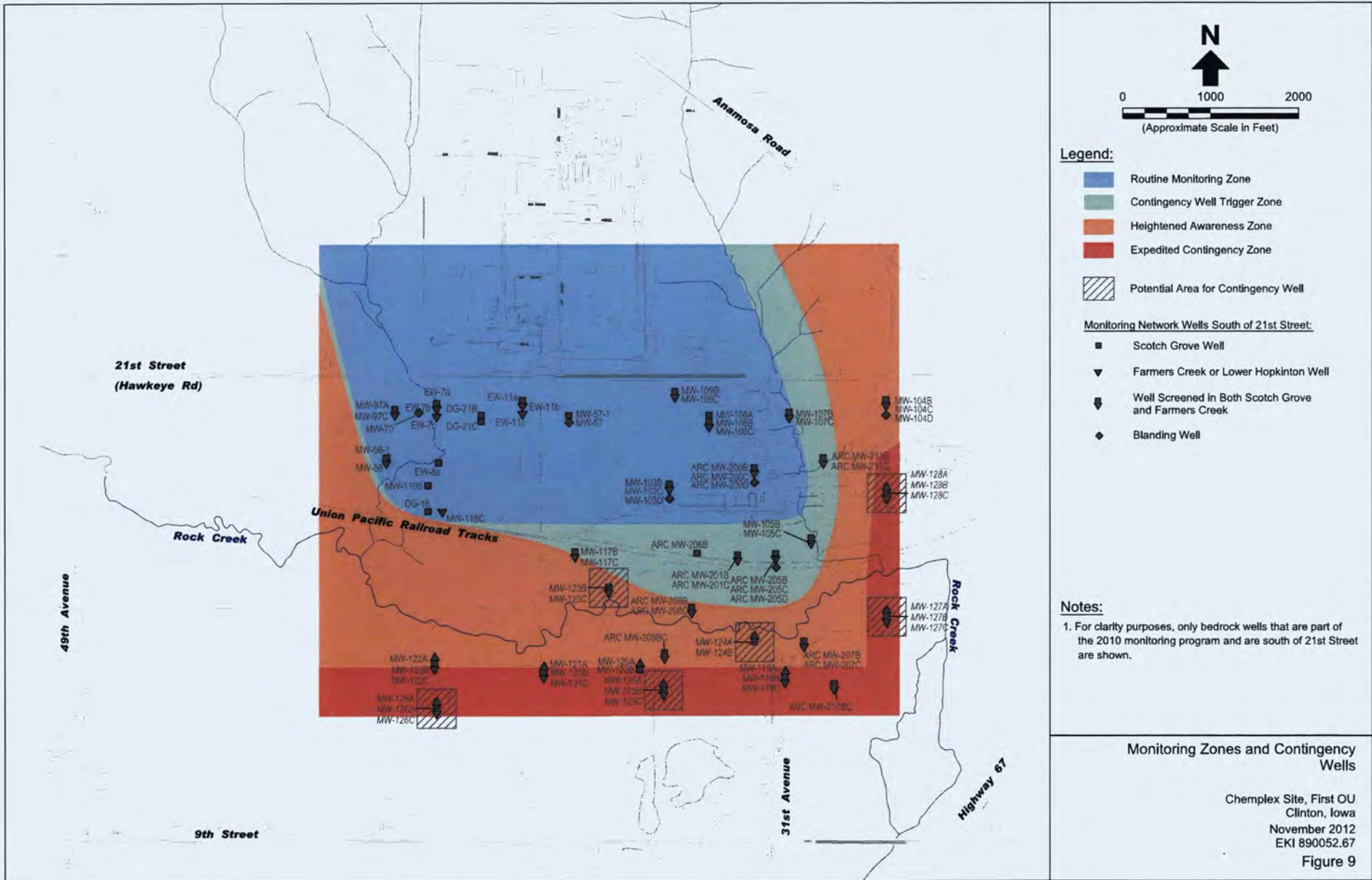
Notes:

1. Head difference shown is the difference between the groundwater elevation at Farmers Creek well MW-101C and Lower Hopkinton well MW-101D. A positive head difference indicates an upward vertical gradient, while a negative head difference indicates a downward vertical gradient.

Historic Head Difference in West Region Monitoring Well Pair MW-101C/MW-101D

Chemplex Site
Clinton, Iowa
July 2012

Figure 8



- Legend:**
- Routine Monitoring Zone
 - Contingency Well Trigger Zone
 - Heightened Awareness Zone
 - Expedited Contingency Zone

- Monitoring Network Wells South of 21st Street:**
- Scotch Grove Well
 - Farmers Creek or Lower Hopkinton Well
 - Well Screened in Both Scotch Grove and Farmers Creek
 - Blanding Well

Notes:

1. For clarity purposes, only bedrock wells that are part of the 2010 monitoring program and are south of 21st Street are shown.

Monitoring Zones and Contingency Wells

Chemplex Site, First OU
Clinton, Iowa
November 2012
EKI 890052.67
Figure 9

Appendix A

APPENDIX A

AMENDMENT TO THE RECORD OF DECISION

RESPONSIVENESS SUMMARY

CHEMPLEX SUPERFUND SITE

CLINTON, IOWA

OPERABLE UNIT NO. 1

IAD045372836

On February 17, 2012, the U.S. Environmental Protection Agency, Region 7, issued a Proposed Plan (Plan) for public review and comment. The Plan described the EPA's Preferred Alternative for addressing groundwater contamination at the Chemplex Superfund Site, Operable Unit No. 1, in Clinton, Iowa (the "Site"). Through the selection of this Preferred Alternative, the EPA will be amending the remedy that it selected in the Record of Decision (ROD) for Operable Unit No. 1 issued on September 27, 1989 (the "1989 ROD"), as modified through an Explanation of Significant Differences issued by the EPA on July 26, 1991. This revision to the remedy will take the form of an Amendment to the Record of Decision (ROD Amendment).

A notice informing the public of the issuance of the Plan, as well as the date and time of the public meeting, was published in the *Clinton Herald*, a major local newspaper of general circulation, on February 17, 2012. Public Comments on the Plan were accepted through March 19, 2012. A public meeting on the Plan was held in Camanche, Iowa on February 27, 2012. Relevant documents pertaining to the Plan were available for public review at the EPA Records Center in Kansas City, Kansas and at the local Camanche Public Library prior to the public meeting. These documents remain available at public repositories as they are part of the Administrative Record file for the Site.

Comments Received and the EPA's Responses

The EPA received comments from one local resident. The commenter presented the comment at the public meeting and then submitted an e-mail to the EPA with an attached letter containing a similar but more detailed comment. The letter detailing the comment is included in the Administrative Record for the Site as Document No. 30245038. The following are summaries of the comments followed by the EPA's responses in italics.

1. The commenter asserted that the Updated Focused Feasibility Study (the "2012 UFFS") and the EPA's Fact Sheets stated that the revised remedy included "enhanced groundwater and surface water monitoring" but at the February 27, 2012 meeting, the EPA stated that the surface water monitoring would be the same as that required in the original Record of Decision (ROD). The commenter stated that "[t]o sum up my concerns, I feel that the Source Polluters should be required, as a condition of the amended ROD, to annually test the surface waters downgradient of the massive toxic chemical plume"

The amended ROD does require more surface water sampling than the original, 1989 ROD. The general sampling requirements for the 1989 ROD are set forth in the August 13, 1991, Consent Decree Statement of Work (SOW). The specific surface water and groundwater requirements of the SOW are set forth in the November 1993 Performance Monitoring Evaluation (PME) Plan. The PME Plan requires that surface water samples be collected annually from one location in the west tributary to Rock Creek. While the revised remedy includes sampling at this original location in the west tributary, it also requires sampling at three additional locations, one in the east tributary and two in Rock Creek. While the responsible parties have been sampling these locations voluntarily, the sampling of all of these locations was not a requirement of the 1989 ROD or 1991 Consent Decree. The revised remedy requires the sampling of all four of these locations on a semiannual (twice yearly) rather than annual basis. So the number of surface locations required to be sampled has increased from one to four and the sampling has increased from annually to twice a year.

In addition, the revised remedy presents contingency measures that must be taken by the responsible parties if certain trigger levels of contaminants are met or exceeded in surface waters. There are three contingency levels that may be triggered if Site contaminants increase within four groundwater monitoring zones. These triggers may require that additional monitoring and potentially, additional remedial responses, be conducted to mitigate any threats to human health and the environment. The monitoring zones and contingency measures are set forth in section 4.7.2.5 of the 2012 UFFS.

2. The commenter expressed concern about the following statement in a December 23, 2008 letter, from Mark Hendrickson of Chevron to Nancy Swyers of the EPA, "ACC/GCC remains concerned about the potential, however unlikely, of future exposure resulting from continued use of these wells." The commenter went on to say that the EPA can't state with 100% certainty that no hazardous substances from the Site will reach any surface water in the Camanche west district "since all cleanup efforts will be abandoned."

The EPA has determined that the contaminant plume has been stable since the groundwater extraction and treatment system was shut off in 2008. The continued stability of the plume will be monitored by the expanded groundwater and surface water monitoring program required as part of the revised remedy. A total of 15 new monitoring wells have been installed downgradient of the Site. These wells will be monitored as part of the revised remedy and the responsible parties will be required to ensure that the plume remains stable.

In addition to the expanded monitoring, the revised remedy provides for "hot spot" treatment of areas where there are elevated levels of contamination. Pilot tests conducted by the responsible parties in 2009 indicated that this "hot spot" treatment, through the use of a strong oxidant or an electron donor, was effective in remediating local hot spots with elevated PCE concentrations in the groundwater. The active remediation component of the revised remedy is discussed in detail in section 4.7.2.2 of the 2012 UFFS.

3. The commenter expressed concern about the contaminants being in fractured bedrock and that nobody can predict the exact path of contaminant movement.

The commenter is correct that the exact future path of contaminant movement in the fractured bedrock cannot be predicted. However, as the EPA's senior hydrogeologist explained at the February 27, 2012 public meeting, it is known that the Scotch Grove formation, which is the upper fractured bedrock geological formation at the Site, discharges into Rock Creek, which is upgradient of the surface water bodies identified by the commenter. Therefore, contaminants will appear in Rock Creek before they will appear in the downgradient surface waters. As monitoring of Rock Creek is a requirement of the revised remedy, the EPA expects that Site contaminants will be detected in Rock Creek before the contaminants would ever appear in any surface waters located downgradient of Rock Creek.

4. The commenter expressed concern about the EPA being able to verify that the Remedial Action Objectives (RAOs) for surface water are being maintained without testing of the surface water.

As stated in response to comment number 3 above, the EPA expects that the sampling of Rock Creek and its tributaries, as required by the revised remedy, will be adequate to verify surface water RAOs. Although there have been some detections of Site contaminants in Rock Creek and its tributaries, these detections have been well below levels that may result in any adverse effects in human health or the environment. Accordingly, the EPA considers the RAOs for surface water, as set forth in the 1989 ROD, to have been consistently achieved for the Site.¹ The EPA also expects that the revised remedy will consistently achieve the RAOs for surface water as set forth in section 4.5 of the 2012 ROD Amendment.

5. The commenter stated that the request for surface water monitoring has widespread support. Local residents of Camanche as well as elected representatives and the Izaak Walton League of America have requested that the surface water testing of the local lakes.

The EPA has received and responded to letters from all of these entities. The EPA tested the Murphy Lake in 2010 and 2011. The EPA also tested the Foley Lake in 2011. As expected, no Site-related contaminants were detected at either location. Although the EPA appreciates the concern that the public has for the water quality of the surface waters, the EPA must make technical and scientific decisions for sites based on evidence and the best judgment of its professionals. It is the EPA's judgment, as discussed above, that the additional sampling is unnecessary and would not enhance the protectiveness of the revised remedy.

6. The commenter expressed concern that the EPA proposed the revised remedy in the Plan because it is cost-effective, not because it is the "right thing to do."

Prior to proposing the revised remedy for the Site, the EPA researched the possibility of implementing other remedies. The EPA looked into innovative technologies that had been implemented at other sites. It is the EPA's judgment that those remedies would not be effective at the Site due to the presence of dense non-aqueous phase liquid (DNAPL) contamination in fractured bedrock. This DNAPL contamination has reached at least one hundred feet below

¹ The remedial action objectives for surface water under the 1989 ROD are the prevention of adverse effects to human health and environmental receptors from Site contaminants in surface waters (see sections 1.6.B, 1.6.C, and 5.1 of the 1989 ROD).

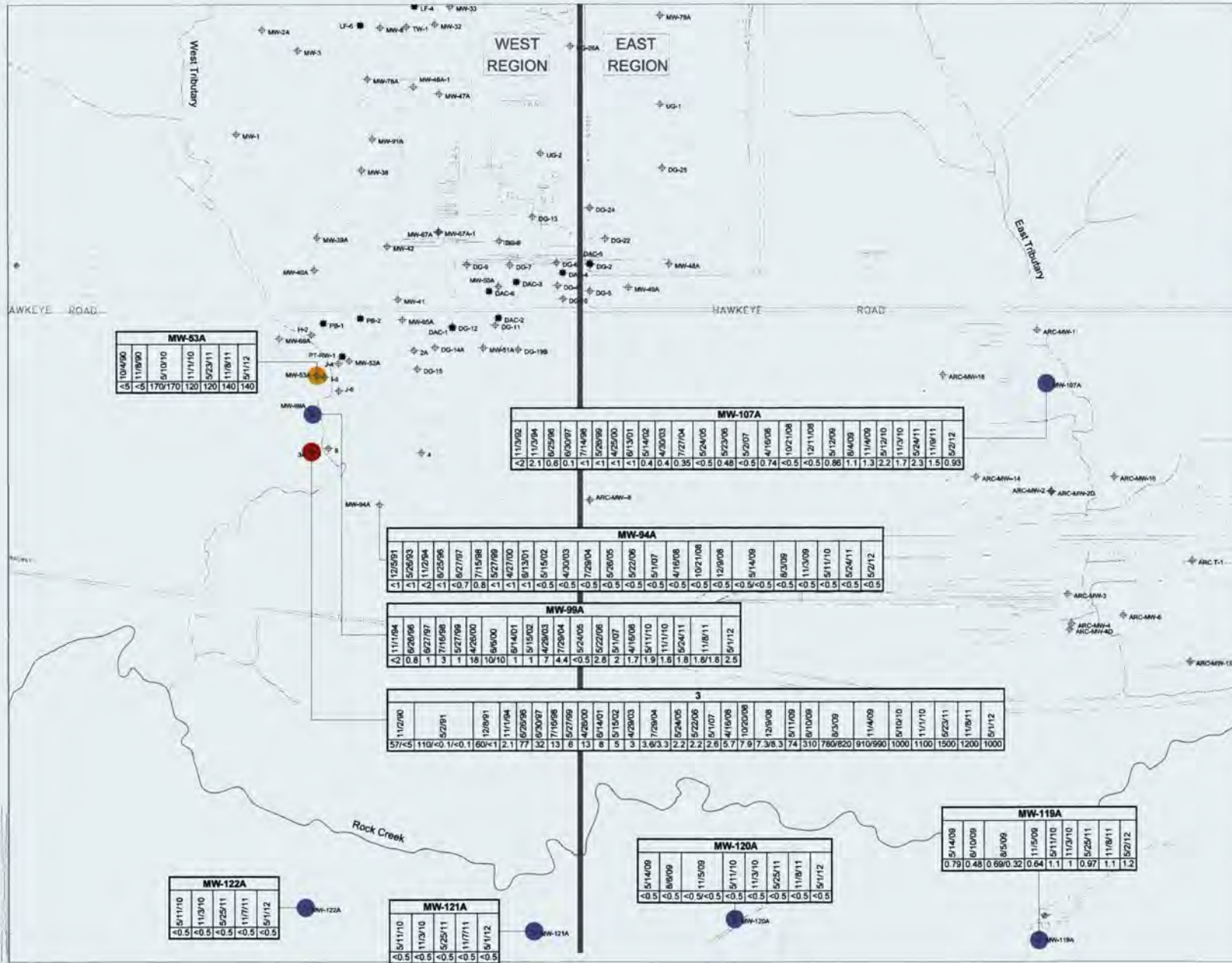
ground surface and reached steady state conditions decades ago. If the EPA disturbs this contamination, it will make the contamination more mobile. In some regards, the groundwater extraction and treatment that was implemented as part of the 1989 ROD deepened and spread out the contaminant plume. The EPA believes that the revised remedy should be implemented because it is the best available alternative for the Site. Cost effectiveness is one of the nine criteria that the EPA is required to consider when selecting a remedy for a site. The EPA believes that the remedy satisfies the other eight criteria as well as cost effectiveness.

7. The commenter concluded his comments with the following:

OFFICIAL REQUEST TO THE EPA CONCERNING THE CHEMPLEX SUPERFUND SITE: to include as a requirement in an amended Record of Decision, annual surface water testing by an Independent Laboratory for all chemicals of concern for the surface water downgradient of the Chemplex Superfund Site. Testing would include Cross' Marsh, Foley's Lake, Bark's Lakes (both), Murphy's Lake and Rock Creek south of the 9th Street Bridge. Annual test results are to be provided to the Lake owners as well as the Attorney for the city of Camanche and the Attorney for Clinton County.

As indicated in the responses to comments above, it is the EPA's judgment, and the state of Iowa concurs, that annual surface water sampling of the local lakes or additional locations in Rock Creek would not enhance the protectiveness of the revised remedy. The EPA believes that the current groundwater and surface water monitoring network are sufficient to ensure that the groundwater contaminant plume does not migrate to the surface water bodies identified by the commenter. Extensive groundwater and surface water monitoring has demonstrated the stability of the plume. In the unlikely event that the contaminant plume would migrate unexpectedly, contingency measures would be available (see response to question number 2 above) to ensure that further remedial actions would be implemented and that the RAOs continue to be achieved.

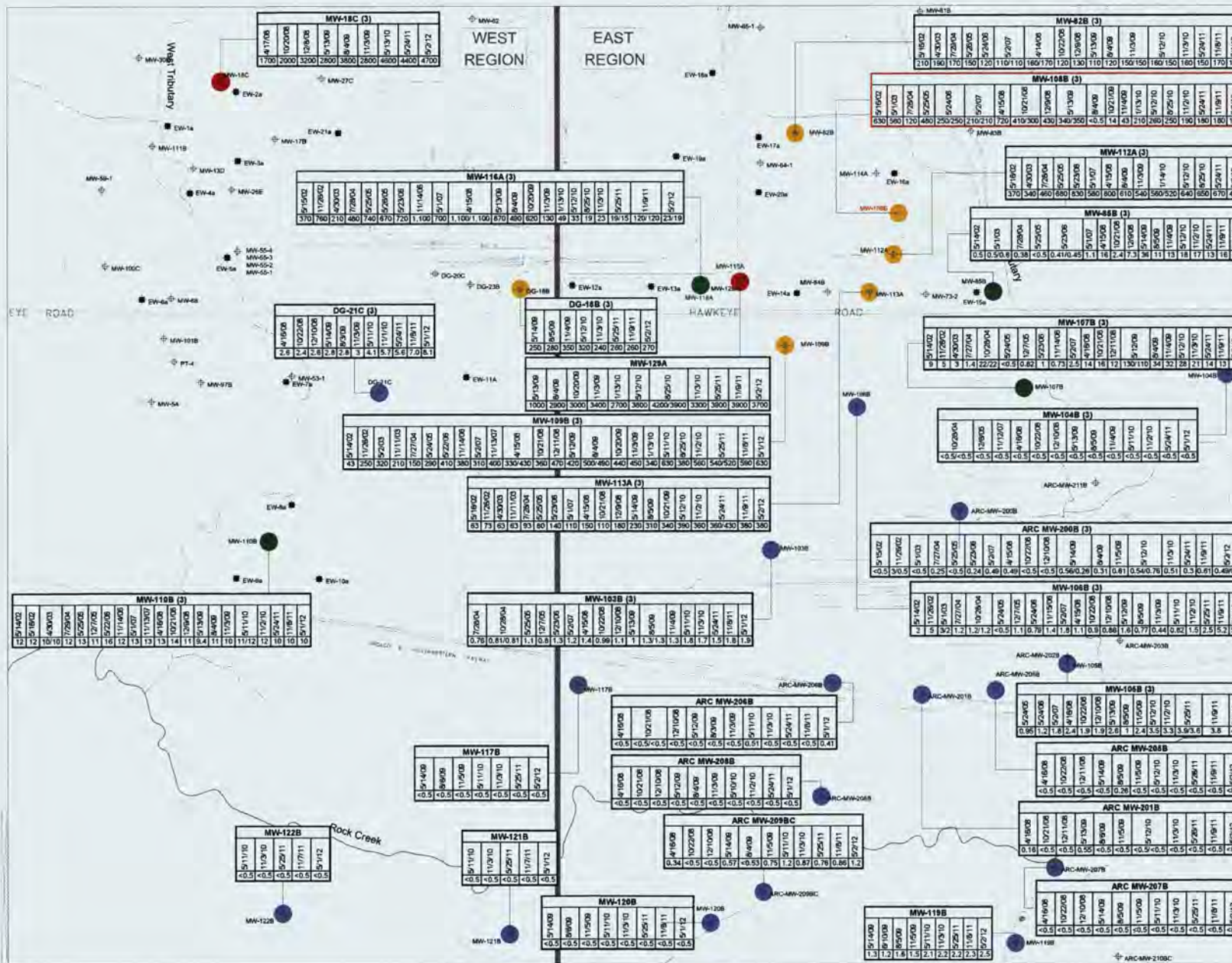
Appendix B



- Legend:**
- ⊕ Monitoring Well
 - Former Extraction Well (Inactive)
 - May 2012 PCE Concentration Greater Than or Equal to 1,000 µg/L
 - May 2012 PCE Concentration Between 100 and 1,000 µg/L
 - May 2012 PCE Concentration Between 10 and 100 µg/L
 - May 2012 PCE Concentration Less than 10 µg/L

- Notes:**
1. All locations are approximate.
 2. Groundwater extraction from this stratum began in December 1994 and was suspended on 29 September 2008.

Erler & Kalinowski, Inc.
 PCE Concentrations (µg/L)
 Detected in Groundwater Samples
 From Overburden
 Chemplex Site First OU
 Clinton, Iowa
 August 2012
 EK1 890052.64
 Figure 1

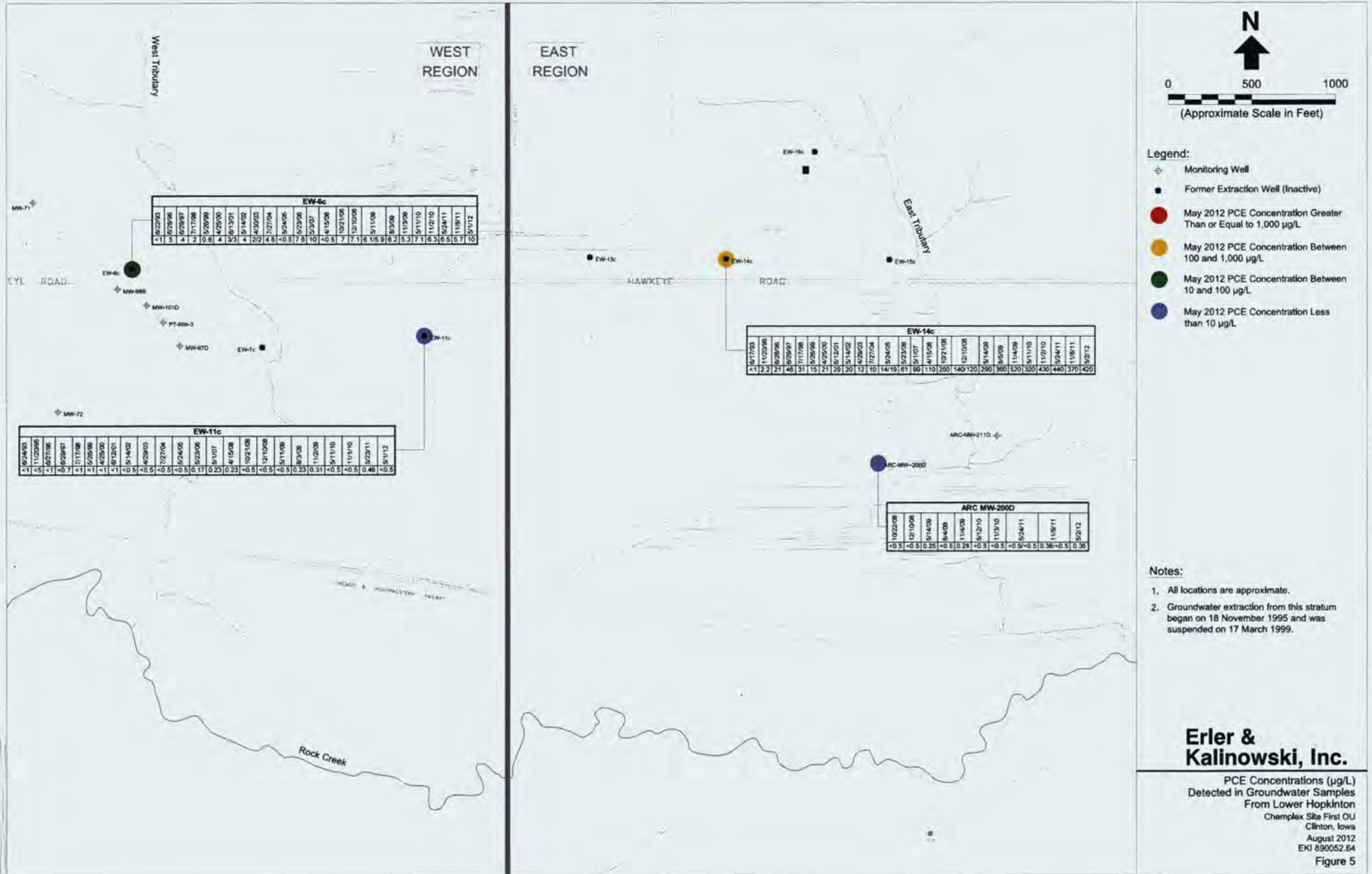


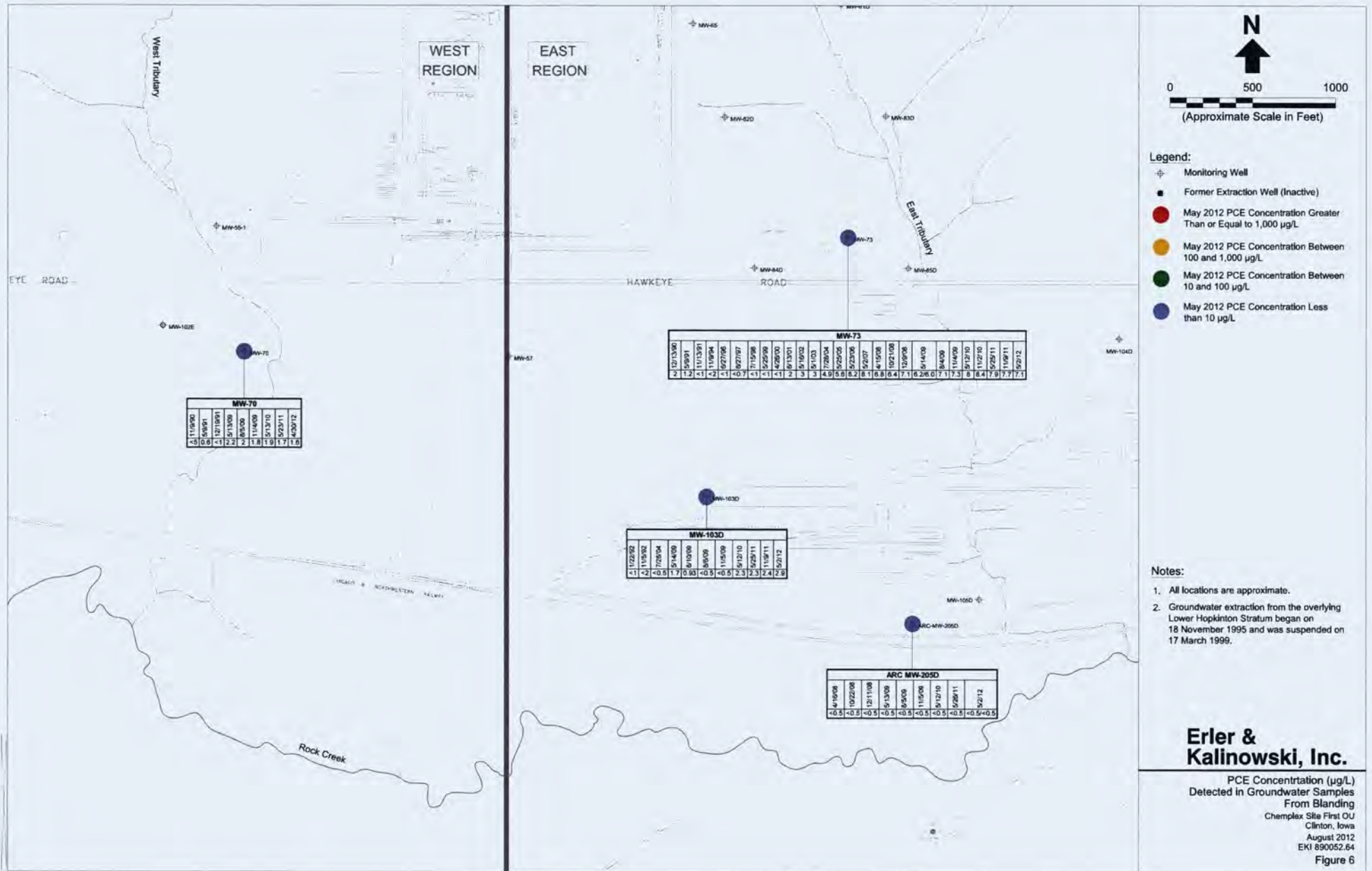
- Legend:**
- ⊕ Monitoring Well
 - Former Extraction Well (Inactive)
 - ⊕ Monitoring Well Injected with Permanganate in July 2009
 - ⊕ Monitoring Well Injected with Vegetable Oil in July 2009
 - May 2012 PCE Concentration Greater Than or Equal to 1,000 µg/L
 - May 2012 PCE Concentration Between 100 and 1,000 µg/L
 - May 2012 PCE Concentration Between 10 and 100 µg/L
 - May 2012 PCE Concentration Less than 10 µg/L

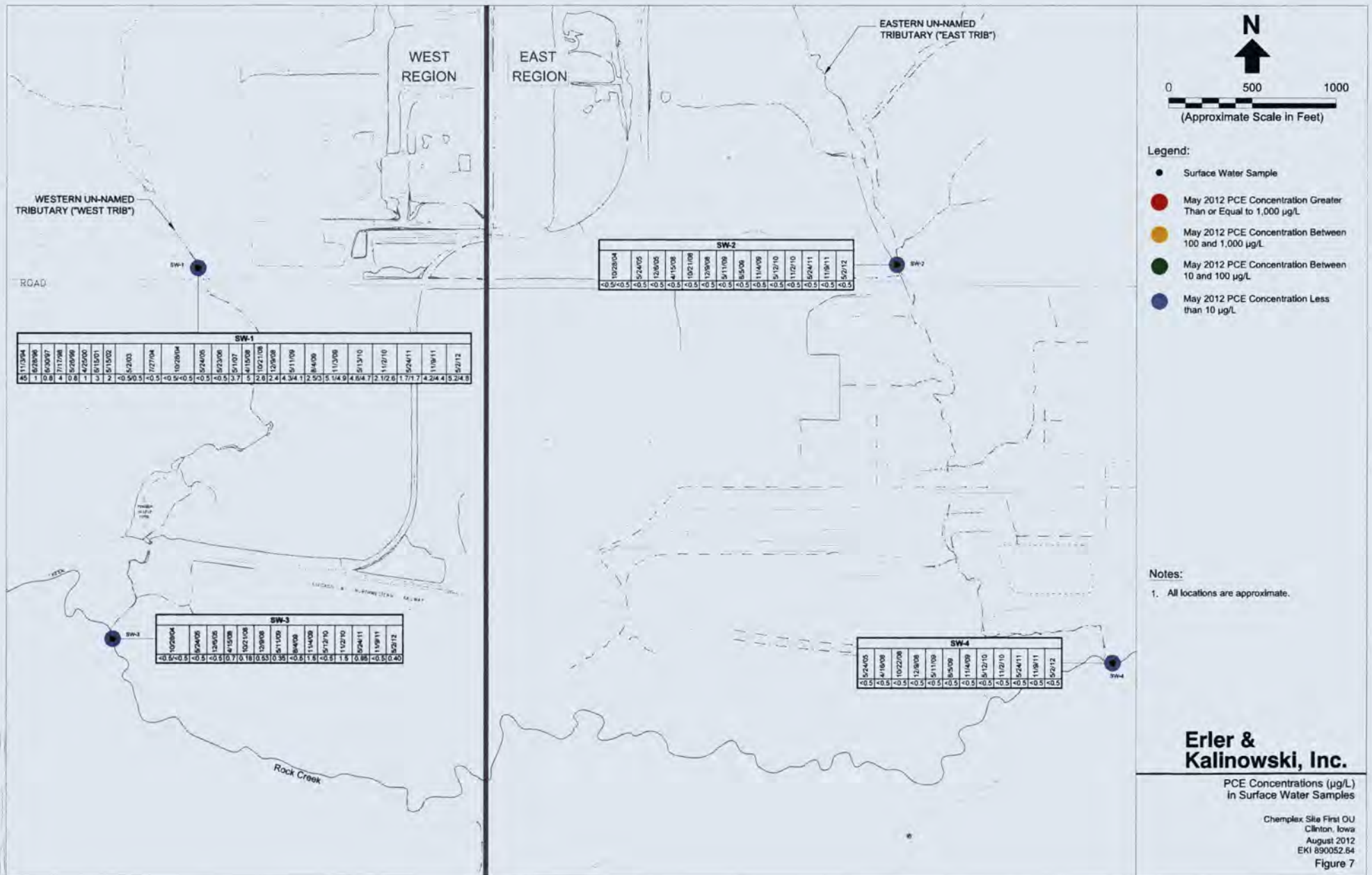
- Notes:**
1. All locations are approximate.
 2. Groundwater extraction from the overlying Upper Scotch Grove stratum began in February 1995 and was suspended on 29 September 2008.
 3. Due to figure readability issues, only data since January 2002 are shown on this figure. Please refer to previous sampling reports for data prior to January 2002.
 4. The reported analytical data from wells MW-107B and MW-107C for samples collected on 28 October 2004 are suspected to be switched. The shown concentration is as reported by the laboratory.

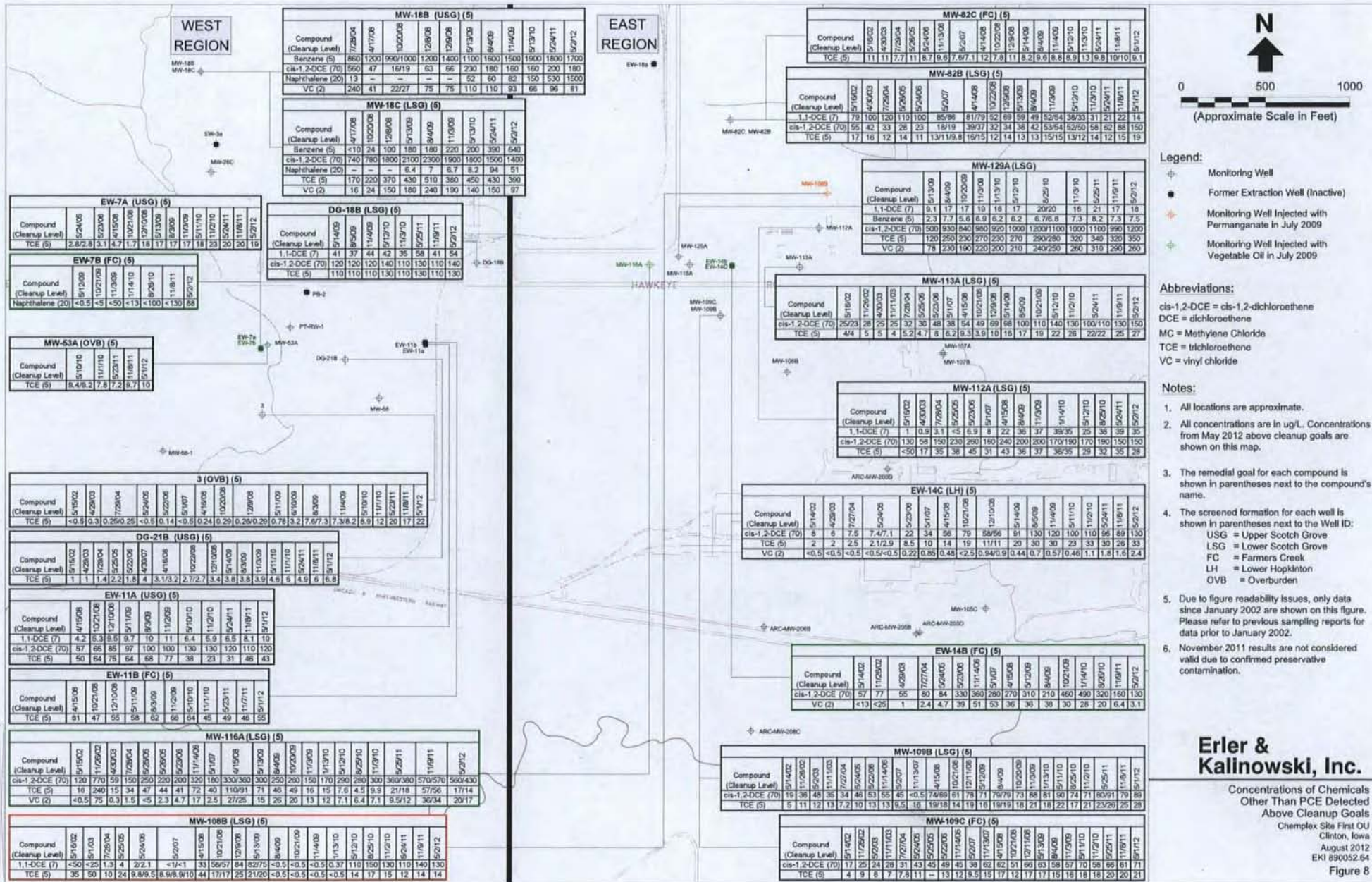
Erler & Kalinowski, Inc.

PCE Concentrations (µg/L)
 Detected in Groundwater Samples
 From Lower Scotch Grove
 Complex Site First OU
 Clinton, Iowa
 August 2012
 EKI 890052.64
 Figure 3









- Legend:**
- ⊕ Monitoring Well
 - Former Extraction Well (Inactive)
 - ⊕ Monitoring Well Injected with Permanganate in July 2009
 - ⊕ Monitoring Well Injected with Vegetable Oil in July 2009

- Abbreviations:**
- cis-1,2-DCE = cis-1,2-dichloroethene
 - DCE = dichloroethene
 - MC = Methylene Chloride
 - TCE = trichloroethene
 - VC = vinyl chloride

- Notes:**
1. All locations are approximate.
 2. All concentrations are in ug/L. Concentrations from May 2012 above cleanup goals are shown on this map.
 3. The remedial goal for each compound is shown in parentheses next to the compound's name.
 4. The screened formation for each well is shown in parentheses next to the Well ID:
 - USG = Upper Scotch Grove
 - LSG = Lower Scotch Grove
 - FC = Farmers Creek
 - LH = Lower Hopkinton
 - OVB = Overburden
 5. Due to figure readability issues, only data since January 2002 are shown on this figure. Please refer to previous sampling reports for data prior to January 2002.
 6. November 2011 results are not considered valid due to confirmed preservative contamination.

Erler & Kalinowski, Inc.
 Concentrations of Chemicals Other Than PCE Detected Above Cleanup Goals
 Complex Site First OU
 Clinton, Iowa
 August 2012
 EKI 890052.64
 Figure 8

WEST REGION

MW-18B (USG) (5)

Compound (Cleanup Level)	5/17/08	10/20/08	12/08/08	12/08/08	5/13/09	8/4/09	11/4/09	5/13/10	5/24/11	5/9/12	
Benzene (5)	860	1200	990	1000	1200	1400	1100	1600	1500	1600	1700
cis-1,2-DCE (70)	560	47	16/19	53	66	230	180	160	200	180	180
Naphthalene (20)	13	-	-	-	52	60	82	130	150	1500	1500
VC (2)	240	41	22/27	75	75	110	110	93	66	96	81

EAST REGION

MW-82C (FC) (5)

Compound (Cleanup Level)	5/16/02	8/30/03	7/28/04	5/26/05	5/24/06	5/27/07	8/1/08	10/20/08	5/14/09	8/4/09	11/4/09	5/13/10	11/01/10	11/8/11	5/9/12
TCE (5)	11	11	7.7	11	8.7	9.6	7.6/7.1	12	7.8	11	8.2	6.6	8.8	8.9	13

MW-18C (LSG) (5)

Compound (Cleanup Level)	4/7/08	10/20/08	12/08/08	5/13/09	8/4/09	11/4/09	5/13/10	5/24/11	5/9/12
Benzene (5)	<10	24	100	180	190	220	200	390	640
cis-1,2-DCE (70)	740	780	1800	2100	2300	1900	1800	1500	1400
Naphthalene (20)	-	-	-	6.4	7	8.7	8.2	94	51
TCE (5)	170	220	370	430	510	380	450	430	360
VC (2)	16	24	150	180	240	190	140	150	97

MW-82B (LSG) (5)

Compound (Cleanup Level)	5/16/02	8/30/03	7/28/04	5/26/05	5/24/06	5/27/07	8/1/08	10/20/08	5/14/09	8/4/09	11/4/09	5/13/10	11/01/10	11/8/11	5/9/12
cis-1,2-DCE (70)	55	42	33	28	23	19/19	39/37	32	34	38	42	53/54	52/50	58	10
TCE (5)	17	16	12	14	11	13/11/8	16/15	12	14	13	13	15/15	13/12	14	15

EW-7A (USG) (5)

Compound (Cleanup Level)	5/24/05	5/23/08	4/15/08	10/21/08	5/13/09	8/4/09	11/4/09	5/13/10	5/24/11	5/9/12
TCE (5)	2.6/2.8	3.1	4.7	11.7	18	17	17	17	17	19

MW-129A (LSG)

Compound (Cleanup Level)	5/13/09	8/4/09	11/4/09	5/13/10	5/24/11	5/9/12
1,1-DCE (7)	8.1	17	17	18	17	20/20
Benzene (5)	2.3	1.7	5.8	6.9	6.3	6.2
cis-1,2-DCE (70)	500	930	840	980	920	1000
TCE (5)	120	250	230	270	230	270
VC (2)	78	230	190	220	200	210

EW-7B (FC) (5)

Compound (Cleanup Level)	5/13/09	8/4/09	11/4/09	5/13/10	5/24/11	5/9/12
Naphthalene (20)	<0.5	<0.5	<1.3	<1.0	<1.3	88

MW-113A (LSG) (5)

Compound (Cleanup Level)	5/16/02	8/30/03	7/28/04	5/26/05	5/24/06	5/27/07	8/1/08	10/20/08	5/14/09	8/4/09	11/4/09	5/13/10	11/01/10	11/8/11	5/9/12
cis-1,2-DCE (70)	25/23	5	3	3	3	3	3	3	3	3	3	3	3	3	3
TCE (5)	44	5	4	5.2	4.7	8	6.2	8.3	3.9	10	16	17	22	26	27

MW-63A (OVB) (5)

Compound (Cleanup Level)	5/10/10	11/11/10	5/24/11	5/9/12
TCE (5)	6.4/6.2	7.8	7.2	8.7

MW-112A (LSG) (5)

Compound (Cleanup Level)	5/16/02	8/30/03	7/28/04	5/26/05	5/24/06	5/27/07	8/1/08	10/20/08	5/14/09	8/4/09	11/4/09	5/13/10	11/01/10	11/8/11	5/9/12
1,1-DCE (7)	0.9	3.1	4.5	6.9	8	22	35	36	37	39/35	35	35	35	35	35
cis-1,2-DCE (70)	130	58	150	230	260	160	240	200	200	170/190	170	190	150	150	150
TCE (5)	<50	17	35	38	45	31	43	36	37	36/35	29	32	35	28	28

3 (OVB) (5)

Compound (Cleanup Level)	5/15/02	4/23/03	7/28/04	5/24/05	5/22/06	5/17/07	4/15/08	10/20/08	5/13/09	8/4/09	11/4/09	5/13/10	5/24/11	5/9/12
TCE (5)	<0.5	0.3	0.25	0.25	<0.5	0.14	<0.5	0.34	0.29	0.26	0.29	0.78	3.2	7.6/7.3

MW-114C (LH) (5)

Compound (Cleanup Level)	5/14/02	5/29/03	7/27/04	5/24/05	5/23/06	5/15/07	4/15/08	10/21/08	5/14/09	8/5/09	11/4/09	5/13/10	5/24/11	5/9/12
cis-1,2-DCE (70)	6	6	7.5	7.4/7.1	2.2	5/11/08	5.6	7.9	58/55	5/15/09	1.30	120	100	110
TCE (5)	2	2	2.5	2.1/2.9	8.5	10	14	19	11/11	20	30	30	23	33
VC (2)	<0.5	<0.5	<0.5	<0.5	0.72	0.85	0.48	<2.5	0.94/0.9	0.44	0.7	0.57	0.46	1.1

DG-21B (USG) (5)

Compound (Cleanup Level)	5/15/02	4/23/03	7/28/04	5/24/05	5/22/06	5/17/07	4/15/08	10/20/08	5/13/09	8/4/09	11/4/09	5/13/10	5/24/11	5/9/12
TCE (5)	1	1	1.4	2.2	1.6	4	3.1/3.2	2.7/2.7	3.4	3.6	3.9	3.9	4.6	6.8

MW-111A (USG) (5)

Compound (Cleanup Level)	4/15/08	10/21/08	12/10/08	5/11/09	8/3/09	11/20/09	5/24/11	5/9/12
1,1-DCE (7)	4.2	5.3	9.5	9.7	10	11	6.4	5.9
cis-1,2-DCE (70)	57	85	85	97	100	100	130	120
TCE (5)	50	54	75	54	58	77	38	31

EW-11B (FC) (5)

Compound (Cleanup Level)	4/15/08	10/21/08	12/10/08	5/11/09	8/3/09	11/20/09	5/24/11	5/9/12
TCE (5)	81	47	55	5/12/08	58	5/11/09	49	35

MW-116A (LSG) (5)

Compound (Cleanup Level)	5/15/02	4/23/03	7/28/04	5/24/05	5/22/06	5/17/07	4/15/08	10/20/08	5/13/09	8/4/09	11/4/09	5/13/10	5/24/11	5/9/12
cis-1,2-DCE (70)	130	770	59	150	250	220	200	320	160	330	360	280	150	170
TCE (5)	16	240	15	34	47	44	41	72	40	49	16	15	7.6	4.5
VC (2)	<0.5	75	0.3	1.5	<0.3	2.3	4.7	17	2.5	27/25	15	26	20	13

MW-108B (LSG) (5)

Compound (Cleanup Level)	5/15/02	5/1/03	7/28/04	5/24/05	5/24/06	5/20/07	4/15/08	10/21/08	12/8/08	5/13/09	8/4/09	11/4/09	5/13/10	5/24/11	5/9/12
1,1-DCE (7)	<50	<25	1.3	4	2/2.1	<1/1	33	56/57	84	82/75	<0.5	<0.5	<0.5	<0.5	<0.5
TCE (5)	35	50	10	24	9.6/9.5	6.9/8.9/10	44	17/17	25	21/20	<0.5	<0.5	<0.5	<0.5	<0.5

MW-109B (LSG) (5)

Compound (Cleanup Level)	5/14/02	11/28/02	5/29/03	7/27/04	5/24/05	5/22/06	5/15/07	4/15/08	10/21/08	5/14/09	8/5/09	11/4/09	5/13/10	5/24/11	5/9/12
cis-1,2-DCE (70)	19	38	48	38	34	48	53	55	<0.5	74/69	61	78	71	76/79	73
TCE (5)	5	11	12	13	13	13	13	9.5	16	19/18	14	19	16	19/19	18

MW-109C (FC) (5)

Compound (Cleanup Level)	5/14/02	11/28/02	5/29/03	7/27/04	5/24/05	5/22/06	5/15/07	4/15/08	10/21/08	5/14/09	8/5/09	11/4/09	5/13/10	5/24/11	5/9/12
cis-1,2-DCE (70)	17	25	24	28	28	31	43	45	52/50/5	62	62	62	62	62	62
TCE (5)	4	9	8	7	7.8	11	-	13	12	9.5	15	17	12	17	17

Appendix C



{In Archive} ROD Amendment for the Chemplex site
Lundberg, Cal [DNR]

to:

Nancy Swyers

06/21/2012 01:23 PM

Cc:

"Drustrup, Bob [DNR]", "Tormey, Brian [DNR]"

Hide Details

From: "Lundberg, Cal [DNR]" <Cal.Lundberg@dnr.iowa.gov>

To: Nancy Swyers/SUPR/R7/USEPA/US@EPA

Cc: "Drustrup, Bob [DNR]" <Bob.Drustrup@dnr.iowa.gov>, "Tormey, Brian [DNR]"
<Brian.Tormey@dnr.iowa.gov>

History: This message has been forwarded.

Archive: This message is being viewed in an archive.

IDNR supports the ROD Amendment recently proposed for the Chemplex site.

Cal Lundberg, Ph.D., Supervisor
Contaminated Sites Section
Iowa Dep't. of Natural Resources
515-281-7040
<mailto:cal.lundberg@dnr.iowa.gov>