EPA/ROD/R01-91/060
1991

EPA Superfund
Record of Decision:

NYANZA CHEMICAL WASTE DUMP
EPA ID: MAD990685422
OU 02
ASHLAND, MA
09/23/1991

DECLARATION FOR THE RECORD OF DECISION

Nyanza Chemical Waste Dump, Operable Unit II
Ashland, Massachusetts

Statement of Purpose

This Decision Document presents the selected interim remedial action for this Site developed in accordance with 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 Contingency Plan (NCP), 40 CFR Part 300, 55 Federal Register 8666 (March 8, 1990).

The Commonwealth of Massachusetts has concurred with the selected remedy.

Statement of Basis

This decision is based on the Administrative Record which was developed in accordance with Section 113(k) of CERCLA and which is available for public review at the information repositories located at the Ashland Public Library in Ashland, Massachusetts, and at the EPA offices at 90 Canal Street in Boston, Massachusetts. The attached index identifies the items which comprise the Administrative Record upon which the selection of a remedial action is based.

Description of the selected Remedy

In summary, the remedy provides for: 1) extracting contaminated groundwater from the northern portion of the Site near the railroad tracks and industrial park, and optionally at the southern border of the cap now under construction on Megunko Hill for a minimum of 5 years; 2) treating the groundwater with a combination of physical and chemical processes; 3) discharging the treated water into the Sudbury River; 4) using institutional and access controls to limit exposure to contaminants; 5) performing pump tests in the eastern portion of the plume to help determine the feasibility of cleaning up groundwater in this area at some future point; 6) installing additional deep bedrock wells to more fully define the depths and locations to which contaminants may have migrated; 7) performing continuing monitoring of selected existing residential and monitoring wells and limited surface water testing to track any further progress of the plume; 8) inspecting the Megunko Road water line; and 9) performing certain pre-design studies to aid in the design of the selected remedy.

The first operable unit addressed contaminated sludges and soils by excavating them from outlying areas, and consolidating them with sludges already on Megunko Hill under an impermeable cap. The first operable unit ROD also included an upgradient diversion trench to preclude contact with groundwater and surface water runoff with the buried material. Construction of the first operable unit remedy is expected to be completed in late 1991.

This second operable unit interim remedial action will serve to collect data to refine the cleanup time estimates for the final Record of Decision, and will in the interim address the following principal threats to human health and the environment posed by the site: migration of contaminants in groundwater, risks to human health associated with potential future consumption and direct contact with groundwater, risks from present and potential future inhalation of evaporated groundwater contaminants, and degradation of the Sudbury River and wetlands due to the natural discharge of contaminated groundwater.

The third operable unit concerns the impact of Nyanza's past uncontrolled wastewater discharges to the Sudbury River and its tributaries. A ROD for that Operable Unit is scheduled for next year.

Declaration

The selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable for this remedial action and is cost-effective. The selected remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. The statutory preference for remedies that utilize treatment as a principal element to reduce the mobility, toxicity, or volume of hazardous substances is met by the selected remedy.

9/23/91
Date

Julie Belaga
Regional Administrator, EPA Region I

Introduction

This document is the index to the **Groundwater Study**, (Operable Unit II) Administrative Record for the Nyanza Chemical Waste Dump National Priorities List (NPL) site. Section I of the index cites site-specific documents, and Section II cites guidance documents used by EPA staff in selecting a response action at the site. This index contains confidential documents that are available only for judicial review.

The Administrative Record is available for public review at EPA Region I's Office in Boston, Massachusetts, and at the Ashland Public Library, 66 Front Street, Ashland, Massachusetts, 01721. **Although not expressly listed in this index, all documents contained in the administrative record for the September 4, 1985, Record of Decision (Operable Unit I) are incorporated by reference herein, and are expressly made a part of the administrative record for the present operable unit, Nyanza Chemical Waste Dump Groundwater Study.** Questions concerning the Administrative Record should be addressed to the EPA Region I site manager.

The Administrative Record is required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA).

Nyanza Chemical Waste Dump
(Groundwater Study)
NPL Site Administrative Record

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Nyanza Chemical Waste Dump
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NFL Site Administrative Record

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VOLUME VI

SECTION I
SITE-SPECIFIC DOCUMENTS

ADMINISTRATIVE RECORD INDEX

for the

Nyanza Chemical Waste Dump
(Groundwater Study)
Operable Unit II

2.0 Removal Response

2.1 Correspondence

1. "Massachusetts Field Investigation Team Letter Report - Nyanza Vault Site Ashland, Massachusetts - Phase II Investigation," Wehran Engineering (November 17, 1986).

2. Cross-Reference: Letter from Edward J. Conley, EPA Region I to MCL Development Corporation (March 23, 1987). Concerning Potentially Responsible Party status and the necessity of immediate removal in connection with the Nyanza Hazardous Waste Site. [Filed and cited as entry number 21 in section 11.9 PRP-Specific Correspondence].

3. Cross-Reference: Letter from Edward J. Conley, EPA Region I to Nyacol Products, Inc. (March 23, 1987). Concerning Potentially Responsible Party status and the necessity of immediate removal in connection with the Nyanza Hazardous Waste Site. [Filed and cited as entry number 27 in section 11.9 PRP-Specific Correspondence].

4. Cross-Reference: Letter from Thomas J. Sartory, Goulston & Storrs (Attorney for Nyacol Products, Inc.) to Frank W. Lilley, EPA Region I (April 2, 1987). Concerning the scheduled meeting on April 3, 1987 to discuss proposed EPA actions and the impact of EPA's activities on production. [Filed and cited as entry number 28 in section 11.9 PRP-Specific Correspondence].

5. Memorandum from Bob Bois, and Madeline Snow, Massachusetts Department of Environmental Quality Engineering to Herb Redman (May 5, 1987). Concerning vault removal at the Nyanza site. With the attached, Internal Memorandum from Karen Martin, Massachusetts Department of Environmental Quality Engineering to Bob Bois (April 21, 1987). Concerning the characterization of potential health threat from the Nyanza site.

2.1 Correspondence (continued)

6. Cross-Reference: Letter from J. Thomas Robinson, Nyacol Products, Inc. to Frank W. Lilley, EPA Region I (June 5, 1987). Concerning the impact of the vault removal and EPA activity on employee health and disruption of manufacturing operations. [Filed and cited as entry number 29 in section 11.9 PRP-Specific Correspondence].

2.5 On-Scene Coordinator Report

1. "After Action Report for Nyanza Vault Hazardous Waste Site, Ashland, Massachusetts," WESTON-SPER Technical Assistance Team Region I (July 1988). (The Enforcement Section of the Memorandum is Withheld as CONFIDENTIAL).

2.9 Action Memoranda

1. Internal Memorandum from Frank W. Lilley, EPA Region I to Michael R. Deland (April 27, 1987). Concerning request to commence removal action at Nyanza Waste Site. (The Enforcement Section of the Memorandum is Withheld as CONFIDENTIAL).

3.0 Remedial Investigation (RI)

3.1 Correspondence

1. Letter from Laura Miller, Ashland Resident to EPA Region I (April 18, 1985). Concerning basement water seepage and odor.

2. Trip Report on a Visit to Nyanza Chemical Site, Martha Meyers Lee, NUS Corporation (April 23, 1986). Concerning sampling of water in residential basements (April 3, 1986) near the Nyanza Chemical site.

3. Letter from Gillette Henry, Ashland Resident to Richard Cavagnero, and Mary Sanderson, EPA Region I (June 28, 1986). Concerning request for report of wet basement samples taken by NUS Corporation.

3.1 Correspondence (continued)

4. Letter from Richard J. Chalpin, Massachusetts Department of Environmental Quality Engineering to Beverly and Alden Dort, Ashland Residents (February 9, 1987). Concerning analytical results of basement samples taken on August 19, 1986. With attached, "Memorandum for the Record," Patricia Donahue, Massachusetts Department of Environmental Quality Engineering (September 2, 1986). Concerning results of sampling at the Dort residence.

5. Letters from Mary C. Sanderson, EPA Region I to Ashland residents, Mrs. Beverly Dort, Mrs. Eunice Flood, Mrs. Gillette Henry, Mrs. Doris Merloni, Mr. Thomas Regan, and Mr. and Mrs. Donald Weld, (January 29, 1987). Concerning the attached, "Technical Assistance: Residential Sampling," NUS Corporation, detailing sampling conducted on April 3, 1986 and June 9, 1986, (January 26, 1987).

6. Memorandum from Bruce Marshall, EPA Region I to Librarian, Ashland Public Library (January 27, 1988). Concerning the Field Operation Plan.

7. Memorandum from Bruce Marshall, EPA Region I to Richard Brown, et al., Ashland Advocates for a Clean Environment (AACE) and Tom Robinson, Nyanza Community Advisory Committee (NCAC) (January 27, 1988). Concerning the Phase II RI/FS Field Operation Plan.

8. "Memorandum for the Record," Patricia Donahue, Massachusetts Department of Environmental Quality Engineering (May 24, 1988). Concerning DEQE Case No. 03-216, drinking water sampling.

9. Letter from Mark D. Semenuk, Ashland Water and Sewer Department to Richard J. Chalpin, Massachusetts Department of Environmental Protection (July 17, 1989). Concerning water mains on Megunko Road.

10. Letter from Patricia Donahue, and Richard J. Chalpin, Massachusetts Department of Environmental Protection to Mark D. Semenuk, Ashland Water and Sewer Department (August 1, 1989). Concerning answers to water main concerns and request for additional information.

3.1 Correspondence (continued)

11. Letter from Mark D. Semenuk, Ashland Water and Sewer Department to Richard J. Chalpin, Massachusetts Department of Environmental Protection (August 16, 1989). Concerning information requested. With attached:

    A: "Leak Detection Survey Location—Megunco Road," Mark D. Semenuk and Charlie Philbrick, Ashland Water and Sewer Commission (July 19, 1989).
    B: Diagrams of Water Main on Megunco Road (August 21, 1989).
    C: Hydrant Flow Data Summary (June 1986).

12. Internal Memorandum from Peter R. Kahn, EPA Region I to David Lederer (January 7, 1991). Concerning the attached, "Indoor Air Screening Survey Results," EPA Region I (December 1990).

3.2 Sampling and Analysis Data

1. Memorandum from Martin E. Mortensen, EPA Region II to Frank Lilley, EPA Region I (October 6, 1987). Concerning report on well drilling, sampling activities, hydrogeology and the attached, "Well Installation and Ground Water Sampling", ERB/REAC for ERB/ERT (September 30, 1987).

2. Cross-Reference: "Indoor Air Screening Survey Results, Nyanza Chemical Superfund Site, Ashland, Massachusetts," EPA Region I (December 1990). [Filed and cited as entry number 12 in section 3.1 Correspondence].

3. "Analytical Results, Phase I Surface Water and Sediment Sampling, Nyanza Operable Unit III-Sudbury River Study, Middlesex County, Massachusetts," with attached oversized plates A and B, NUS Corporation (May 1991). (Note: Oversized plates may be reviewed by appointment only at EPA Region I, Boston, Massachusetts).

* Additional Sampling and Analysis Data may be reviewed by appointment only, at EPA Region I, Boston, Massachusetts.

3.4 Interim Deliverables

1. Internal Letter from J. Kevin Reilly, and David Chin, EPA Region I to Mary Sanderson, EPA Region I (December 16, 1986). Concerning the sanitary report of the Ashland water system sent to the State of Massachusetts.

3.4 Interim Deliverables (continued)

2. Letter from J. Kevin Reilly, and David Chin, EPA Region I to Mr. Chester Mysel, Massachusetts Department of Environmental Quality Engineering (December 16, 1986). Concerning recommendations based on the October 28, 1986 sanitary survey conducted on the Ashland water system.

3. "Final Field Operations Plan - Remedial Investigation/Feasibility Study, Nyanza Chemical Site, Operable Unit II Groundwater Study," E.G. Jordan Company for Ebasco Services Incorporated (January 1988).

4. Letter from Luis Seijido, Ebasco Services Incorporated to David Lederer, EPA Region I (June 13, 1990). Concerning the development of treatment trains, other potentially applicable technologies and the attached, "Treatability Study Evaluation, Nyanza Chemical Site, Operable Unit II, Ashland, Massachusetts," SEA Consultants, Inc. for Ebasco Services Incorporated (June 1990).

3.6 Remedial Investigation (RI) Report

1. "Draft Final Remedial Investigation Report, Nyanza II Groundwater Study, Ashland, MA," (Volume I-II) Ebasco Services Incorporated (April 1991). (Note: Volume I contain an oversized map that may be reviewed, by appointment only at EPA Region I, Boston, Massachusetts.)

3.7 Work Plans and Progress Reports

1. Cross-Reference: Trip Report on a Visit to Nyanza Chemical Site, Martha Meyers Lee, NUS Corporation (April 23, 1986). Concerning sampling of water in residential basements (April 3, 1986) near the Nyanza Chemical site. [Filed and cited as entry number 2 in section 3.1 Correspondence].

2. "Data Quality Objectives (DQO) Information Document, Nyanza II - Groundwater Study, Ashland, Massachusetts," E.G. Jordan Co. for Ebasco Services Incorporated (August 1987).

3. "Final Work Plan, Nyanza II - Groundwater Study, Ashland, Massachusetts," E.G. Jordan Company for Ebasco Services Incorporated (December 1987).

3.9 Health Assessments

1. Letter from Richard Brown and Maureen Lavin, Nyanza Citizen Advisory Committee to Mary Sanderson, EPA Region I (December 11, 1986). Concerning the Nyanza Citizen Advisory Committee petition to conduct a health study.

2. Memorandum from Marilyn R. DiSirio, Agency for Toxic Substances and Disease Registry to Mary Sanderson, EPA Region I (March 16, 1987). Concerning citizen's petition for a health study at the Nyanza site.

3. Letter from Bruce Marshall, EPA Region I to Maureen Lavin, Nyanza Citizen Community Advisory Committee (October 30, 1987). Concerning informal procedures for requesting a health assessment.

4.0 Feasibility Study (FS)

4.1 Correspondence

1. Internal memorandum from Al Klinger, EPA Region I to David Lederer (May 7, 1991). Concerning extent of contamination in deep bedrock, and possibility of remediation.

2. Internal memorandum from Al Klinger, EPA Region I to David Lederer (May 17, 1991). Concerning the need for downgradient bedrock monitoring at Nyanza.

3. Letter from Donna Grotzinger, Ebasco Services Incorporated to David Lederer, EPA Region I (June 12, 1991). Concerning cost estimates in support of the Nyanza Groundwater Proposed Plan.

4. Letter from Henry M. Fassler, Ashland Board of Health to David Lederer, EPA Region I (June 14, 1991). Concerning transmittal of attached list of private wells within the Town of Ashland.

5. Letter from Donna Grotzinger, Ebasco Services Incorporated to David Lederer, EPA Region I (June 20, 1991). Concerning transmittal of the Town of Ashland private well water distribution map.

4.4 Interim Deliverables

1. "Draft Final Risk Assessment Report, Nyanza Chemical Waste Dump Site, Operable Unit II - Groundwater Study, Ashland, MA," Ebasco Services Incorporated (June 1991).

4.6 Feasibility Study

1. Cross-reference: Letter from Luis Seijido, Ebasco Services Incorporated to David Lederer, EPA Region I (June 13, 1990). Concerning the development of treatment trains, other potentially applicable technologies and the attached, "Treatability Study Evaluation, Nyanza Chemical Site, Operable Unit II, Ashland, Massachusetts," SEA Consultants, Inc. for Ebasco Services Incorporated (June 1990). [Filed and cited as entry number 4 in section 3.4 Interim Deliverables].

2. "Draft Final Feasibility Study Report, Nyanza Chemical Waste Dump Site, Operable Unit II - Groundwater Study, Ashland, MA," Vol I and II, Ebasco Services Incorporated (June 1991).

* Comments on the Feasibility Study received by EPA Region I are summarized in the Responsiveness Summary, which is Appendix I of the Record of Decision (ROD). The ROD is filed and cited as entry number 1 in 5.4 Record of Decision (ROD).

4.9 Proposed Plans for Selected Remedial Action

1. "EPA Proposes Cleanup Plan for the Nyanza Chemical Waste Dump Site," Ebasco Services Incorporated, with attached list of addressees (June 1991).

5.0 Record of Decision (ROD)

5.3 Responsiveness Summaries

l. Cross-Reference: Responsiveness Summary is in Appendix I of the Record of Decision [Filed and cited as entry number 1 in 5.4 Record of Decision (ROD)].

5.4 Record of Decision (ROD)

1. "Record of Decision: Nyanza Chemical Waste Dump Site, Groundwater Study, Operable Unit II," EPA Region I (September 23, 1991).

11.0 Potentially Responsible Party (PRP)

11.9 PRP-Specific Correspondence

AIF REALTY TRUST

1. Letter from Merrill S. Hohman, EPA Region I to AIF Realty Trust (June 21, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

ASHLAND REALTY DEVELOPMENT CORPORATION

2. Letter from Merrill S. Hohman, EPA Region I to Ashland Realty Development Corporation (January 22, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

3. Letter from Merrill S. Hohman, EPA Region I to Robert E. Gayner, Ashland Realty Development Corporation (February 11, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

JOHN P. BAUM

4. Letter from Merrill S. Hohman, EPA Region I to John P. Baum (July 22, 1991). Concerning notification of removal from list of potentially responsible parties.

EDWARD B. BELL, JR.

5. Letter from Merrill S. Hohman, EPA Region I to Edward B. Bell, Jr. (July 22, 1991). Concerning notification of removal from list of potentially responsible parties.

J. BELMAR, INCORPORATED

6. Letter from Merrill S. Hohman, EPA Region I to J. Belmar, Incorporated (July 22, 1991). Concerning notification of removal from list of potentially responsible parties.

BERNARD AND PAULINE BLOOMSTEIN

7. Letter from Merrill S. Hohman, EPA Region I to Bernard and Pauline Bloomstein (January 22, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

8. Letter from Merrill S. Hohman, EPA Region I to Bernard and Pauline Bloomstein (July 22, 1991). Concerning notification of removal from list of potentially responsible parties.

11.9 PRP-Specific Correspondence (continued)

EDWARD J. CAMILLE

9. Letter from Merrill S. Hohman, EPA Region I to Edward J. Camille (January 22, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

SAMUEL CAPLIN

10. Letter from Merrill S. Hohman, EPA Region I to Samuel Caplin (January 22, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

11. Letter from Merrill S. Hohman, EPA Region I to Samuel Caplin (July 22, 1991). Concerning notification of removal from list of potentially responsible parties.

CONSOLIDATED RAIL CORPORATION

12. Letter from Merrill S. Hohman, EPA Region I to J. C. Curry, Consolidated Rail Corporation (January 22, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

ESTATE OF ROLAND E. DERBY, JR.

13. Letter from Merrill S. Hohman, EPA Region I to Middlesex County Probate Court (January 22, 1991). Concerning Notice of Potential Liability which the Estate of Roland E. Derby, Jr. (Docket No. 507540) has or may have at the Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

ESTATE OF ROLAND E. DERBY, SR.

14. Letter from Merrill S. Hohman, EPA Region I to Middlesex County Probate Court (January 22, 1991). Concerning Notice of Potential Liability which the Estate of Roland E. Derby, Sr. (Docket No. 412228) has or may have at the Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

ENVIRONMENTAL RESTORATION ENGINEERING TRUST

15. Letter from Merrill S. Hohman, EPA Region I to John J. Glynn, Jr., Environmental Restoration Engineering Trust (January 22, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

11.9 PRP-Specific Correspondence (continued)

ROBERT E. GAYNER

16. Letter from Merrill S. Hohman, EPA Region I to Robert E. Gayner, Black Point, Derby Side (February 11, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

MARTHA E. AND NELSON HOLDEN

17. Letter from Merrill S. Hohman, EPA Region I to Martha E. and Nelson Holden, Holden - Ashland Trust (January 22, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

WILLIAM M. LEACU

18. Letter from Merrill S. Hohman, EPA Region I to William M. Leacu (January 22, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

DR. ROBERT LURIE

19. Letter from Merrill S. Hohman, EPA Region I to Dr. Robert Lurie (January 22, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

EDWARD M. LYNCH, JR.

20. Letter from Merrill S. Hohman, EPA Region I to Edward M. Lynch, Jr. (July 22, 1991). Concerning notification of removal from list of potentially responsible parties.

MCL DEVELOPMENT CORPORATION

21. Letter from Edward J. Conley, EPA Region I to MCL Development Corporation (March 23, 1987). Concerning Potentially Responsible Party status and the necessity of immediate removal in connection with the Nyanza Hazardous Waste Site.

22. Letter from William F. Hicks, Cuddy, Lynch, Manzi & Cunningham, P.C. (Attorney for MCL Development Corporation) to Frank W. Lilley, EPA Region I (March 31, 1987). Concerning tentative agreement to meet on April 3, 1987 to discuss removal actions.

MCL DEVELOPMENT CORPORATION (continued)

23. Letter from Merrill S. Hohman, EPA Region I to MCL Development Corporation (January 22, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

24. Letter from Merrill S. Hohman, EPA Region I to Robert E. Gayner, MCL Development Corporation (February 11, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

MEGUNKO - CHERRY REALTY TRUST

25. Letter from Merrill S. Hohman, EPA Region I to Frances A. and Peter A. Bruen, Megunko - Cherry Realty Trust (January 22, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

26. Letter from Merrill S. Hohman, EPA Region I to Frances A. and Peter A. Bruen, Megunko - Cherry Realty Trust (July 22, 1991). Concerning notification of removal from list of potentially responsible parties.

NYACOL PRODUCTS, INC.

27. Letter from Edward J. Conley, EPA Region I to Nyacol Products, Inc. (March 23, 1987). Concerning Potentially Responsible Party status and the necessity of immediate removal in connection with the Nyanza Hazardous Waste Site.

28. Letter from Thomas J. Sartory, Goulston & Storrs (Attorney for Nyacol Products, Inc.) to Frank W. Lilley, EPA Region I (April 2, 1987). Concerning the scheduled meeting on April 3, 1987 to discuss proposed EPA actions and the impact of EPA's activities on production.

29. Letter from J. Thomas Robinson, Nyacol Products, Inc. to Frank W. Lilley, EPA Region I (June 5, 1987). Concerning the impact of the vault removal and EPA activity on employee health and disruption of manufacturing operations.

30. Letter from Merrill S. Hohman, EPA Region I to J. Thomas Robinson, Nyacol Products, Inc. (January 22, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

11.9 PRP-Specific Correspondence (continued)

NYANZA, INC.

31. Letter from Merrill S. Hohman, EPA Region I to Scott D. Taylor, Nyanza, Inc. (January 22, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

DR. THOMAS O'CONNOR

32. Letter from Merrill S. Hohman, EPA Region I to Dr. Thomas O'Connor (January 22, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

EARL A. PIKE, JR.

33. Letter from Merrill S, Hohman, EPA Region I to Earl A. Pike, Jr. (July 22, 1991). Concerning notification of removal from list of potentially responsible parties.

PQ CORPORATION

34. Letter from Merrill S. Hohman, EPA Region I to Ernest G. Posner, PQ Corporation (January 22, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

PYNE SAND & STONE COMPANY

35. Letter from Merrill S. Hohman, EPA Region I to James G. Pyne, Pyne Sand & Stone Company, Inc. (January 22, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

36. Letter from Merrill S. Hohman, EPA Region I to James G. Pyne, Pyne Sand & Stone Company, Inc. (July 22, 1991). Concerning notification of removal from list of potentially responsible parties.

ROHM TECH, INC.

37. Letter from Merrill S. Hohman, EPA Region I to Ekkehard Grampp, Rohm Tech, Inc. (January 22, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

11.9 PRP-Specific Correspondence (continued)

THOMAS W. SHOESMITH

38. Letter from Merrill S. Hohman, EPA Region I to Thomas W. Shoesmith (July 22, 1991). Concerning notification of removal from list of potentially responsible parties.

GEORGE W. SPICER

39. Letter from Merrill S. Hohman, EPA Region I to George W. Spicer (July 22, 1991). Concerning notification of removal from list of potentially responsible parties.

SCOTT D. TAYLOR

40. Letter from Merrill S. Hohman, EPA Region I to Scott D. Taylor (January 22, 1991). Concerning Notice of Potential Liability at Nyanza Chemical Waste Dump with attached list of Potentially Responsible Parties.

13.0 Community Relations

13.2 Community Relations Plan

1. Letter from Sanford M. Matathia, Rackemann, Sawyer & Brewster (Attorney for Ashland Board of Health) to Maureen Lavin, Chairman Ashland Board of Health (February 26, 1986). Concerning the Draft Community Relations Plan.

2. "Community Relations Plan, Nyanza Chemical Site, Ashland, MA" with attached Community Relations Plan mailing list (February 1986).

13.3 News Clippings/Press Releases

1. "Environmental News," EPA Region I (May 1, 1987).
2. "Media Advisory," EPA Region I (September 25, 1987).
3. "Environmental News - Residents Encouraged to Attend Nyanza Discussion at Ashland Town Hall," EPA Region I (July 14, 1989).
4. "EPA Proposes Interim Groundwater Cleanup Plan for the Nyanza Chemical Waste Dump Superfund Site," EPA Region I (June 14, 1991).

13.3 News Clippings/Press Releases (continued)

5. "The United States Environmental Protection Agency Invites Public Comment on the Feasibility Study and Proposed Plan for the Nyanza Chemical Waste Dump Site Groundwater Study in Ashland, Massachusetts and Announces the Availability of the Site Administrative Record," Middlesex News (June 21, 1991).

13.4 Public Meetings

1. Notice of Public Meeting, including Agenda, to be held on January 18, 1990, EPA Region I (January 8, 1990).

2. Cross-Reference: Transcript, Proposed Cleanup Plan Public Meeting for the Nyanza Chemical Waste Dump Site (July 18, 1991) is in Appendix I of the Record of Decision [Filed and cited as entry number 1 in 5.4 Record of Decision (ROD)].

13.5 Fact Sheets

1. "Superfund Program Information Update - EPA To Begin Ground-Water Study," EPA Region I (January 1988).

2. "Superfund Program Fact Sheet - EPA Completes Design of Hazardous Waste Containment System, Construction to Begin this Summer," EPA Region I (March 1988).

3. "Information Update - Nyanza Chemical Superfund Site, Ashland, Massachusetts," EPA Region I, with additional information about Nyanza Night IV (public meeting) (May 1989).

17.0 Site Management Records

17.1 Correspondence

1. Letter from Daniel Greenbaum, Massachusetts Department of Environmental Protection to Julie Belaga, EPA Region I (September 23, 1991). Concerning state concurrence with the selected remedy.

17.8 State and Local Technical Records

1. Cross-Reference: "Massachusetts Field Investigation Team Letter Report - Nyanza Vault Site Ashland, Massachusetts - Phase II Investigation," Wehran Engineering Consulting Engineers (November 17, 1986). [Filed and cited as entry number 1 in section 2.1 Removal Response Correspondence].

2. Letter from William A. Brutsch, Massachusetts Water Resources Authority to David Lederer, EPA Region I (March 11, 1991). Concerning the potential use of the Framingham Reservoirs, with the attached:

   A: Excerpts from the "Sudbury Reservoir Water Treatment Plant, Southborough, Massachusetts, Draft Environmental Impact Report," Commonwealth of Massachusetts Metropolitan District Commission Water Division (1984).

   B: Excerpts from the "Draft Drought Management Plan," Massachusetts Water Resources Authority and Commonwealth of Massachusetts Metropolitan District Commission (1989).

   C: Excerpts from the "Supplementary Drought Contingency Plan," Massachusetts Water Resources Authority and Commonwealth of Massachusetts, Metropolitan District Commission (1989) via transmittal letter from William A. Brutsch, Massachusetts Water Resources Authority and Joseph McGinn, Metropolitan District Commission (July 17, 1989).

   D: Excerpts from the "Massachusetts Water Resources Authority, MDC - MWRA Long Range Water Supply Study and Environmental Impact Report - 2020, Phase II Report," Massachusetts Water Resources Authority (October 1990).

SECTION II
GUIDANCE DOCUMENTS

GUIDANCE DOCUMENTS

EPA Guidance Documents may be reviewed at EPA Region I, Boston, Massachusetts.

General Guidance Documents

1. Comprehensive Environmental Response, Compensation, and Liability Act of 1980, amended October 17, 1986.

2. Memorandum from J. Winston Porter, HQ EPA to Addressees ("Regional Administrators, Regions I-X et al.), (OSWER Directive 9234.0-05), July 9, 1987 (discussing interim guidance on compliance with applicable or relevant and appropriate requirements).

3. Memorandum from Jonathan Z. Cannon, HQ EPA to Addressees ("Waste Management Division Directors, Regions I, et al., October 18, 1989 (discussing considerations in Ground Water Remediation at Superfund Sites with attached: U.S. Environmental Protection Agency. Office of Environmental and Remedial Response. Evaluation of Ground-Water Extraction Remedies, Volume 1. Summary Report (EPA/540/2-89/054), September 1989.)

4. "National Oil and Hazardous Substances Pollution Contingency Plan," (40 CFR Part 300), March 8, 1990.

5. U.S. Department of Health and Human Services. National Institute for Occupational Safety and Health, and Occupational Safety and Health Administration. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, October 1985.

6. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Community Relations in Superfund: A Handbook (Interim Version) (EPA/HW-6, OSWER Directive 9230.0-3B), June 1988.

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RECORD OF DECISION: NYANZA CHEMICAL WASTE DUMP SITE

GROUNDWATER STUDY, OPERABLE UNIT II

SEPTEMBER 23, 1991

NYANZA CHEMICAL WASTE DUMP SITE

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I. SITE NAME, LOCATION AND DESCRIPTION

The Nyanza Chemical Waste Dump Superfund Site - Groundwater study area is located in the Town of Ashland, Middlesex County, Massachusetts (see Figure 1-1). Ashland is located in the Metrowest area of eastern Massachusetts, bordered by Sherborn to the east, Southborough to the west and northwest, Framingham to the north, and Hopkinton and Holliston to the south. Ashland is 25 miles west-southwest of Boston, and 20 miles east-southeast of Worcester.

The "Site", for purposes of describing the Operable Unit II - Groundwater Study, consists of all areas in and adjacent to the Nyanza property which appear to be sources of groundwater contamination.[1] The "Nyanza property", which is a part of the Site, consists of approximately 35 acres formerly owned by Nyanza, Inc. (Figure 1-2) and includes several wetlands, the Megunko Hill area, and the lower industrial area along Megunko Road. The Hill is located in the southern part of the property and was formerly used as a landfill/disposal area. This area is currently the focus of Operable Unit I remediation activities. The lower industrial area was formerly the location of dye manufacturing facilities, the wastewater treatment system and a series of settling lagoons south of Megunko Road. The areal extent of the Site is approximately bounded by an active Conrail railroad line and Chemical Brook to the north, wetland areas and Cherry Street to the east, and undeveloped mixed hardwood forest land to the south, southeast, and west. The Sudbury River is approximately 700 feet north of the Site.

The "study area" of the Operable Unit II - Groundwater Study is larger than the Site. It consists of the Site plus the areal extent of wells (approximately 395 acres) installed off the Nyanza property thus far.

This report also discusses the downgradient area, which is the area north and east of the Site bounded by the Sudbury River. Groundwater contamination as a result of contaminant migration from the Nyanza Site has been documented in this area.

The Town of Ashland occupies approximately 12.9 square miles, of which 18 percent is open water and wetland areas, and more than 40 percent is intensively developed. The bulk of development has occurred in response to the need for single- and multiple-family housing created by rapid economic expansion along the major transportation routes: State Route 128 (1-95), 1-495, U.S. Route 9, and 1-290. From 1951 to 1980, agriculture and open-land use in the area has decreased from 19 to less than five percent.

The Site is classified as industrial, wetland, and forest (U.S. Department of Forestry and Wildlife Management, 1982). South and southeast of the Site, the upper elevations of Megunko Hill are forested with stands of

[1] For purposes of CERCLA § 121(e)(1) in so far as it relates to permits, "on-site" shall be "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response actions". National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR § 300.400(e).

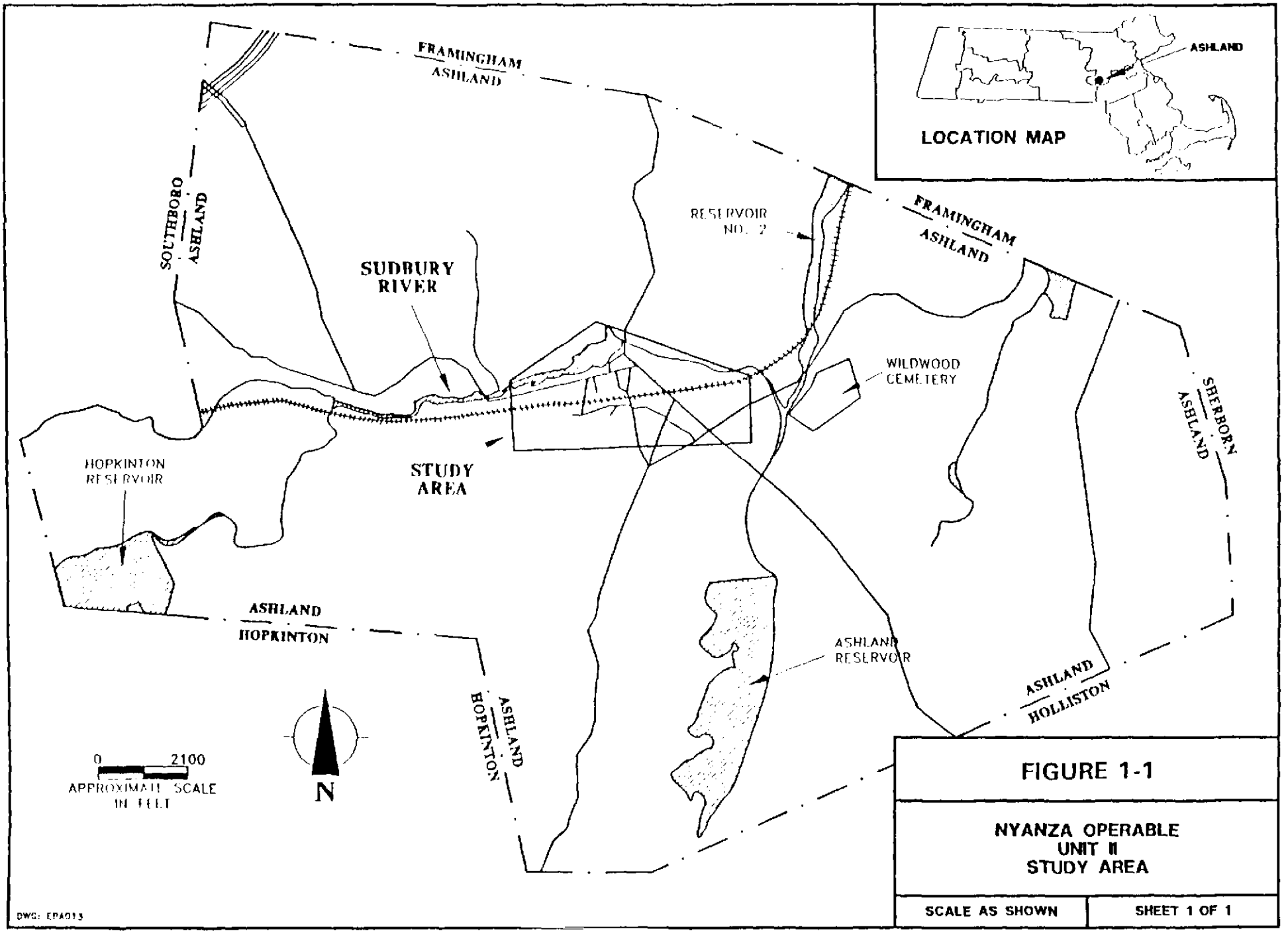


FIGURE 1-1

NYANZA OPERABLE UNIT II STUDY AREA

SCALE AS SHOWN	SHEET 1 OF 1

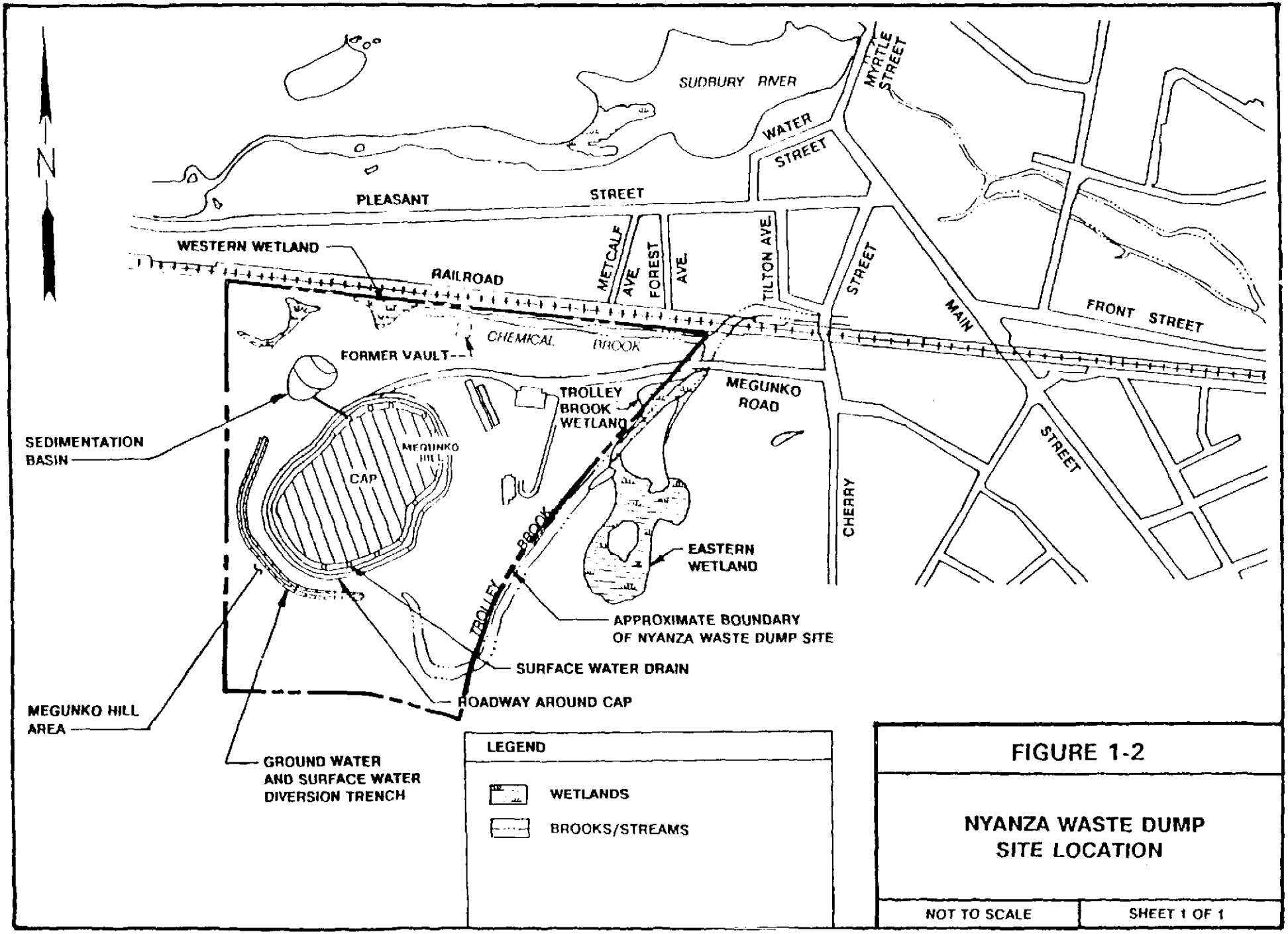


FIGURE 1-2

NYANZA WASTE DUMP SITE LOCATION

NOT TO SCALE | SHEET 1 OF 1

mixed hardwoods on well-drained, stony soils. The lower industrial area of the Site, built on udorthent soils (filled or human-influenced land), supports several light industries and commercial businesses and little to no vegetation.

The land north, northeast, and east of the Site is classified as urban-suburban (U.S. Department of Forestry and Wildlife Management, 1982). It receives heavy use and includes residential, commercial, industrial, and public recreation areas. The center of Ashland village is located less than one-half mile northeast of Nyanza. Stone Park (the town park) is located 1700 feet southeast of the Site and is heavily used during the summer months. Ashland Junior High School is located just over three quarters of a mile northwest of the Site. Much of the woodlands north of the Sudbury River have been recently cleared for residential construction.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

A. Land Use and Response History

From 1917 through 1978, the property was occupied by several companies involved in manufacturing of several products. Textile dyes and dye intermediates were produced on the Site until 1978 when Nyanza, Inc. apparently ceased operations. Products manufactured on the property in addition to those previously mentioned included inorganic colloidal solids and acrylic polymers. Starting in 1917, several types of chemical wastes were disposed in various on-site locations with the majority of these wastes deposited on Megunko Hill, which was used as an unsecured landfill. Wastes included partially-treated process wastewater; chemical sludge from the wastewater treatment process; solid process wastes (e.g., chemical precipitate and filter cakes) in drums; solvent recovery distillation residue in drums; and off-specification products. Process chemicals that could not be recycled or reused (including phenol, nitrobenzene, and mercuric sulfate) were also disposed of on-site.

Chemical wastes were also disposed of in the wetland areas. The eastern wetland area received waste effluent discharge from various manufacturing operations in the area. The northwest wetland area at the headwater of Chemical Brook contained wastewater treatment sludge and possibly received overflow from an underground concrete wastewater vault that discharged into Chemical Brook.

Nyanza, Inc., which apparently ceased operations in Ashland in 1978, was the most recent dye manufacturing company to occupy the Site. The former plant grounds now are occupied by several industrial concerns, the largest of which is Nyacol Products, Inc.

Nyanza, Inc. and its predecessors originally discharged the dye waste stream to a concrete "vault" or settling basin adjacent to the main process building. The vault was used as a central sump for the collection of wastewater from the entire Nyanza, Inc. operation, as well as for other generating tenants housed in the immediate vicinity. This vault was approximately 40 x 80 feet and approximately 10 feet deep. The liquid occasionally overflowed via a pipe into Chemical Brook which flowed into Trolley Brook and through a culvert to the raceway that entered the wetlands along the Sudbury River. The vault was taken out of service in the 1960's or 1970's and was subsequently filled with sludge and covered over with fill. As part of an ongoing effort to ease river pollution, the Massachusetts Division of Water Pollution Control (DWPC) ordered Nyanza, Inc. to install a pretreatment system for industrial process water and to discharge the treated waste to the Metropolitan District Commission (MDC) sewer collection system. Nyanza, Inc. connected to the MDC system in March 1970.

The first type of contamination linked to the Site was mercury, discovered in the Sudbury River in 1970, as part of an overall investigation of mercury problems in Massachusetts for the DKPC. A follow up study in 1972 focusing on Nyanza, Inc. revealed mercury contamination in the Sudbury River caused by uncontrolled sludge and wastewater disposal at the Site.

Since 1972, several investigations have been prompted by contamination present at or originating from the Site. From 1972 through 1977, the Massachusetts Department of Water Pollution Control (DWPC) and Department of Public Health (DPH) cited Nyanza, Inc., for several contamination problems associated with dumping activities. Following a 1973 DWPC order to implement a plan to stop further groundwater pollution, Camp Dresser and McKee, Inc. (COM), working for Nyanza, Inc., performed a 1974 Site investigation aimed at source identification

and devised plans to control groundwater contamination on the Nyanza property; however, the plans were implemented. In 1979, Edward J. Camille, a property owner, hired Connorstone Engineering, Inc. to complete the COM groundwater pollution control program. However, the Massachusetts Department of Environmental Quality Engineering (DEQE; now known as the Department of Environmental Protection or DEP) halted these plans, pending further investigation. In 1980, DEQE released a Preliminary Site Assessment Report summarizing the Site history and findings of previous investigations at the Site (DEQE, 1980). MCL Development Corporation acguired much of the property in 1981, and hired Connorstone Engineering, Inc. and Carr Research Laboratory, Inc. to characterize soil composition and locate sludge deposits.

The Site was included on the original National Priority List (NPL) of Superfund Sites in 1982 and a preliminary Remedial Action Master Plan (RAMP) was prepared. In 1984, the Environmental Protection Agency (EPA) authorized NUS Corporation (NUS) to perform an Remedial Investigation/Feasibility Study.

The September 4, 1985 Record of Decision (ROD) divided the Agency's remedial response into Operable Units for the purpose of addressing distinct problems. The September 1985 ROD was designated Operable Unit I. The ROD selected soil and wetland excavation at nine localized areas of contamination; solidification of water bearing excavated sludge, sediments, and soil; and placement, capping and consolidation of those materials with material left in place on the "Hill" area in the southern part of the Site. A diversion trench has been constructed on the side of Megunko Hill above around the capped area to divert surface water flow and lower the groundwater table beneath the cap as part of Operable Unit I. Construction of the project began in early 1989 and will be complete in late 1991.

In 1985 the DEQE undertook an Interim Response Measure at the Site consisting of the following activities: fencing the Trolley Brook Road embankment; placing one foot of clean fill in one of the Site areas to remove the threat of direct contact; and culverting Chemical Brook through neighboring property.

In 1986, EPA authorized COM to conduct additional field investigations to define source locations and design the remedial action stipulated in the ROD. The remedial design is complete and construction began in early 1989.

In January 1987, DEQE and the EPA Environmental Services Division (ESD) initiated a sludge removal action of the contents within the vault (see Figure 2-2). Prior studies by a DEQE contractor indicated that the vault, and contaminated soil and groundwater in the vicinity of the vault, were a significant source of organic contamination in the groundwater downgradient of the area. Contaminants present included, but were not limited to, trichloroethene (TCE), chlorobenzene, and nitrobenzene, all by-products of aniline dye production. Inorganic contaminants found in the sludge included heavy metals such as antimony, cadmium and chromium. Initially, the vault contamination investigation was planned within the scope of Operable Unit II. DEQE and the EPA conducted a subsurface investigation in the vault and surrounding area, culminating in a decision to proceed immediately with remediation of the vault area. The removal action was conducted by EPA's Emergency Response Team. From October to December 1987, 665 tons of soil adjacent to the vault were removed; 309 tons were incinerated, and 356 tons were shipped off-site to an approved landfill. In March and June 1988, 2,512 tons of sludge from the vault was solidified on-site and disposed of at an off-site RCRA landfill facility.

June 1987, EPA authorized the REM III team to begin RI/FS activities for Operable Unit II. Operable Unit II comprises groundwater contamination related to the Site. A third set of RI/FS investigations, Operable Unit III, is focused on contamination in the Sudbury River. Work on Operable Unit III is being performed by NUS Corp. under an ARCS contract to EPA.

A more detailed description of the Site history can be found in Section 1.4 of the Remedial Investigation Report.

B. Enforcement History

On April 4, 1982, EPA sent general notice letters to 18 entities it believed were responsible parties. On January 22, 1991, based on newly acquired information, EPA notified approximately 21 parties who either owned or operated the facility, generated wastes that were shipped to the facility, arranged for the disposal of wastes at the facility, or transported wastes to the facility of their potential liability with respect to the Site. Some of the 21 parties named in the January, 1991 letters had been previously notified in the 1982 letters. An additional owner/operator was notified on June 21, 1991 based on new information supplied by existing PRPs. On July 22, 1991, eleven parties were removed from the PRP list. EPA therefore, considers twenty parties potentially liable to perform or pay for the cleanup of the Site. EPA generally conducts negotiations with potentially responsible parties (PRPs) as soon as possible regarding the settlement of their liability at the Site. The PRPs have formed a steering committee and substantial discussions between EPA and the steering committee have taken place.

The PRPs have been active in the remedy selection process for this Site. Technical comments presented by PRPs during the public comment period are summarized in the responsiveness summary, and the summary and written comments have been included in the Administrative Record.

III. COMMUNITY PARTICIPATION

Throughout the Site's history, community concern and involvement has been high. EPA has kept the community and other interested parties apprised of the Site activities through informational meetings, fact sheets, press releases and public meetings which have been held on an almost monthly basis since 1986. These meetings served to update the public regarding the progress of various aspects of the cleanup, including the groundwater RI/FS.

During 1986, EPA released a community relations plan which outlined a program to address community concerns and keep citizens informed about and involved in activities during the planning and execution of remedial activities.

Upon the start of construction of the cap and diversion trench on-site in 1989, EPA intensified its community relations efforts in response to public concerns about safety issues related to the cleanup. For a several month period, weekly meetings were held with representatives of the police and fire departments, as well as with concern citizens and representatives of organized labor.

On June 27, 1991 EPA made the Administrative Record available for public review at EPA's offices in Boston and at the Ashland Public Library. EPA published a notice and brief analysis of the Proposed Plan in the Middlesex News on June 21, 1991.

On June 26, 1991, EPA held an informational meeting to discuss the results of the Remedial Investigation and the cleanup alternatives presented in the Feasibility Study and to present the Agency's Proposed Plan. Also during this meeting, the Agency answered questions from the public. From June 27 to July 26, 1991 the Agency held a 30 day public comment period to accept public comment on the alternatives presented in the Feasibility Study and the Proposed Plan and on any other documents previously released to the public. On July 18, 1991, the Agency held a public meeting to discuss the Proposed Plan and to accept any oral comments. A transcript of this meeting and the comments and the Agency's response to comments are included in the attached Responsiveness Summary, Appendix I.

IV. SCOPE AHD ROLE OF OPERABLE UNIT (OU) OR RESPONSE ACTION

The ROD for the first operable unit at Nyanza was signed on September 4, 1985. This source control remedy called for the excavation of outlying on-site sludges and their consolidation under an impermeable cap. The con-struction of this remedy is now nearing completion. The third operable unit, dealing with contamination of the Sudbury River and its tributaries, remains in the RI/FS stage at this time.

The selected OU II groundwater remedy was developed from components of different management of migration alternatives to obtain an approach for groundwater remediation. The selected remedy is an interim remedy. An interim remedy is designed to take action to protect human health and the environment, in the short term while additional information is collected to better assess the aquifer and contaminant response to remediation efforts. The interim remedy will operate for a minimum of 5 years after which time a final remedial action will be developed. A final Record of Decision (ROD) for groundwater will be based on the data collected during the design, operation, and monitoring of the interim remedy. Additional interim remedial action(s) may be proposed if data collected prior to the final ROD warrants.

In summary, the remedy provides for: 1) extracting contaminated ground-water from the northern portion of the Site near the railroad tracks and industrial park, and optionally at the southern border of the cap now under construction on Megunko Hill for a minimum of 5 years; 2) treating the groundwater with a combination of physical and chemical processes; 3) dis-charging the treated water into the Sudbury River; 4) using institutional and access controls to limit exposure to contaminants; 5) performing pump tests in the eastern portion of the plume to help determine the feasibility of cleaning up groundwater in this area at some future point; 6) installing additional deep bedrock wells to more fully define the depths and locations to which contaminants may have migrated; 7) performing continuing moni-toring of selected existing residential and monitoring wells and limited surface water testing to track any further progress of the plume; 8) inspecting the Megunko Road water line; and 9) performing certain pre-design studies to aid in the design of the selected remedy.

The first operable unit addressed contaminated sludges and soils by excavating them from outlying areas, and consolidating them with sludges already on Megunko Hill under an impermeable cap. The first operable unit ROD also included an upgradient diversion trench to preclude contact with groundwater and surface water runoff with the buried material. Construction of the first operable unit remedy is expected to be completed in late 1991.

The second operable unit interim remedial action will serve to collect data to refine the cleanup time estimates for the final Record of Decision, and will in the interim address the following principal threats to human health and the environment posed by the site: migration of contaminants in groundwater, risks to human health associated with potential future consumption and direct contact with groundwater, risks from present and potential future inhalation of evaporated groundwater contaminants, and degradation of the Sudbury River and wetlands due to the natural discharge of contaminated groundwater.

V. SUMMARY OF SITE CHARACTERISTICS

A. General

Chapter 2 of the Feasibility Study contains an overview of the Remedial Investigation. The significant findings of the Remedial Investigation are summarized below. The RI report utilized information developed by previous studies and information developed as part of a two-phased field program conducted specifically to evaluate the Nyanza II Groundwater Study. The specific objectives of these field investigation activities are summarized below:

- characterize the hydrogeologic regime, including the geologic deposits underlying the study area, the direction and rate of groundwater flow, and the interaction between groundwater and surface water in the wetlands and the Sudbury River;

- assess the nature, distribution, and migration of contaminants in groundwater, surface water, sediment, subsurface soils, and bedrock;

- assess the degree to which future migration of contaminants may pose a threat to public health, welfare, and the environment; and

- obtain groundwater quality data to assess the applicability of groundwater treatment technologies for the FS.

To achieve the above objectives, the two-phased field program commenced in February 1988 and continued until June 1988, with subsequent water level measurements in June, October and November of the same year. The second phase of the program was conducted from September of 1989 until February 1990. The analytical data from the two phases are generally referred to as "1988" or "1990" data. The following field activities were conducted as part of these investigative efforts:

- topographic and property location survey;
- geophysical investigations including seismic refraction, electromagnetic and resistivity surveys;
- exploratory borings in the vault and lower industrial area to augment Operable Unit I data;
- subsurface drilling, and monitoring well and well point installation;
- chemical sampling of groundwater, surface water, subsurface soil, and sediment;
- aquifer permeability testing including slug testing and packer testing;
- water elevation measurement;
- well inventory;
- treatability studies;
- ecological risk assessment; and
- public health risk assessment.

The results of these efforts are presented in detail in the RI report. Plate 1 is a base map showing all monitoring wells and other features of the study area. The treatability study results were presented and discussed in the 1990 "Treatability Study Evaluation" performed for EPA by Ebasco Services, Inc..

B. Topography

The study area lies within the New England physiographic province. The topography is strongly influenced by underlying bedrock and has been shaped y glaciation into rolling hills dissected by postglacial drainage systems. Thick glacial deposits typically overlie the bedrock in valleys and areas of low relief, while thinner deposits blanket slopes and upland areas. Surface elevations range from over 350 feet above mean sea level (msl) on Megunko Hill to 180 feet msl along the Sudbury River.

Topographic features of interest in the study area include:

- The northern flank of Megunko (alternate spelling: Magunko) Hill, which dominates the southwestern corner of the study area. The Hill section of the former Nyanza property is located here (see Figure 1-2). The landfill constructed under the Operable Unit I ROD has significantly altered the topography of the Megunko Hill area.

- The lower industrial area located along Megunko Road.

- The wetland near the eastern boundary of the former Nyanza property. This Wetland is bisected by an abandoned trolley bed embankment. Trolley Brook originates on Megunko Hill and flows along the western embankment of the trolley bed and into a wetland near Megunko Road. The eastern wetland lies east of the trolley bed and merges with the Trolley Brook wetland via a culvert. Trolley Brook flows northeasterly along the western side of the trolley bed, under Megunko Road, and into Chemical Brook. The Trolley Brook Wetland was remediated under Operable Unit I during 1990.

- The western wetland in the northwestern corner of the former Nyanza property, which forms the headwater of an intermittent stream, Chemical Brook. Chemical Brook flows along the northern boundary of the Nyanza property parallel to the Conrail Railroad tracks, converges with Trolley Brook, and presently flows northeasterly through an underground culvert to its confluence with the Sudbury River near Concord Street. The western wetland and Chemical Brook were remediated in 1990 as part of construction activities associated with Operable Unit I.

- A broad, low-lying area located between the Sudbury River to the north and Megunko Hill to the south. This area is bisected by the Conrail Railroad tracks. The Sudbury River flows easterly to the Myrtle Street dam and southeasterly downstream of the dam.

- The Sudbury River, which flows into the Framingham Reservoir No. 2 (See Figure 1-2). Classified in 1872 as an emergency water supply for the Metropolitan Boston area, the reservoir has not been used since 1946. The Sudbury River joins the Assabet and Concord River systems, which flow northeast into the Merrimack River located in the northeastern part of the state. The Sudbury River is being investigated in conjunction with the Third Operable Unit for the Nyanza Site.

C. Geology

The Site directly overlies glacial sediments, which in turn overlie granitic bedrock. The bedrock surface is undulating and slopes downward from Megunko Hill toward the Sudbury River with a small trough paralleling the Sudbury River in a general east-west orientation between Pleasant Street and the railroad tracks. Depth to bedrock generally increases from the hillside (5 to 10 feet) toward the lowlands and the Sudbury River (20 to 50 feet). The greatest depths to bedrock (50 to 100 feet) occur in what is interpreted as a bedrock depression, or trough, parallel to the southern shore of the Sudbury River and then trending south in the general area near the intersection of Park Road and Summer Street.

Bedrock contours were developed from geophysical soundings, bedrock corings, and refusals in overburden borings (see Figure 5-1). The highest elevations, along Megunko Hill, decrease radially out from the Hill into a valley in the lowlands before beginning to rise again on the north shore of the Sudbury River. A meandering bedrock trough exists in the center of the study area and roughly parallels the Sudbury River. The trough probably represents a preglacial river course for the Sudbury River.

The total observed thickness of glacial sediments varies from 10.8 feet (MW-10B) to greater than 110 feet (MW-404A). Glacial sediment cover is generally thinnest on Megunko Hill and thickest in the bedrock trough.

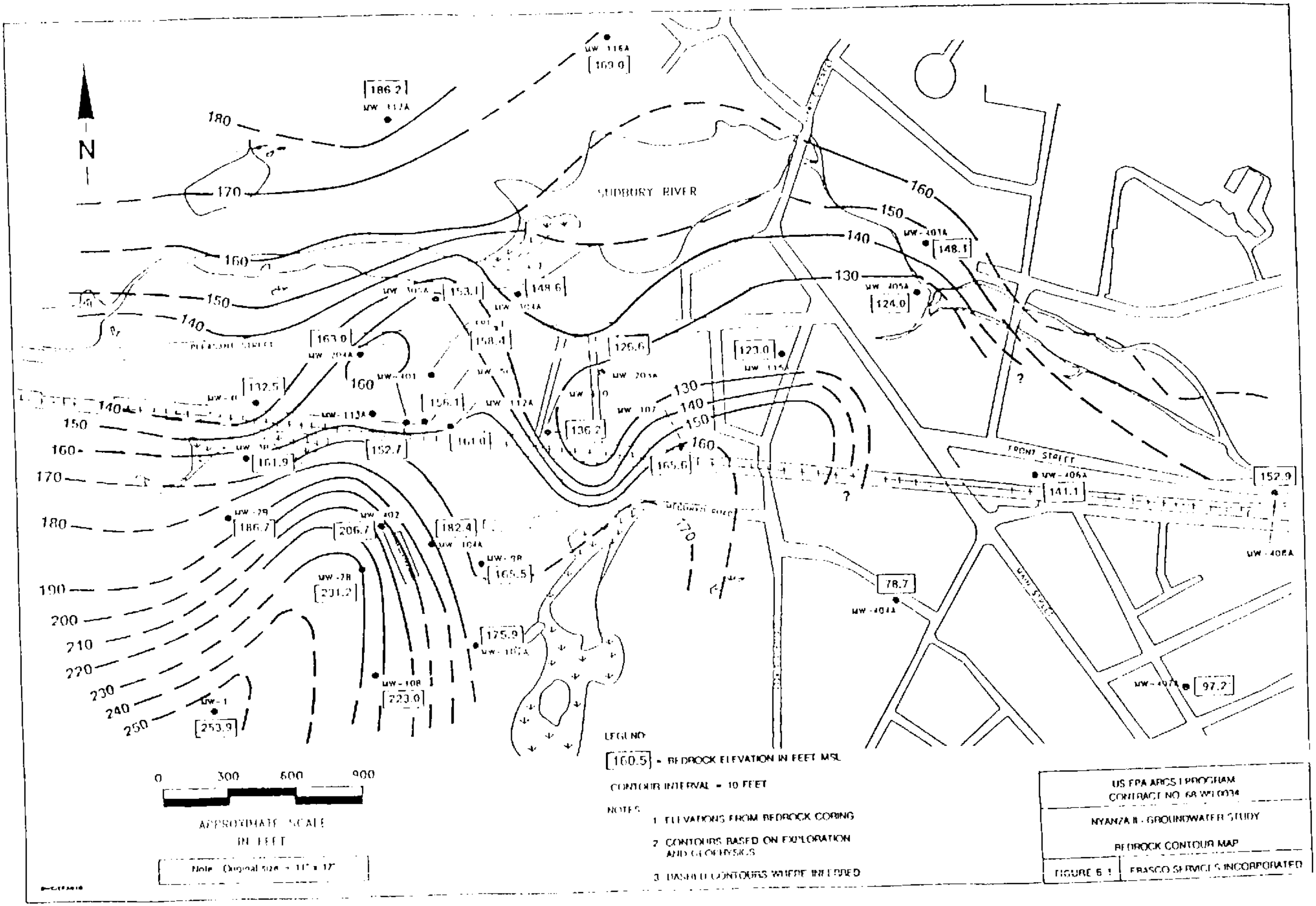
The till consists of a non-stratified and poorly graded mixture of clay/silt, sand, gravel, cobbles, and boulders. It can be deposited subglacially during glacier advances, or as draped deposits when entrained debris melts out during glacial recessions. Glacial till occurs on Megunko Hill above an elevation of approximately 200 feet msl as observed in a road/cut on the north flank of Megunko Hill.

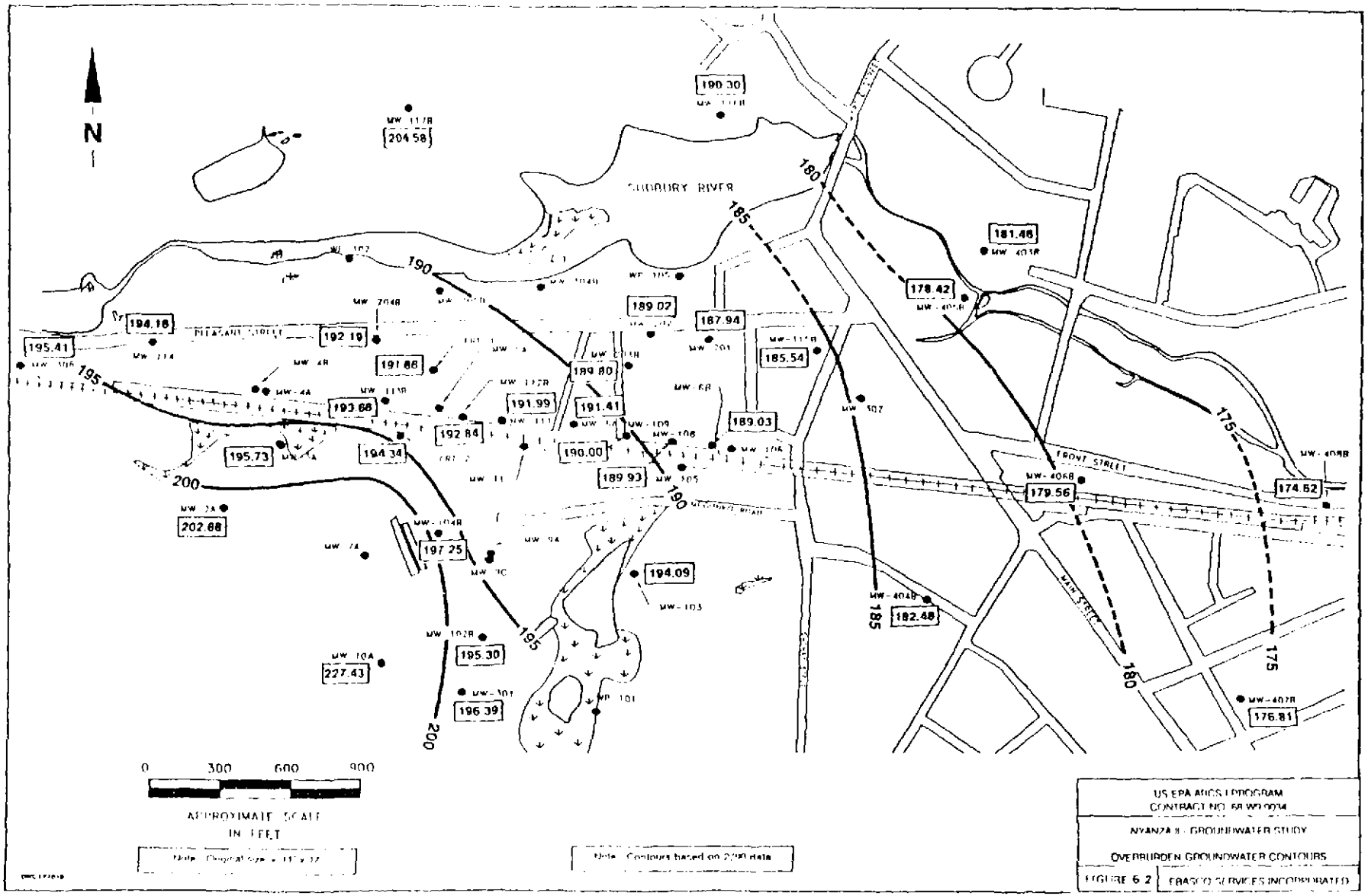
Glacial lake deposits cover the lowlands to the north on both sides of the Sudbury River. The deposits range in thickness from 5 to 50 feet but commonly occur in deposits 20 to 40 feet thick across the lowlands, with the thicker deposits in the bedrock trough. Typically, three types of materials comprise these glacial lake deposits: boulders and cobbles, glaciofluvial sediments or glaciolacustrine sediments based on the dominant depositional environments in which they were created.

D. Hydrogeology

This section summarizes the hydrogeologic findings for the study area and includes a summary of the hydrogeologic evaluation. Additional details and specific data supporting the hydrogeologic evaluation are presented in the RI.

Groundwater flows radially off Megunko Hill. West of the MW-113 couplet, flow is to the north toward the Sudbury River. To the east, groundwater flow is northeasterly, becoming east-northeasterly near MW-201 (see Figure 5-2). This shift may be related to the elevated river levels caused either by the dam at Myrtle Street or by flow through the bedrock trough located north of the northeast sections of the lower industrial area. Downward hydraulic gradients along the Sudbury River between MW-304B and WP-105 are indicative of induced infiltration from the river to the adjacent


N
SUDBURY RIVER
FRONT STREET
MAIN STREET
180
170
160
150
140
130
190
200
210
220
230
240
250
186.2
MW-117A
169.0
MW-116A
153.1
148.6
163.0
MW-204A
158.4
126.6
123.0
132.5
156.1
161.0
152.7
161.9
136.2
165.6
148.1
MW-403A
124.0
MW-405A
141.1
MW-406A
152.9
MW-408A
186.7
MW-7B
206.7
MW-402
182.4
165.5
MW-9B
201.2
175.9
MW-107A
223.0
MW-108
253.9
MW-1
78.7
MW-404A
97.2
MW-401
MW-113A
MW-107
0
300
600
900
APPROXIMATE SCALE
IN FEET
Note: Original size = 11" x 17"
LEGEND
160.5 = BEDROCK ELEVATION IN FEET MSL
CONTOUR INTERVAL = 10 FEET
NOTES:
1. ELEVATIONS FROM BEDROCK CORING
2. CONTOURS BASED ON EXPLORATION AND GEOPHYSICS
3. DASHED CONTOURS WHERE INFERRED
US EPA ARCS I PROGRAM
NYANZA II - GROUNDWATER STUDY
BEDROCK CONTOUR MAP
FIGURE 6.1
EBASCO SERVICES INCORPORATED


N
SUDBURY RIVER
PLEASANT STREET
FRONT STREET
MAIN STREET
MW-117R
204.58
190.30
181.46
MW-403R
178.42
MW-405R
189.07
187.94
185.54
194.16
195.41
192.19
191.86
189.80
193.68
191.99
191.41
189.03
195.73
194.34
192.84
190.00
189.93
MW-408B
MW-406B
179.56
174.82
MW-3A
202.88
197.25
194.09
MW-404B
182.48
MW-102R
195.30
MW-10A
227.43
MW-101
196.39
MW-403R
176.81
0
300
600
900
APPROXIMATE SCALE
IN FEET
Note: Original size = 11" x 17"
Note: Contours based on 2/90 data
US EPA ARCS I PROGRAM
CONTRACT NO. 68-W9-0014
NYANZA II - GROUNDWATER STUDY
OVERBURDEN GROUNDWATER CONTOURS
FIGURE 6.2
EBASCO SERVICES INCORPORATED

overburden aquifer in the north central part of the study area. However, depending on the river stage and piezometric head, the area around MW-304B may periodically discharge to the river; the lack of river stage data prevents further verification of this scenario.

Groundwater probably discharges to the Sudbury River above MW-304 and below the Myrtle Street dam; the river reach in between is likely an area of induced infiltration from the river. The probability of groundwater flow beneath the river is very low based on the following:

- upward gradients at MW-305, MW-405, MW-408, WP-102 and occasionally at MW-304;
- the 15 to 25 foot rise in bedrock over the short distances from the southern to northern shores of the river;
- the probable deflection of flow through the bedrock trough; and
- consistently higher groundwater elevations on the north shore of the river compared to the south shore.

Measured horizontal hydraulic gradients in the overburden ranged between 0.234 and 0.268 ft/ft in the upland portions of the Site and between 0.004 to 0.006 ft/ft in the lowland portions. Bedrock horizontal hydraulic gradients ranged between 0.112 to 0.230 ft/ft in the uplands and 0.003 to 0.007 ft/ft in the lowlands.

E. Contamination of Affected Media

1. Groundwater

The groundwater assessment was based on the 1988 and 1990 sampling data from wells installed during these field investigations and wells installed during previous investigations. Most monitoring wells were screened at two different depths. Depending on their depth, wells installed during the Operable Unit II remedial investigation were designated by well sequence numbers greater than 100. Overburden wells are designated with the suffix "B", and bedrock with the suffix "A". Existing wells installed prior to Operable Unit II were designated by well identification numbers below 100. These overburden and bedrock wells were generally differentiated by the suffix "A" or "B", respectively.

The results of the 1988 and 1990 groundwater sampling program contamination assessment may be summarized as follows:

- o Major volatile organic contaminants include 1,2-DCE, TCE, and chlorobenzene. These three compounds generally exceed their respective MCLs or MCLGs in wells where they were detected.
- o Major semivolatile organic contaminants include 1,4-dichlorobenzene, 1,2-dichlorobenzene, nitrobenzene, 1,2,4-trichlorobenzene, and aniline. All of these contaminants were detected at numerous sampling locations at concentrations exceeding 1,000 ug/1. Concentrations of 1,2-dichlorobenzene, 1,4-dichlorobenzene, and 1,2,4 trichlorobenzene exceeded existing or proposed MCLs in many wells in which they were detected.

- VOC and SVOC groundwater contamination appear to originate from at least three Site areas. The major source appears to be the vault near MW-ERT-2, as seen by the very high VOC and SVOC concentrations observed downgradient in MW-113. Secondary sources appear to be Megunko Hill and the northeastern lower industrial area. The vault was excavated during a removal action in 1987-1988. In addition, metals bearing sludge deposited on Megunko Hill and in the northeast lower industrial park are currently scheduled to be remediated as part of Operable Unit I. Furthermore, it is uncertain as to whether the patterns of VOCs and SVOCs in soil borings taken from the lower industrial area reflect groundwater contaminant migration in the overburden and bedrock from upgradient sources or past disposal practices in the immediate area of the borings.

- The general distributions of VOCs and SVOCs suggest a highly contaminated groundwater plume apparently originating from the general area of the vault and migrating in an easterly and northeasterly direction toward MW- 405 and the Sudbury River.

- Immediately downgradient from the vault and Megunko Hill, VOC and SVOC contamination is generally one to three orders-of-magnitude higher in the shallow bedrock than in the overburden. Elsewhere, concentrations are more evenly distributed between the overburden and bedrock. The high concentrations immediately downgradient of the vault suggests the past or current presence of nonaqueous phase liquid.

- The significant changes in bedrock contour elevations between MW-405 and MW-403 and vertical gradient data suggest that the contaminant plume is not migrating under the river towards MW-403, but is probably discharging to the river. Elevated sodium levels in wells to the southeast of MW-405 might support the hypothesis of some plume migration in this direction.

- Several pesticides were detected in only a limited number of wells sampled, and these at relatively low concentrations. Included were heptachlor, 4,4'-DDT, beta-BHC, delta-BHC, dieldrin, and gamma-chlordane. However, heptachlor concentrations exceeded its MCLG in all five wells where it was detected. Because of the low concentrations of pesticides detected and their limited distribution, it is difficult to locate specific sources of pesticide contamination or to completely confirm a Site origin.

- Cadmium, lead, mercury, and other metals were detected in a limited number of wells in the 1988 and/or 1990 sampling programs at concentrations greater than their respective MCLs. Generally, the migration and exceedances of MCLs by metal contaminants is limited in comparison with the degree of organic contamination found at the Site. Inorganic contamination appears to originate from several Site areas. One source exists on Megunko Hill. Other sources appear to be in the western wetland, and in the northeastern lower industrial area south of MW-109. Contaminated soils and sludge deposits in those areas were remediated as part of Operable Unit I.

- o Inorganic concentration distributions between the overburden and shallow bedrock wells appear to be somewhat contaminant-specific.

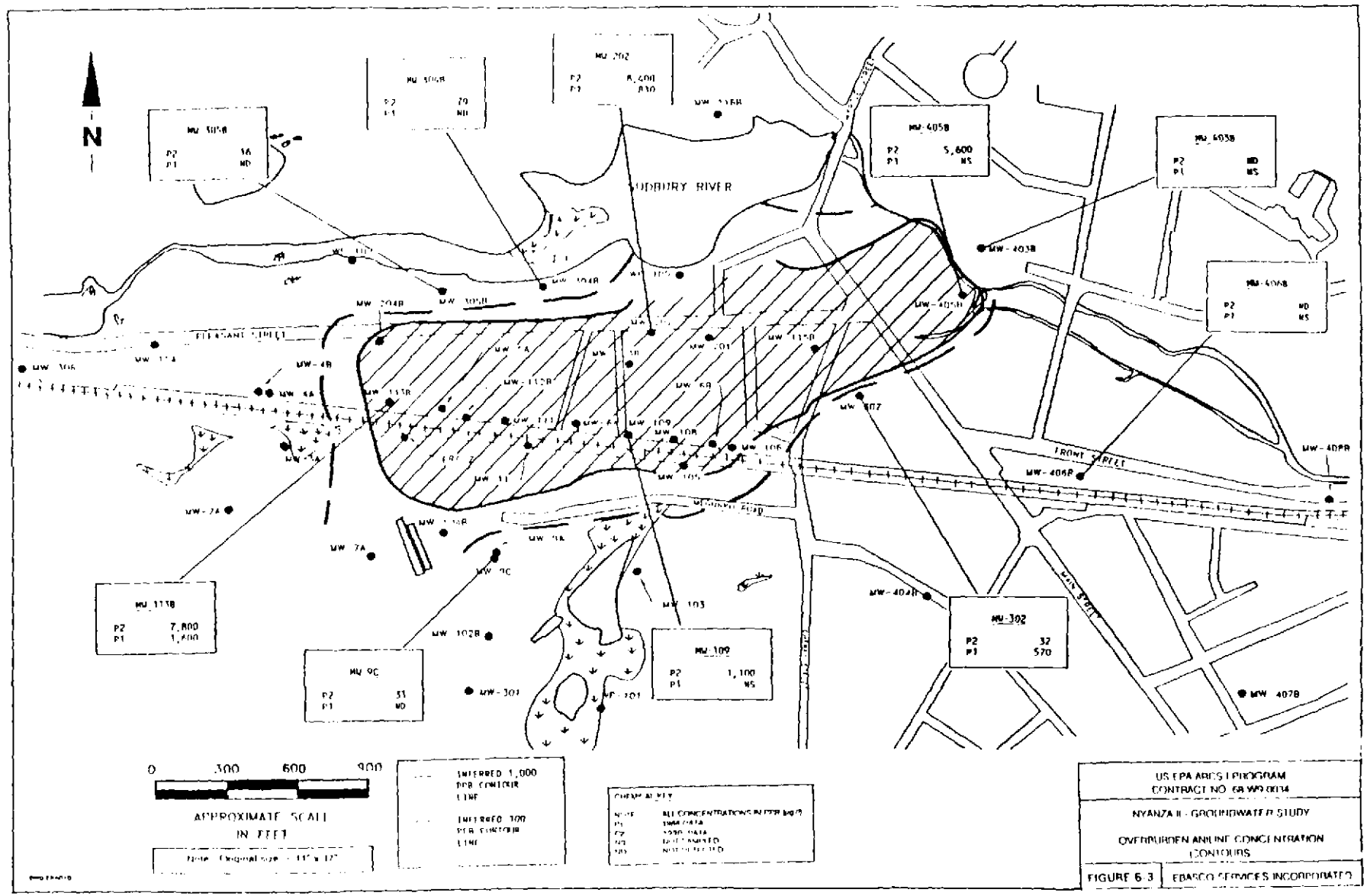
- o Sodium concentration contours suggest that it is potentially a conservative (non-attenuated) Site-related contaminant. Sodium concentration contours also support the hypothesis of potential groundwater and organic contaminant transport to the southeast of MW-302 and MW-405 parallel to the river.

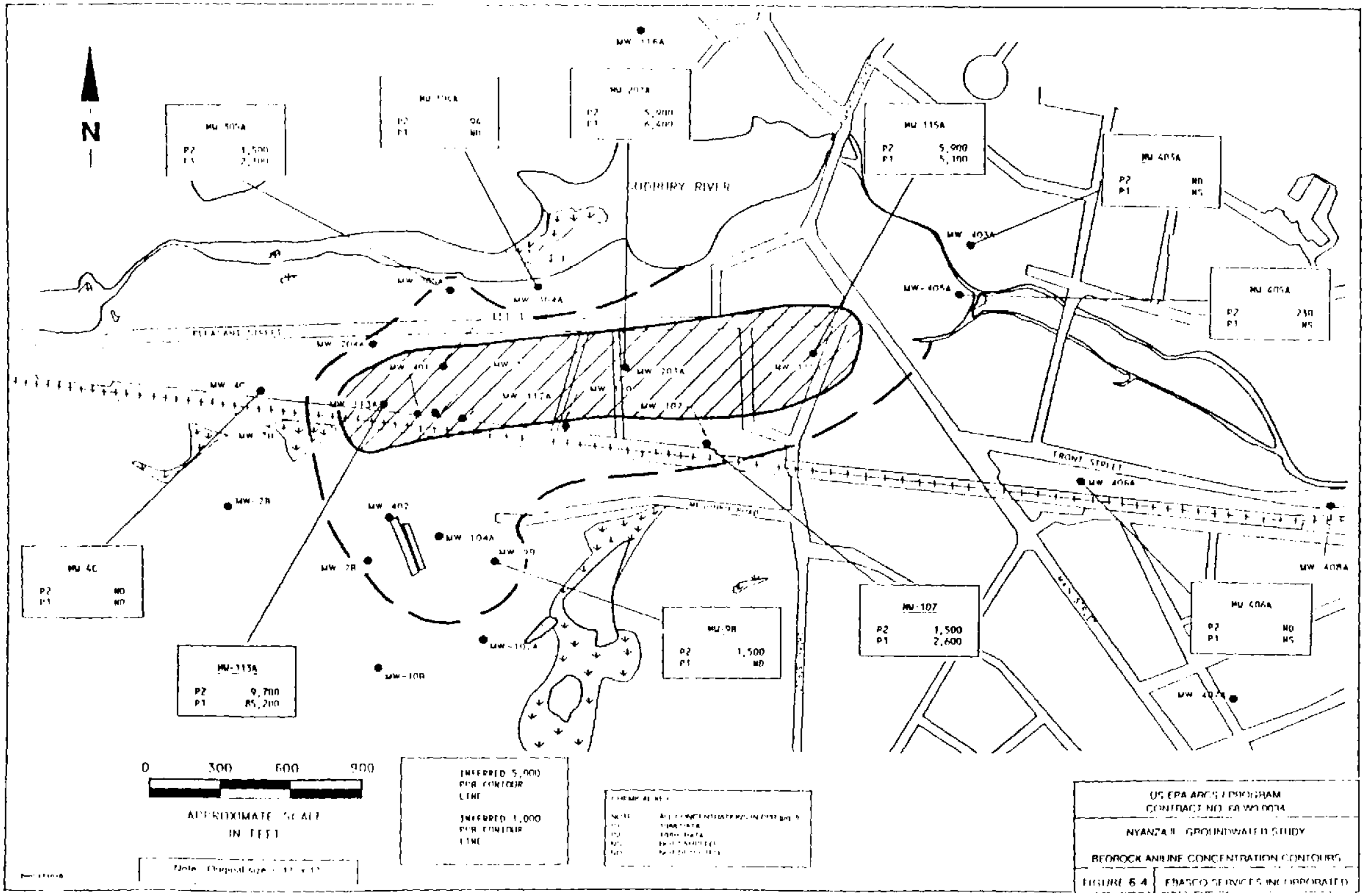
Contour maps showing the prevalence of aniline, nitrobenzene, dichlorobenzene, and trichloroethene in overburden and bedrock aquifers are shown in Figures 5-3 through 5-10.

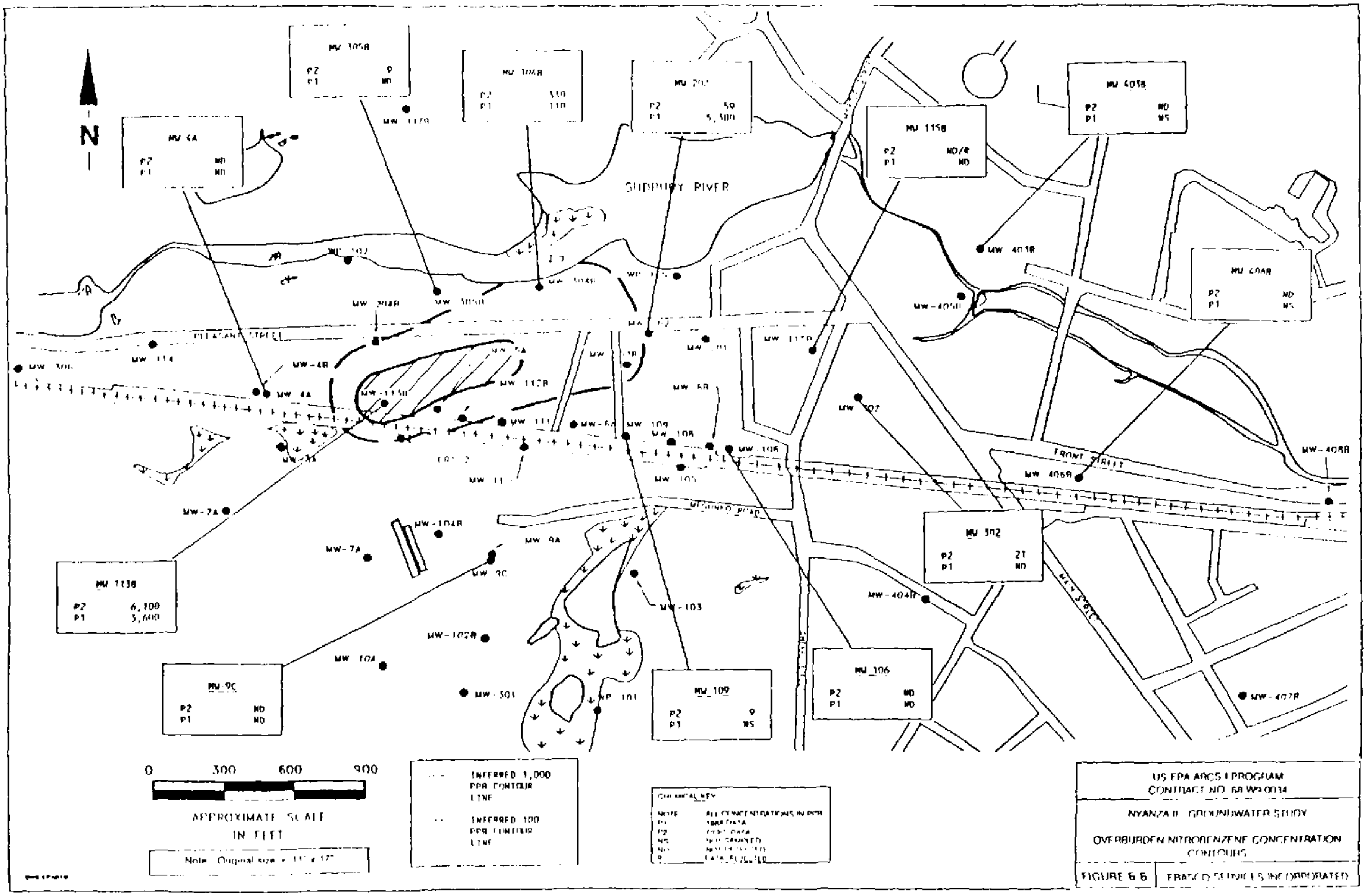
2. Surface Water and Sediment

Analytical surface water and sediment results were derived from the limited 1988 field efforts and other previous studies conducted at the Site. The sampling locations and the analytical results for these media are presented in the RI report along with a more detailed presentation of the contaminant assessment and distribution. It should be noted that surface water and sediment issues will be addressed in Operable Unit III.

The results of the Operable Unit I and II studies indicate that both surface water and sediment are contaminated with Site-related organic and inorganic contaminants. VOCs, SVOCs and heavy metals were all detected in the surface water or sediment of the eastern and western wetlands, Trolley and Chemical Brooks, the Sudbury River, and near the confluence of Chemical Brook and the Sudbury River.


N
SUDBURY RIVER
PLEASANT STREET
FRONT STREET
MAIN STREET
MW-405B
P2 5,600
P1 NS
MW-302
P2 32
P1 570
MW-109
P2 1,100
P1 NS
MW-9C
P2 51
P1 MD
MW-113B
P2 7,800
P1 1,400
0 300 600 900
APPROXIMATE SCALE IN FEET
INFERRED 1,000 PCB CONTOUR LINE
INFERRED 100 PCB CONTOUR LINE
CHEMICAL KEY
NOTE: ALL CONCENTRATIONS IN PPB (ug/l)
P1 1988 DATA
P2 1990 DATA
ND NOT DETECTED
NS NOT SAMPLED
US EPA ARCS I PROGRAM
CONTRACT NO. 68-W9-0014
NYANZA II - GROUNDWATER STUDY
OVERBURDEN ANILINE CONCENTRATION CONTOURS
FIGURE 6-3
EBASCO SERVICES INCORPORATED


N
MW-305A
P2 1,500
MW-207A
P2 5,900
MW-115A
P2 5,900
P1 5,100
MW-405A
P2 ND
P1 NS
MW-406A
P2 230
P1 NS
SUDBURY RIVER
PLEASANT STREET
FRONT STREET
MW-4C
P2 ND
P1 ND
MW-113A
P2 9,700
P1 85,200
MW-9B
P2 1,500
P1 ND
MW-107
P2 1,500
P1 2,600
MW-406A
P2 ND
P1 NS
MW-2B
MW-402
MW-104A
MW-10B
MW-403A
MW-405A
MW-408A
0 300 600 900
APPROXIMATE SCALE
IN FEET
INFERRED 5,000
PCB CONTOUR
LINE
INFERRED 1,000
PCB CONTOUR
LINE
US EPA ARCS I PROGRAM
NYANZA II GROUNDWATER STUDY
BEDROCK ANILINE CONCENTRATION CONTOURS
FIGURE 6.4
EBASCO SERVICES INCORPORATED

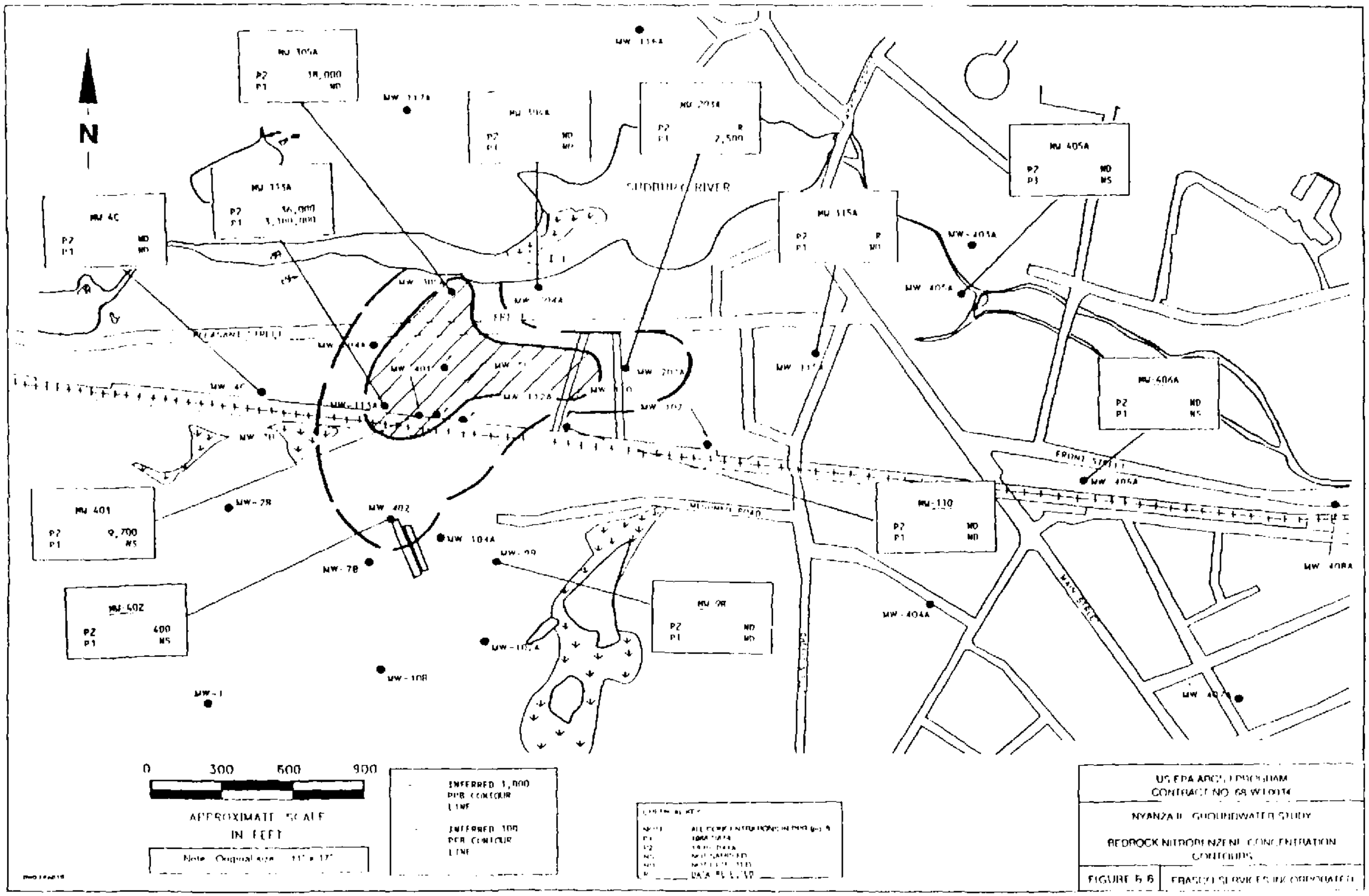


US EPA ARCS I PROGRAM
CONTRACT NO. 68-W9-0034

NYANZA II GROUNDWATER STUDY

OVERBURDEN NITROBENZENE CONCENTRATION CONTOURS

FIGURE 6-6 | EBASCO SERVICES INCORPORATED

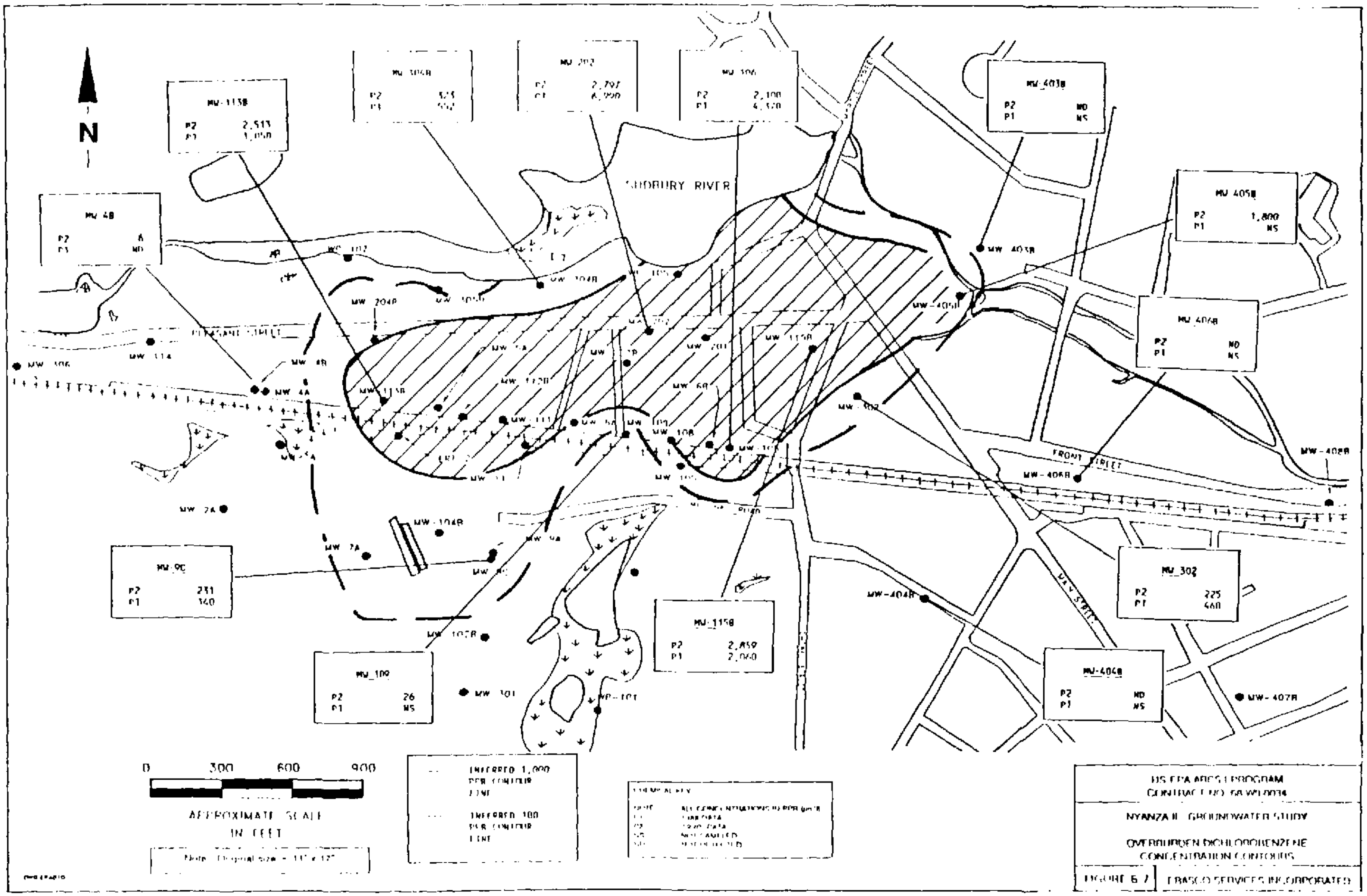


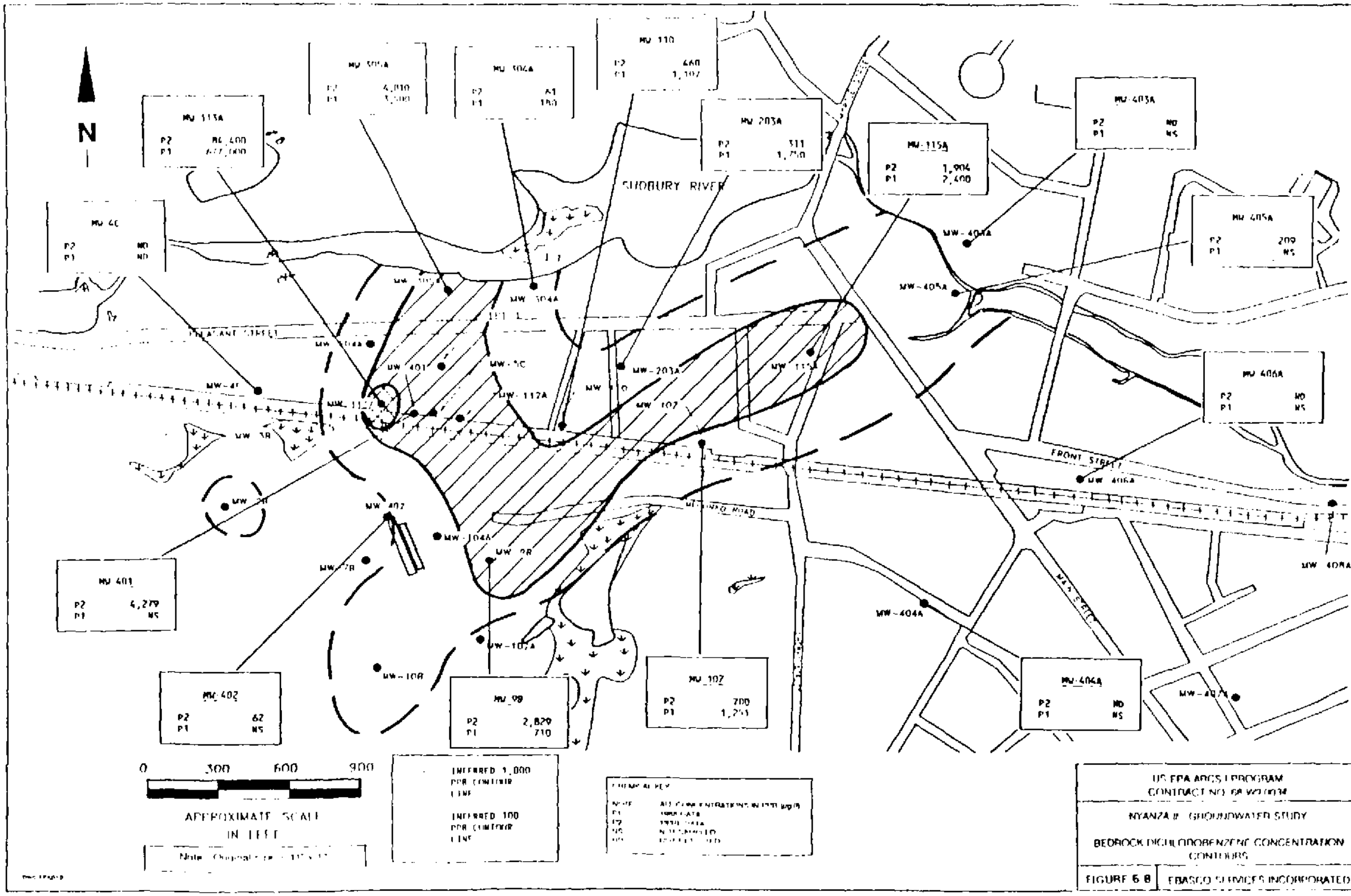
US EPA ARCS PROGRAM
CONTRACT NO. 68-W1-0014

NYANZA II GROUNDWATER STUDY

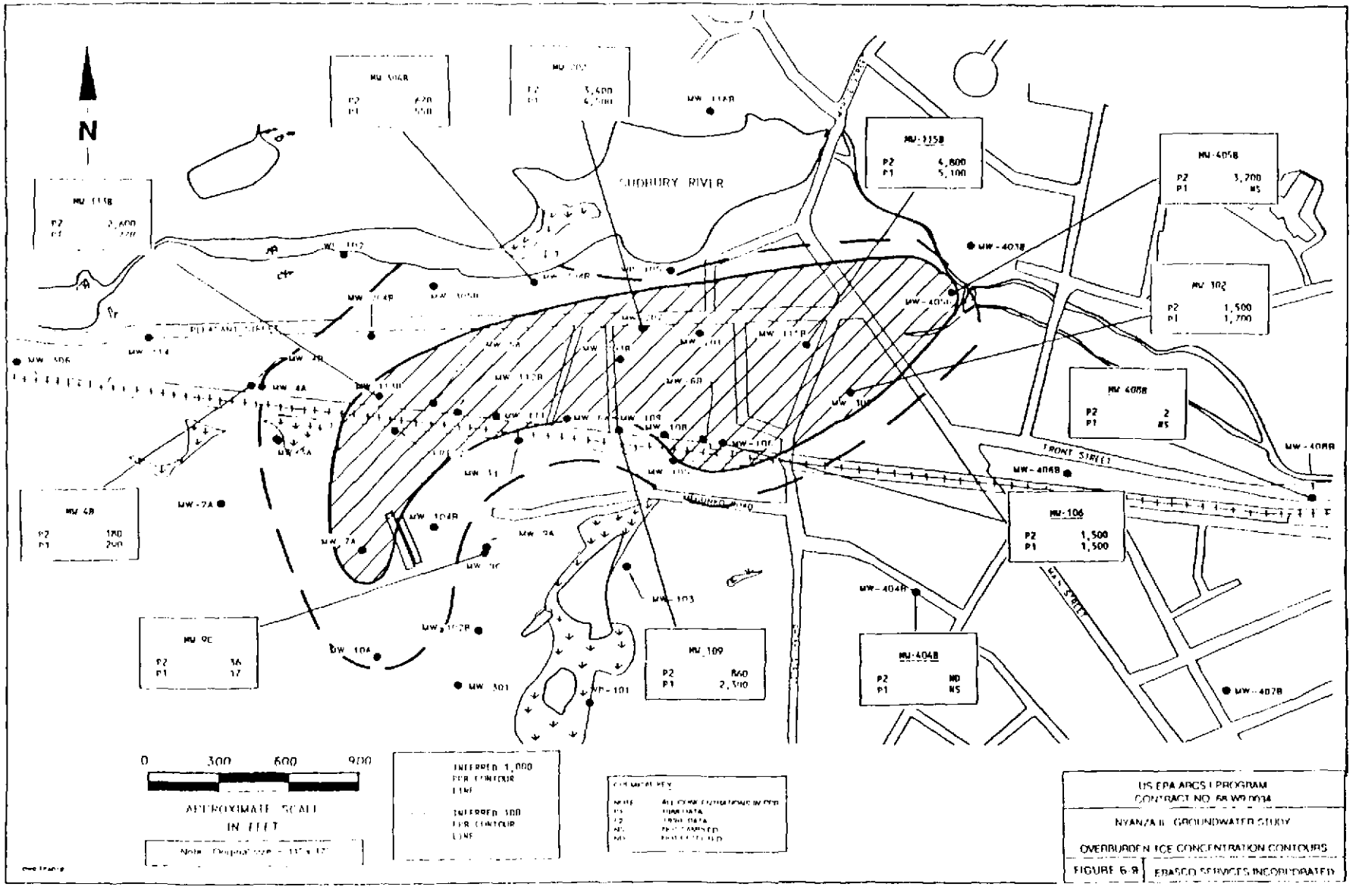
BEDROCK NITROBENZENE CONCENTRATION CONTOURS

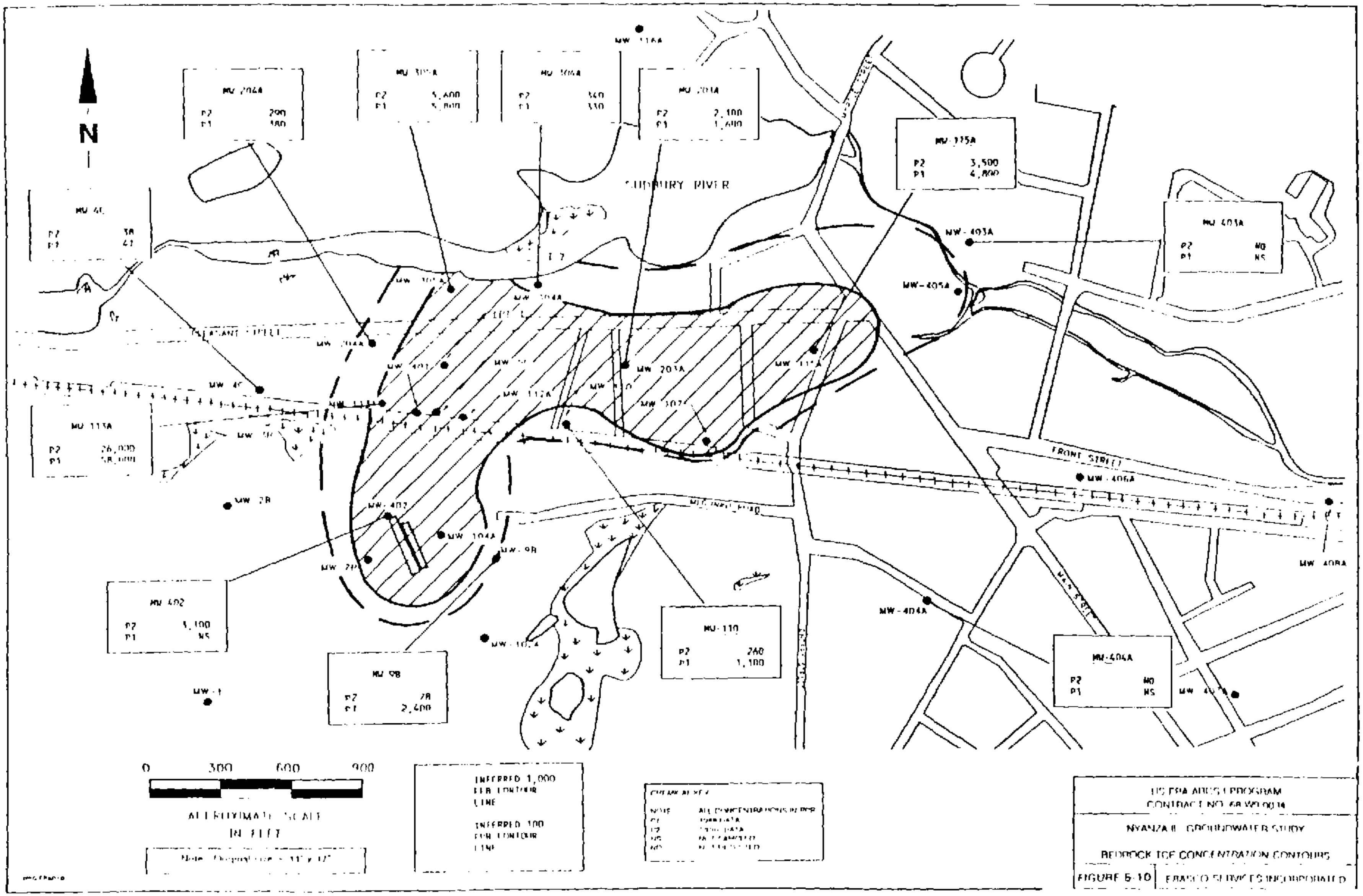
FIGURE 5-6 | EBASCO SERVICES INCORPORATED


N
MW-113B
P2 2,513
P1 1,050
MW-204B
MW 202
P2 2,797
MW 306
P2 2,100
MW-403B
P2 ND
P1 NS
MW-405B
P2 1,800
P1 NS
MW-4B
P2 6
P1 ND
SUDBURY RIVER
PLEASANT STREET
MW-406B
P2 ND
P1 NS
MW-9C
P2 231
P1 340
MW-115B
P2 2,859
P1 2,060
MW-302
P2 225
P1 460
MW-109
P2 26
P1 NS
MW-404B
P2 ND
P1 NS
FRONT STREET
MW-403B
MW-405B
MW-406B
MW-408B
MW-404B
MW-407B
MW-104B
MW-102B
MW-301
MW-7A
MW-2A
MW-4A
MW-115B
MW-302
0 300 600 900
APPROXIMATE SCALE
IN FEET
INFERRED 1,000
PPB CONTOUR
LINE
INFERRED 100
PPB CONTOUR
LINE
US EPA ARCS I PROGRAM
NYANZA II GROUNDWATER STUDY
OVERBURDEN DICHLOROBENZENE
CONCENTRATION CONTOURS
FIGURE 6-7
EBASCO SERVICES INCORPORATED



N
SUDBURY RIVER
PLEASANT STREET
FRONT STREET
MW 313A
P2 86,400
P1 677,000
MW 305A
P2 4,010
P1 3,500
MW 304A
P2 61
P1 150
MW 110
P2 660
P1 1,107
MW 203A
P2 311
P1 1,750
MW 115A
P2 1,904
P1 2,400
MW 403A
P2 ND
P1 NS
MW 405A
P2 209
P1 NS
MW 4C
P2 ND
P1 ND
MW 406A
P2 ND
P1 NS
MW 401
P2 4,279
P1 NS
MW 402
P2 62
P1 NS
MW 98
P2 2,829
P1 710
MW 107
P2 700
P1 1,251
MW 404A
P2 ND
P1 NS
MW-404A
MW-405A
MW-406A
MW-408A
MW-407A
MW-403A
MW-115A
MW-203A
MW-107
MW-110
MW-112A
MW-5C
MW-401
MW-304A
MW-305A
MW-4C
MW-3B
MW-2B
MW-402
MW-104A
MW-9B
MW-7B
MW-107A
MW-108
0 300 600 900
APPROXIMATE SCALE
IN FEET
INFERRED 1,000
PPB CONTOUR
LINE
INFERRED 100
PPB CONTOUR
LINE
US EPA ARCS I PROGRAM
CONTRACT NO. 68-W9-0034
NYANZA II GROUNDWATER STUDY
BEDROCK DICHLOROBENZENE CONCENTRATION
CONTOURS
FIGURE 6-8
EBASCO SERVICES INCORPORATED


N
SUDBURY RIVER
MW-115B
P2 4,600
P1 5,100
MW-405B
P2 3,200
P1 NS
MW-102
P2 1,500
P1 1,700
MW-405B
P2 2
P1 NS
MW-48
P2 180
P1 200
MW-106
P2 1,500
P1 1,500
MW-9E
P2 36
P1 17
MW-109
P2 860
P1 2,310
MW-404B
P2 ND
P1 NS
FRONT STREET
0 300 600 900
APPROXIMATE SCALE IN FEET
INFERRED 1,000 PER CONTOUR LINE
INFERRED 100 PER CONTOUR LINE
US EPA ARCS I PROGRAM
CONTRACT NO. 68-W9-0034
NYANZA R. GROUNDWATER STUDY
OVERBURDEN ICE CONCENTRATION CONTOURS
FIGURE 6-8
ERASCO SERVICES INCORPORATED


N
SUDBURY RIVER
PLEASANT STREET
FRONT STREET
MW-204A
P2 290
P1 380
MW-305A
P2 5,600
P1 5,800
MW-306A
P2 340
P1 330
MW-203A
P2 2,100
P1 1,600
MW-115A
P2 3,500
P1 4,800
MW-4C
P2 38
P1 41
MW-403A
P2 ND
P1 NS
MW-113A
P2 26,000
P1 58,000
MW-402
P2 1,100
P1 NS
MW-9B
P2 28
P1 2,400
MW-110
P2 260
P1 1,100
MW-404A
P2 ND
P1 NS
MW-403A
MW-405A
MW-406A
MW-408A
MW-404A
MW-2B
MW-1
MW-104A
0 300 600 900
APPROXIMATE SCALE
IN FEET
INFERRED 1,000
PPB CONTOUR
LINE
INFERRED 100
PPB CONTOUR
LINE
US EPA ARCS I PROGRAM
CONTRACT NO. 68-W8-0014
NYANZA II - GROUNDWATER STUDY
BEDROCK TCE CONCENTRATION CONTOURS
FIGURE 5-10
EBASCO SERVICES INCORPORATED

VI. SUMMARY OF SITE RISKS

A Risk Assessment (RA) was performed to estimate the probability and magnitude of potential adverse human health and environmental effects from exposure to contaminants associated with the Site. The public health risk assessment followed a four step process: 1) contaminant identification, which identified those hazardous substances which, given the specifics of the site were of significant concern; 2) exposure assessment, which identified actual or potential exposure pathways, characterized the potentially exposed populations, and determined the extent of possible exposure; 3) toxicity assessment, which considered the types and magnitude of adverse health effects associated with exposure to hazardous substances, and 4) risk characterization, which integrated the three earlier steps to summarize the potential and actual risks posed by hazardous substances at the site, including carcinogenic and non-carcinogenic risks. The results of the public health risk assessment for the Nyanza Chemical Waste Dump Site are discussed below followed by the conclusions of the environmental risk assessment.

The summary of contaminants of concern found in groundwater, surface water and sediment is found in Table 6-1. These contaminants constitute a representative subset of the contaminants identified at the Site during the Remedial Investigation. The contaminants of concern for each medium were selected to represent potential site related hazards based on toxicity, concentration, frequency of detection, and mobility and persistence in the environment. A summary of the health effects of each of the contaminants of concern can be found in Appendix B of the Risk Assessment.

Potential human health effects associated with exposure to the contaminants of concern were estimated quantitatively through the development of several hypothetical exposure pathways. These pathways were developed to reflect the potential for exposure to hazardous substances based on the present uses, potential future uses, and location of the Site. The following is a brief summary of the exposure pathways evaluated. A more thorough description can be found in Section 4 of the Risk Assessment.

At the Nyanza Operable Unit II study area, risks were assessed for exposure to contaminants in groundwater, surface water, and sediments. Table 6-2 summarizes the exposure pathways investigated, along with the sources of data used to assess exposure point concentrations.

Although groundwater is the most extensively contaminated medium at the Site, there is no current exposure to groundwater via ingestion as a drinking water supply. The area in the vicinity of the Nyanza Site is supplied by a municipal water supply wellfield located approximately two miles west of the Site. Exposure to groundwater contaminants through the use of groundwater for domestic purposes could occur in the future if the aquifer was developed for this purpose. Groundwater exposure through domestic use is only possible in the future if water supply wells are installed in the shallow or bedrock aquifers.

People may also be exposed to groundwater in residential basements, since groundwater has been found to migrate into basements. Although the present risk from exposure to basement seepage contamination is reportedly low (based on trace levels of contamination observed during a survey of 6 basements), risks were assessed using the measured levels of contaminants found in the shallow overburden groundwater wells during the 1988 and 1990 investigations and projections regarding their contributions to indoor air levels, to provide a conservative estimate of future risks through this pathway. Exposure to surface

TABLE 6-1

Summary of Contaminants of Concern Selected for the
Nyanza Site Groundwater Operable Unit
1988 and 1990

Contaminant	1988 Groundwater	1990 Groundwater	Surface Water	Sediment
Volatile Organics				
Benzene	X	X		
2-Butanone	X			X
Chlorobenzene	X	X	X	X
1,2-Dichloroethene	X	X	X	X
Methylene Chloride	X			
Tetrachloroethene		X		
Toluene	X	X		
Trichloroethene	X	X	X	X
Vinyl Chloride				X
Semivolatile Organics				
Aniline	X	X		
Benzidine		X		
4-Chloroaniline		X		
2-Chlorophenol		X		
1,2-dichlorobenzene	X	X		X
1,3-dichlorobenzene	X	X		
1,4-dichlorobenzene	X	X		
3,3-dimethylbenzidine		X		
bis-(Ethylhexyl)phthalate		X		
Naphthalene	X	X		
Nitrobenzene	X	X		
N-Nitrosodiphenylamine		X		
N-Nitrosodi-n-propylamine	X			
Pentachlorophenol		X		
1,2,4-Trichlorobenzene	X	X		X
Pesticides				
Dieldrin	X			
Heptachlor	X			
Inorganics				
Antimony	X	X		
Arsenic	X	X		X
Beryllium	X	X		X
Cadmium	X	X		
Chromium	X	X	X	X
Copper	X	X	X	X
Lead	X	X	X	X
Manganese	X	X		
Mercury	X	X	X	X
Nickel	X	X		

TABLE 6-2
Exposure Pathways
Nyanza II - Groundwater Study
Ashland, Massachusetts

Medium	Point of Exposure	Route of Exposure	Exposure Status	Exposed Population	Data Used To Estimate Exposures
Groundwater	Downgradient Area	Ingestion; Inhalation of VOCs during showering; Dermal contact during washing	Current	None	1988, 1990
			Future	Users of wells dug in vicinity	
	Basement Seepage (Downgradient Area)	Inhalation & Dermal Contact	Current & Future	Household residents	1988, 1990
	Vault Area	Ingestion	Current	None	1988
			Future	Users of wells dug in vicinity	
	Megunko Hill Area	Ingestion	Current	None	1988
			Future	Users of wells dug in vicinity	
Surface Water	Trib. to Bibb & Eastern wetlands	Dermal Contact & Ingestion	Current & Future	Children wading	1988
Sediments	Eastern wetlands	Dermal Contact & Ingestion	Current & Future	Children wading	1988

water and sediment contaminants may occur via dermal contact and ingestion under existing conditions, as well as in the future. The potentially exposed populations and pathways of exposure for each medium are discussed in the following sections.

A. Groundwater Exposure Scenarios

Two situations in which exposure to groundwater may occur in the Nyanza II study area were considered: groundwater as a public water supply, and groundwater seepage into basements.

1. Groundwater as Public Water Supply

The area in the vicinity of the Site is supplied by a public water supply located outside of the study area. Therefore, local groundwater is not currently used as a drinking water supply. Future development in the area, however, may require the installation of new wells. If water supply wells are installed in the future, exposure to contaminants present in groundwater could occur in a variety of ways. These include: 1) ingestion; 2) inhalation of chemicals released into air during household uses such as showering; and 3) dermal absorption of chemicals from household water uses such as washing. The assumptions made to assess exposure through these routes are described in Table 6-3.

For each pathway evaluated, an average (most probable) and a reasonable maximum exposure (realistic worst case) estimate was generated corresponding to exposure to the average and maximum concentration detected in that particular medium.

The estimated groundwater concentrations derived from the 1988 and 1990 data are summarized in Table 4-3 of the Risk Assessment which is included as an Appendix III to this ROD. Included in Table 4-3 are the arithmetic mean and maximum values and frequencies of detection of contaminants broken out into individual exposure areas: Megunko Hill, the vault area, and the downgradient area.

2. Groundwater Seepage

The second groundwater exposure scenario evaluated is associated with seepage of shallow groundwater into residential basements. Previous residential sampling conducted by NUS Corporation for EPA detected low levels of contaminants in water collected from several basements downgradient of the Site. In addition, air samples collected from basements located downgradient of the Site did not indicate significant air impact from contaminated groundwater.

Residents of houses with basements may come into contact with contaminated groundwater basement seepage. The most likely routes of exposure to contaminants as a result of basement seepage are dermal contact, ingestion, and inhalation. Assumptions used to assess exposure through these pathways are described in Table 6-4.

To estimate exposure point concentrations of puddled water standing in basements or of submersible pump discharges, it was assumed that the contaminants found in shallow groundwater monitoring wells in the downgradient area migrated into residential basements. Thus, the groundwater contaminant concentrations that could potentially migrate into basements were assumed to be the same as the concentrations in shallow wells defined as overburden wells. Table 6-5a and 6-5b present 1988 and 1990 exposure point concentrations, respectively, for basement seepage based upon data sets comprised only of samples from downgradient overburden wells.

TABLE 6-3

Oral, Dermal and Inhalation Exposure to Groundwater
as a Potable Drinking Water Supply
Myanza II - Groundwater Study
Ashland, Massachusetts

Drinking, Washing, and Showering Pathways

Parameter	Assumption [4/]
Ages	Adult
Average Body Weight [1/]	70 kg
Average Surface Area Exposed [2]	2300 cm^2
Incidental Ingestion from Washing	0 l
Ingestion as Drinking Water [3]	2 l/day
Inhalation Rate [3]	1.3 m^3/hr
Frequency of Events	365 events/year
Duration of Event	0.25 hrs showering, 0.17 hr post-showering 2 hr (washing)
Duration of Exposure [3]	70 years (Carcinogens)

Notes:

1/ USEPA, 1989b. Supplemental Risk Assessment Guidance for the Superfund Program. Draft Final, USEPA 540 of 1.

2/ Hands and forearms during household activities such as washing hands, dishes and clothing; Anderson et al., 198-

3/ USEPA, 1989. Superfund Exposure Assessment Manual, Washington D.C.

4/ kg = kilograms; cm = square centimeter, m^3 = cubic meters

TABLE 6-4

Exposure to Groundwater
from Basement Seepage
Nyanza II - Groundwater Study
Ashland, Massachusetts

Parameter	Assumption [5/]
Ages	Adult
Average Body Weight [1/]	70 kg
Average Surface Area Exposed [2]	1000 cm^2
Average Inhalation Rate [3]	1.3 m^3/hr
Incidental Ingestion	1 ml/event
Frequency of Exposure [4]	104 events/year
Duration of Event	4 hr (inhalation) 0.5 hr (dermal)
Duration of Exposure	70 years

Notes:

1/ Anderson, et al., 1988.
2/ Assumed potentially exposed skin surface area of 2,000 cm^2, and a factor of 50% to account for the fraction that is likely to be actually exposed. USEPA, 1989b. Supplemental Risk Assessment Guidance for the Superfund Program. Draft Final, USEPA Region 1.
3/ USEPA, 1989. Superfund Exposure Assessment Manual, Washington, D.C.
4/ 2 events per week, 52 weeks/year
5/ kg = kilograms; cm^2 = square centimeters; m = meters; l = liters

Inhalation exposures due to basement seepage were assessed using a model developed by Murphy to estimate the basement air concentrations for volatile contaminants associated with the presence of contaminants in sumps. Further detail on this model is included in the Risk Assessment.

3. Surface Water and Sediment Exposure Scenarios

The contaminated surface water bodies in the Nyanza II study area are the eastern wetland and Trolley Brook. The most likely population to be exposed to contaminants at these locations are older children and adolescents wading in the water. Risks associated with dermal contact and incidental ingestion of the surface water were calculated for this medium. Exposure parameters used to assess risk at these locations are shown in Table 6-6.

Exposure point concentrations of contaminants at these locations were calculated using data from 1988 samples SW-101 (eastern wetland) and SW-102 (Trolley Brook) (see Table 6-7). The maximum detected concentrations and arithmetic means were used for the risk calculations in the realistic worst case and most probable case scenarios, respectively. However, where the data set consisted of only one sample, only most probable case scenarios were evaluated.

4. Exposure to Subsurface Soil

Potential contaminant exposures and risks associated with future exposures to subsurface soil are discussed qualitatively in Section 6.2 of the Risk Assessment. For each pathway evaluated, an average and a reasonable maximum exposure estimate was generated corresponding to exposure to the average and the maximum concentration detected in that particular medium.

B. Risk Characterization

Excess lifetime cancer risks were determined for each exposure pathway by multiplying the exposure level with the chemical specific cancer potency factor. Cancer potency factors have been developed by EPA from epidemiological or animal studies to reflect a conservative "upper bound" of the risk posed by potentially carcinogenic compounds. That is, the true risk is very unlikely to be greater than the risk predicted. The resulting risk estimates are expressed in scientific notation as a probability (e.g. 1×10^{-6} for 1/1,000,000) and indicate (using this example), that an individual is not likely to have greater than a one in a million chance of developing cancer over 70 years as a result of site-related exposure as defined to the compound at the stated concentration. Current EPA practice considers carcinogenic risks to be additive when assessing exposure to a mixture of hazardous substances.

The hazard quotient was also calculated for each pathway as EPA’s measure of the potential for non-carcinogenic health effects. The hazard quotient is calculated by dividing the exposure level by the reference dose (RfD) or other suitable benchmark for non-carcinogenic health effects. Reference doses have been developed by EPA to protect sensitive individuals over the course of a lifetime and they reflect a daily exposure level that is likely to be without an appreciable risk of an adverse health effect. RfDs are derived from epidemiological or animal studies and incorporate uncertainty factors to help ensure that adverse health effects will not occur. The hazard quotient is often expressed as a single value (e.g. 0.3) indicating the ratio of the stated exposure as defined to the reference dose value (in this example, the exposure as characterized is approximately one third of an acceptable exposure level for

TABLE 6-5a

Exposure Point Concentrations for Groundwater in Basement Seepage
Downgradient Overburden Wells
Nyanza II - 1988 Groundwater Study
Ashland, Massachusetts

Contaminant	Maximum (ug/l)	Arithmetic Mean (ug/l)	Frequency of Detection
VOCs			
Benzene	34	48.3	9/21
Methylene Chloride	930	86.0	5/21
1,2-Dichloroethene	1,600	164	15/21
2-Butanone	390	139	3/15
Trichloroethene	5,100	1,290	21/21
Toluene	6	45.3	4/21
Chlorobenzene	7,900	1,650	21/21
SVOCs			
1,3-Dichlorobenzene	330	65.2	3/21
1,4-Dichlorobenzene	390	137	12/19
1,2-Dichlorobenzene	6,600	1,500	15/18
N-Nitroso-di-n-propylamine	160	114	3/10
Nitrobenzene	5,300	360	4/20
1,2,4-Trichlorobenzene	5,100	562	10/18
Naphthalene	1,600	123	4/21
Aniline	24,000	1,290	9/15
Pesticides			
Heptachlor	5.4	0.30	3/21
Dieldrin	0.19	0.083	3/21
Inorganics			
Antimony	673	126	9/21
Arsenic	74.9	5.33	6/21
Barium	56.0	10.8	17/21
Cadmium	23.0	4.57	5/21
Chromium	74.0	18.0	10/21
Copper	31.0	9.38	7/21
Lead	32.6	13.6	17/21
Manganese	126,000	18,900	21/21
Mercury	8.23	0.69	9/21
Nickel	473	79.1	15/21

TABLE 6-5b

Exposure Point Concentrations
for Groundwater in Basement Seepage
Downgradient Overburden Wells
Nyanza II - 1990 Groundwater Study
Ashland, Massachusetts

Compound	Maximum (ug/l)	Arithmetic Mean (ug/l)	Frequency of Detection
VOCs			
Benzene	77.5	24.1	6/15
Chlorobenzene	4,650	1,233	10/15
1,2-Dichloroethene	360	74.0	6/15
Tetrachloroethene	24	22.7	3/15
Toluene	6	20.7	2/15
Trichloroethene	4,800	1,088	11/15
SVOCs			
Aniline	9,200	1,437	8/14
Benzidine	--	--	0/11
Bis(2-ethylhexyl)phthalate	39	8.8	1/11
4-Chloroaniline	18	6.5	2/12
2-Chlorophenol	5	5.0	3/12
1,3-Dichlorobenzene	47	13.1	7/14
1,4-Dichlorobenzene	480	104	8/15
1,2-Dichlorobenzene	2,400	614	10/15
3,3'-Dimethylbenzidine	--	--	0/11
n-Nitrosodiphenylamine	--	--	0/11
Naphthalene	215	35.0	6/15
Nitrobenzene	330	10.9	6/13
Pentachlorophenol	--	--	0/12
1,2,4-Trichlorobenzene	680	76.1	6/14
Inorganics			
Antimony	156	27.3	1/14
Arsenic	12	2.8	6/14
Beryllium	49	5.9	7/15
Cadmium	--	--	0/14
Chromium	1,140	82.2	3/15
Copper	50	8.7	3/14
Lead	13.5	2.8	6/15
Manganese	94,100	16,160	15/15
Mercury	5.8	0.8	6/14
Nickel	535	67.0	7/15

--- Indicates contaminant not detected in this area.

TABLE 6-6

Oral and Dermal Exposure to Surface Water
at Trolley Brook and Eastern Wetland
Nyanza II - 1988 Groundwater Study
Ashland, Massachusetts

Parameter	Assumption [4/]
Age	8-18
Average Body Weight [1/]	46 kg
Average Surface Area Exposed [2/]	4000 cm^2
Amount of Incidental Ingestion	1.0 ml/event
Frequency of Events [3/]	72 events/year
Duration of Event	2 hours
Duration of Exposure	10 years

Notes:

1/ Anderson, et al., 1988
2/ hands, arms, and feet; Anderson et al., 1988
3/ 12 events/month, 6 months/year
4/ kg = kilograms; cm^2 = square centimeters; ml = milliliters

TABLE 6-7

Summary Statistics for Selected Surface Water Samples
All Locations: Trolley Brook and Eastern Wetland
Nyanza II - 1988 Groundwater Study
Ashland, Massachusetts

Compound	Maximum (ug/l)	Arithmetic 1/ Mean (ug/l)	Frequency of Detection	Contaminants of Concern
VOCs				
Chlorobenzene	9.00	4.80	1/2	Yes
1,2-Dichloroethene	6.00	4.30	1/2	Yes
Trichloroethene	6.00	4.30	1/2	Yes
SVOCs				
1,2-Dichlorobenzene	---	---	0/2	No
Nitrobenzene	---	---	0/2	No
1,2,4-Trichlorobenzene	---	---	0/2	No
Acenaphthalene	---	---	0/2	No
Phenanthrene	---	---	0/2	No
Anthracene	---	---	0/2	No
Di-n-butylphthalate	---	---	0/2	No
Fluoranthene	---	---	0/2	No
Pyrene	---	---	0/2	No
Benzo(a)anthracene	---	---	0/2	No
Chrysene	---	---	0/2	No
Benzo(b)fluoranthene	---	---	0/2	No
Benzo(k)fluoranthene	---	---	0/2	No
Benzo(a)pyrene	---	---	0/2	No
Indeno(1,2,3-cd)pyrene	---	---	0/2	No
Benzo(g,h,i)perylene	---	---	0/2	No
Pesticides/PCB				
Alpha-BHC	---	---	0/2	No
Beta-BHC	---	---	0/2	No
Delta-BHC	---	---	0/2	No
Gamma-BHC (Lindane)	---	---	0/2	No
Heptachlor	---	---	0/2	No
Aldrin	---	---	0/2	No
Heptachlor Epoxide	---	---	0/2	No
Endosulfan I	---	---	0/2	No
Dieldrin	---	---	0/2	No
4,4-DDE	---	---	0/2	No
Endrin	---	---	0/2	No
Endosulfan II	---	---	0/2	No
4,4'-DDT	---	---	0/2	No
Methoxychlor	---	---	0/2	No
Endrin Ketone	---	---	0/2	No
Alpha-Chlordane	---	---	0/2	No
Gamma-Chlordane	---	---	0/2	No
Toxaphene	---	---	0/2	No

TABLE 6-7 (continued)

Summary Statistics for Selected Surface Water Samples
All Locations: Trolley Brook and Eastern Wetland
Nyanza II - 1988 Groundwater Study
Ashland, Massachusetts

Compound	Maximum (ug/l)	Arithmetic 1/ Mean (ug/l)	Frequency of Detection	Contaminants of Concern
Pesticides/PCB (continued)				
Aroclor-1016	---	---	0/2	No
Aroclor-1221	---	---	0/2	No
Aroclor-1232	---	---	0/2	No
Aroclor-1242	---	---	0/2	No
Aroclor-1248	---	---	0/2	No
Aroclor-1254	---	---	0/2	No
Aroclor-1260	---	---	0/2	No
Inorganics				
Aluminum	521	3.5	2/2	No
Antimony	---	---	0/2	No
Arsenic	---	---	0/2	No
Barium	---	---	0/2	No
Beryllium	---	---	0/2	No
Cadmium	---	---	0/2	No
Calcium	27,400	26,100	2/2	No
Chromium	51	35	2/2	Yes
Copper	30	30	2/2	Yes
Iron	47,700	46,100	2/2	No
Lead	28	22	2/2	Yes
Manganese	570	503	2/2	No
Mercury	-	5	2/2	Yes
Nickel	33	20	1/2	No
Sodium	64,500	61,050	2/2	No
Vanadium	23	14	1/2	No

Notes:

--- Not Detected
1/ Arithmetic means are calculated using one-half detection limits for non-detect samples.

the given compound). The hazard quotient is only considered additive for compounds that have the same or similar toxic endpoints (for example: the hazard quotient for a compound known to produce liver damage should not be added to a second whose toxic endpoint is kidney damage). The resulting sum is referred to as the hazard index.

Table 6-8 summarizes total carcinogenic risks for downgradient areas for all pathways, while Table 6-9 summarizes the total non-carcinogenic risk for downgradient areas for all pathways considered. Tables 6-1 through 6-6 of the Risk Assessment summarize the risks associated with the major contaminants of concern.

This section summarizes the calculated carcinogenic and non-carcinogenic risk for various pathways, describes which contaminants of concern contribute the most to the calculated risk, and compares the calculated risk to EPA's target carcinogenic risk range of 10^{-4} to 10^{-6} and discuss non-carcinogenic hazard index as it relates to the value where adverse non-carcinogenic effects are not expected (HK1).

1. Groundwater Risk Characterization.

Potential risks associated with possible future use of groundwater as a potable water supply was evaluated at three locations: the downgradient, former vault, and Megunko Hill areas.

Downgradient Area - The carcinogenic risks that may result from groundwater ingestion at this location greatly exceed both federal and Massachusetts target levels. Lifetime cancer risks calculated from the 1988 data were $2.5xlO^{-2}$ for the most probable scenario and $5.5xlO^{-2}$ for the realistic worst case scenario, with exposures to n-nitrosodi-n-propylamine accounting for the bulk of the risk. The cancer risks associated with consumption of downgradient groundwater calculated based on the 1990 data were also quite high with values for the most probable and realistic worst case risks both being approximately $l.3xlO^{-1}$. The bulk of the risks for the 1990 data were due to exposure to benzidine and 3,3'-dimethylbenzidine, two compounds which were not analyzed for during the 1988 study. It is likely that these compounds were present in the 1985 groundwater samples also, and that the risks calculated using the 1988 data may somewhat underestimate the site-associated risk for this pathway. The cancer risk associated with inhalation of volatile contaminants during showering, and with dermal contact of groundwater during washing also were within or above the target risk range, based on both the 1988 and 1990 data. Risks due to exposures by these pathways are, however, lower than the cancer risks associated with groundwater ingestion. Trichloroethene contributed the bulk of calculated inhalation risks from showering, based on the 1990 data.

The potential for non-carcinogenic adverse effects associated with consumption of groundwater from the downgradient area is also quite high. Using the results of the 1988 sampling, the Hazard Indices for the use of downgradient groundwater are approximately 5600 and 220 for the realistic worst case and most probable case scenarios, respectively. Based on the 1990 data, the corresponding Hazard Indices are approximately 1100 and 56, respectively. In both data sets, the vast majority of the Hazard Index value is due to presence of nitrobenzene, which is present at concentrations up to 94 mg/1 in groundwater in the downgradient area. Both the worst case and most probable Hazard Indices for inhalation of groundwater contaminants while showering from either the 1988 or 1990 data also exceeded 1.0 for several target endpoints indicating a potential for adverse non-carcinogenic effects.

TABLE 6-8

TOTAL CARCINOGENIC RISK FOR DOWNGRADIENT AREAS
FOR ALL PATHWAYS
NYANZA II GROUNDWATER STUDY
ASHLAND, MASSACHUSETTS

EXPOSURE AREA	MEDIUM	ROUTE OF EXPOSURE	MOST PROBABLE SCENARIO 1988	MOST PROBABLE SCENARIO 1990	REALISTIC WORST CASE SCENARIO 1988	REALISTIC WORST CASE SCENARIO 1990
DOWNGRADIENT AREA	GROUNDWATER, DRINKING WATER	INGESTION	2.5E-02	1.3E-01 *	5.5E-02	1.3E-01
DOWNGRADIENT AREA	GROUNDWATER, SHOWERING	INHALATION	2.8E-03	8.2E-04	1.4E-02	3.5E-03
DOWNGRADIENT AREA	GROUNDWATER, WASHING	DERMAL	7.9E-05	3.4E-04 *	2.6E-04	3.1E-04
DOWNGRADIENT AREA	GROUNDWATER, BASEMENT SEEPAGE	DERMAL AND INGESTION	5.8E-06	6.7E-07	1.1E-05	3.4E-06
DOWNGRADIENT AREA	GROUNDWATER, BASEMENT SEEPAGE	INHALATION	3.0E-05	2.4E-05	1.2E-04	1.0E-04
TROLLEY BROOK	SURFACE WATER	DERMAL AND INGESTION	2.6E-09	(2)	(1)	(1)
EASTERN WETLAND	SURFACE WATER	DERMAL AND INGESTION	1.1E-07	(2)	(1)	(1)
EASTERN WETLAND	SEDIMENT	DERMAL AND INGESTION	1.7E-06	(2)	1.3E-05	(1)
TOTAL SITE CANCER RISK			2.8E-02	1.3E-01	6.9E-02	1.3E-01

NOTES:

(1) Not applicable because only a single sample was taken.

(2) No surface water or sediment samples were collected during 1990. Therefore, this pathway was not evaluated.

* Due to the data treatment method for averaging non-detected values, the calculated most probable case risks (Appendix E) slightly exceeds the calculated worst case risk. The most probable case risk has, therefore, been set equal to the worst case risk.

TABLE 6-9

TOTAL NONCARCINOGENIC RISK FOR DOWNGRADIENT
AREAS FOR ALL PATHWAYS
NYANZA II GROUNDWATER STUDY
ASHLAND, MASSACHUSETTS

EXPOSURE AREA	MEDIUM	ROUTE OF EXPOSURE	MOST PROBABLE SCENARIO 1988	MOST PROBABLE SCENARIO 1990	MOST PROBABLE ORGAN-SPECIFIC HAZARD INDICES EXCEEDING 1.0 1988	MOST PROBABLE ORGAN-SPECIFIC HAZARD INDICES EXCEEDING 1.0 1990	REALISTIC WORST CASE SCENARIO 1988	REALISTIC WORST CASE SCENARIO 1990
DOWNGRADIENT AREA	GROUNDWATER, DRINKING WATER	INGESTION	2.2E+02	5.6E+01	B,L,K,U (1)	B,L,K,U	5.6E+03	1.1E+03
DOWNGRADIENT AREA	GROUNDWATER, SHOWERING	INHALATION	1.1E+02	1.2E+01	L,K,B	L,K,B	5.2E+02	1.8E+02
DOWNGRADIENT AREA	GROUNDWATER, WASHING	DERMAL	4.7E-01	1.6E-01	--	--	1.0E+01	2.1E+00
DOWNGRADIENT AREA	GROUNDWATER, BASEMENT SEEPAGE	INHALATION	3.1E-01	1.6E-01	--	--	2.8E+00	6.8E-01
DOWNGRADIENT AREA	GROUNDWATER, BASEMENT SEEPAGE	DERMAL AND INGESTION	9.2E-03	4.7E-03	--	--	1.7E-01	1.9E-02
TROLLEY BROOK	SURFACE WATER	DERMAL AND INGESTION	1.5E-03	(2)	--	--	(3)	(2)
EASTERN WETLAND	SURFACE WATER	DERMAL AND INGESTION	2.9E-03	(2)	--	--	(3)	(2)
EASTERN WETLAND	SEDIMENT	DERMAL AND INGESTION	1.9E-01	(2)	--	--	3.5E-01	(2)
TOTAL RISK			3.3E+02	6.9E+01			6.1E+03	1.3E+03

Notes:
(1) Organ system abbreviations: B = Blood, Bw = Body Weight Effects, C = Central Nervous System, K = Kidney, L = Liver, U = Undefined
(2) No surface water or sediment samples collected during 1990.

Groundwater exposure could also occur as a result of groundwater migrating into residential basements in the downgradient area. Risks were estimated for this pathway using contaminant concentrations detected in shallow monitoring wells during both 1988 and 1990 investigations. The carcinogenic risks predicted for breathing volatilized contaminants from basement seepage calculated from the 1988 data were within USEPA's target range for both the most probable and the realistic worst scenarios (3.0×10^{-5} and 1.2×10^{-4}, respectively). The carcinogenic risks due to dermal contact and ingestion of sump water were also within the USEPA target range. None of the organ specific non-carcinogenic hazard indices predicted for the inhalation of volatile contaminants in basement sumps exceeded a HI=l.O indicating that the potential for adverse non-carcinogenic effects is unlikely. The Hazard Indices associated with dermal and ingestion exposure of sump water were well below 1.0.

The risks predicted for exposure to basement seepage calculated from the 1990 data are similar although slightly lower in magnitude to those calculated from the 1988 data. Realistic worst case and most probable case cancer risks associated with the inhalation pathway are both within the USEPA target limits (1.0×10^{-4} and 2.4×10^{-5}, respectively). Risks associated with dermal contact and ingestion exposures are 3.4×10^{-6} for the worst case scenario and 6.7×10^{-7} for the most probable case scenario. Exposures to groundwater contaminants in seepage by both routes are associated with Hazard Indices which approach but do not exceed 1.0.

Former Vault and Hill Areas - Carcinogenic risks posed by the ingestion of groundwater from both of these locations would greatly exceed the USEPA target cancer risk range for both the most probable and realistic worst case scenarios. Similarly, the hazard index posed by the ingestion of groundwater from these areas non-carcinogenic also exceeded the USEPA target hazard index of l.0.

2. Surface Water Risk Characterization.

Surface water exposure was assessed at Trolley Brook and the eastern wetland based a limited number of samples. The carcinogenic and non-carcinogenic risks of exposure through dermal contact and ingestion were found to be within or below acceptable. A comprehensive sampling and risk characterization effort of the surface water at the site being completed as part of Operable Unit 3.

3. Sediment Risk Characterization.

Sediment exposure was assessed in the eastern wetland based on a limited number of samples. Non- carcinogenic risks were below 1.0 indicating that the potential for adverse non- carcinogenic health effects is small. Cancer risks associated with exposures to eastern wetland sediments were within EPA's target risk range, at 1.3×10^{-5}. A comprehensive sampling and risk characterization effort of the sediments at the site is being completed as part of Operable Unit 3.

C. Uncertainties in Estimating Risk

It should be emphasized that the risk estimates in this assessment are based on numerous assumptions, each having uncertainty associated with it. Several types of uncertainties should be considered in any risk evaluation:

- uncertainties associated with identifying contaminants of concern and estimating exposure concentrations
- uncertainties associated with estimating the frequency, duration, and magnitude of exposure
- uncertainties in the models used to characterize risks
- uncertainties in estimating carcinogenic potency factors and/or non-carcinogenic measures of toxicity (e.g., RfDs)

A complete discussion of these uncertainties is located in Section 6 of the Risk Assessment.

D. Ecological Assessment

An Ecological Assessment of the groundwater contaminants effect on the environment was performed as a component of the Risk Assessment (Section 7) based on a limited number of surface water sampling. Final assessment of the Site's overall effect on surface waterbodies and their associated ecosystems will be performed as part of the Operable Unit 3 studies now Bunder way.

E. Conclusion

Actual or threatened releases of hazardous substances to groundwater, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment. Risks due to groundwater releases are dealt with in this Record of Decision.

VII. DEVELOPMENT AND SCREENING OF ALTERNATIVES

A. Statutory Requirements/Response Objectives

Under its legal authorities, EPA's primary responsibility at Superfund "sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences, including: a requirement that EPA's remedial action, when complete, must comply with all federal and more stringent state environmental standards, requirements, criteria or limitations, unless a waiver is invoked; a requirement that EPA select a remedial action that is cost-effective and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and a preference for remedies in which treatment which permanently and significantly reduces the volume, toxicity or mobility of the hazardous substances is a principal element over remedies not involving such treatment. Response alternatives were developed to be consistent with these Congressional mandates.

Based on preliminary information relating to types of contaminants, environmental media of concern, and potential exposure pathways, remedial action objectives were developed in the Feasibility Study to aid in the development and screening of alternatives. These remedial action objectives were developed to mitigate existing and future potential threats to public health and the environment. These response objectives were:

1. Reduce migration of contaminants in groundwater.

2. Reduce risks to human health associated with potential future consumption and direct contact with groundwater.

3. Reduce risks from present and potential future inhalation of evaporated groundwater contaminants.

4. Limit degradation of the Sudbury River and wetlands due to the natural discharge of contaminated groundwater.

5. Comply with state and federal applicable, relevant and appropriate requirements (ARARs), including drinking water standards.

These objectives were developed for final remedial actions. The interim actions described in the Proposed Plan and in this Record of Decision are designed as interim steps toward reaching these objectives.

B. Technology and Alternative Development and Screening

CERCLA and the NCP set forth the process by which remedial actions are evaluated and selected. In accordance with these requirements, a range of alternatives were developed for the site.

The RI/FS developed alternatives that involve little or no treatment but provide protection through engineering or institutional controls. The focus of Operable Unit 1 and the vault removal was on source control, therefore, the emphasis of this action is concentrated on management of migration.

TABLE 7-1
NYANZA GROUNDWATER
REMEDIAL ALTERNATIVES

Remediation Alternative	Description	Extraction	Treatment	Effluent Disposal
RA-1	Minimal/No Action	EC-1: Natural Flushing	No Treatment	Not Applicable
RA-2	Site Area Extraction	EC-2: Extraction wells and interceptor trench at Site area only.	TC-3: Metals precipitation with filtration and air stripping/ carbon adsorption.	To Sudbury River
RA-3	Downgradient Management of Migration	EC-3: Downgradient wells only	TC-3: Metals precipitation with filtration and air stripping/carbon adsorption	To Sudbury River
RA-4	Site Area Extraction and Downgradient Management of Migration	EC-4: Site area and downgradient wells and interceptor trench	TC-3: Metals precipitation with filtration and air stripping/carbon adsorption	To Sudbury River
RA-5	Active Plume-wide Extraction	EC-5: Site area and downgradient wells throughout the plume and interceptor trench	TC-3: Metals precipitation with filtration and air stripping/carbon adsorption	To Sudbury River

With respect to ground water response action, the RI/FS developed a limited number of remedial alternatives that attain site specific remediation levels within different time frames using different technologies; and a no action alternative.

As discussed in Chapter 4 of the Feasibility Study, the RI/FS identified, assessed and screened technologies based on implementability, effectiveness, and cost. These technologies were combined management of migration (MM) alternatives. Chapter 5 of the Feasibility Study presented the remedial alternatives developed by combining the technologies identified in the previous screening process in the categories identified in Section 300.430(e) (3) of the NCP. The purpose of the initial screening was to narrow the number of potential remedial actions for further detailed analysis while preserving a range of options. Each alternative was then evaluated and screened in Chapter 6 of the Feasibility Study.

In summary, of the 1 limited action alternative and the 4 active management of migration remedial alternatives screened in Chapter 5, all 5 were retained for detailed analysis. Table 7-1 identifies the alternatives that were retained through the detailed analysis process.

VIII. DESCRIPTION OF ALTERNATIVES

The alternatives described here are all interim remedies. The reasons for EPA's decision to utilize an interim remedy are spelled out in Section X of this ROD.

This Section provides a narrative summary of each alternative evaluated. Management of migration alternatives address contaminants that have migrated from the original source of contamination. At the Nyanza Chemical Waste Dump Site, contaminants have migrated from Megunko Hill, the vault, and other possible source areas towards downgradient areas, and away from the presumed source areas.

The alternatives evaluated include a minimal action alternative (RA-1) as well as a series of alternative management of migration collection schemes (RA-2, RA-3, RA-4, RA-5). A "true" no-action alternative was not included because it would not have been protective, and therefore would not have met the threshold criteria of the CERCLA statute.

The interim alternatives discussed here are identical to the long-term alternatives discussed in the FS, except that their comparison is based on a 5-year operational period, rather than the 30-year time frame used for cost purposes in the FS. The cost estimates are documented in the administrative record.

Each of these alternatives is described briefly below, along with a discussion of how each would function as an interim remedy. A more detailed description of each alternative can be found in Section 6 of the FS report.

Alternative RA-1: Minimal/No Action: The FS evaluated this alternative in detail to serve as a baseline for comparison with other remedial alternatives under consideration. Under this alternative, no treatment or containment of groundwater contamination would occur. The objectives of this alternative are to restrict public access and potential exposure to Site contamination, prohibit use of contaminated groundwater, and evaluate Site conditions and contaminant migration periodically during the interim period. These objectives would be accomplished using Site access control measures and institutional controls to limit exposure to contaminants and installation of wells and long-term environmental monitoring. Fencing and signs would be readily installed by vendors in the area. Environmental monitoring would also be conducted easily by several vendors. Institutional controls in the form of deed and well permit restrictions may require cooperation from local and state authorities.

Estimated Time for Design and Construction: one year
Estimated Time of Operation, interim alternative: 5 years
Estimated Capital Cost: $320,000
Estimated Operation and Maintenance Costs (5 years, present worth): $721,000
Estimated Total Cost (present worth): $1,041,000

Alternative RA-2: Management of Migration with extraction at the Northern Boundary of the Site; treatment of collected groundwater; discharge of effluent to the Sudbury River: This alternative is the selected alternative and is discussed in Section X, entitled "The Selected Remedy".

Alternative RA-3: Management of Migration with extraction to the north and north-east of the Site; treatment of collected groundwater; discharge of effluent to the Sudbury River: This remedial alternative involves contaminated groundwater extraction in the portion of the plume to the north and north-east of the Site; treatment of the groundwater; and "discharge of treated groundwater into the Sudbury River. The treatment process is the same one as is described under EPA's selected alternative. This alternative also includes the Site control features described for RA-1. The objective of this alternative is to prevent the contaminants from expanding beyond current limits of the plume and thereby prevent the discharge of contaminants to the Sudbury River. Unlike RA-2, this alternative would not directly remediate the source area of the contaminated groundwater, thus allowing potentially high levels of contamination to migrate by natural processes to the extraction wells to the north and north-east of the Site before being removed from the aquifer.

As an interim remedy, this alternative would permit the collection of some operational data, but it would also allow the continued migration of groundwater contaminants from the Site.

Estimated Time for Design and Construction: 3 years
Estimated Time of Operation, interim alternative: 5 years
Estimated Capital Cost: $3,870,000
Estimated Operation and Maintenance Costs (5 years, present worth): $1,820,000
Estimated Total Cost (present worth): $5,690,000

Alternative RA-4: Management of Migration with extraction both at the northern boundary of the Site and to the north-east of the Site; treatment of the collected groundwater; discharge of effluent to the Sudbury River: This alternative extracts highly contaminated source area groundwater by combining the extraction components of the selected Alternative RA-2 with those of Alternative RA-3. The collected groundwater would undergo treatment to remove contaminants as described in the selected Alternative RA-2. Following treatment, the water would be discharged to the Sudbury River. This alternative would include the Site control features described for Alternative RA-1. The objective of this alternative is to prevent the contaminated groundwater from expanding beyond its current boundaries and ultimately into the Sudbury River. This alternative would also extract the most highly contaminated groundwater to prevent increases in contamination to the north and east of the Site. RA-4 would require much more disruption to the community surrounding the Site than the selected alternative, while capturing contaminants over a larger area.

As an interim remedy, this alternative would permit the collection of operational data, while reducing the migration of contaminants throughout the plume.

Estimated Time for Design and Construction: 3 years
Estimated Time of Operation, interim alternative: 5 years
Estimated Capital Cost: $6,050,000
Estimated Operation and Maintenance Costs (5 years, present worth): $3,140,000
Estimated Total Cost (present worth): $9,190,000

Alternative RA-5: Active Plume-Wide Extraction; treatment of the collected groundwater; discharge of effluent to the Sudbury River: This alternative is a comprehensive plume-wide alternative that differs from the others because it involves extraction of contaminated water at many locations throughout the plume. It also includes groundwater treatment as described for the selected Alternative RA-2, followed by discharge of the treated water into the Sudbury River. Alternative RA-5 would also include the site control features described

for Alternative RA-1. This alternative would use numerous extraction wells to minimize the transport of contamination through the aquifer and to minimize the time frame required to complete treatment of the aquifer; and would prevent migration and discharge of contaminated groundwater into the Sudbury River. Uniformly distributed extraction wells would prevent highly contaminated groundwater from migrating to areas of lower concentrations.

As an interim remedy, this alternative would permit the collection of operational data, while reducing the migration of contaminants throughout the plume.

Estimated Time for Design and Construction: 3 years
Estimated Time of Operation, interim alternative: 5 years
Estimated Capital Cost: $6,650,000
Estimated Operation and Maintenance Costs (present worth, 5 years): $3,430,000
Estimated Total Cost (present worth): $10,080,000

IX. SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

Section 121(b)(l) of CERCLA presents several factors that at a minimum EPA is required to consider in its assessment of alternatives. Building upon these specific statutory mandates, the National Contingency Plan articulates nine evaluation criteria to be used in assessing the individual remedial alternatives.

A detailed analysis was performed on the alternatives as final remedies using the nine evaluation criteria in order to select a remedy and can be found in the FS at pages 6-10 through 6-82. The following is a summary of the comparison of each alternative's strength and weakness with respect to the nine evaluation criteria. These criteria and their definitions are:

Threshold Criteria

The two threshold criteria described below must be met in order for the alternatives to be eligible for selection in accordance with the NCP.

1. **Overall protection of human health and the environment** addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls, or institutional controls.

2. **Compliance with Applicable or relevant and appropriate requirements (ARARS)** addresses whether or not a remedy will meet all of the ARARs of other Federal and State environmental laws and/or provide grounds for invoking a waiver.

Primary Balancing Criteria

The following five criteria are utilized to compare and evaluate the elements of one alternative to another that meet the threshold criteria.

3. **Long-term effectiveness and permanence** addresses the criteria that are utilized to assess alternatives for the long-term effectiveness and permanence they afford, along with the degree of certainty that they will prove successful.

4. **Reduction of toxicity, mobility, or volume through treatment** addresses the degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume, including how treatment is used to address the principal threats posed by the site.

5. **Short-term effectiveness** addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until cleanup goals are achieved.

6. **Implementability** addresses the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7. **Cost** includes estimated capital and Operation Maintenance (O&M) costs, as well as present-worth costs.

Modifying Criteria

The modifying criteria are used on the final evaluation of remedial alternatives generally after EPA has received public comment on the RI/FS and Proposed Plan.

8. **State acceptance** addresses the State's position and key concerns related to the preferred alternative and other alternatives, and the State's comments on ARARs or the proposed use of waivers.

9. **Community acceptance** addresses the publics general response to the alternatives described in the Proposed Plan and RI/FS report.

Following the detailed analysis of each individual alternative, a comparative analysis, focusing on the relative performance of each alternative as a final remedy against the nine criteria, was conducted. This comparative analysis can be found in Section VI of the Feasibility Study.

The section below presents the nine criteria and a brief narrative summary of the alternatives as interim remedies and their strengths and weaknesses according to the detailed and comparative analysis.

1. Overall Protection of Human Health and the Environment:

Each of the alternatives, viewed as five-year interim measures, would reduce the overall risk to human health and the environment to varying degrees. Over a five-year period, alternative RA-1 would provide the least protection due to uncontrolled migration of existing contamination and continued contaminated discharges into the Sudbury River. Over a five-year period, alternatives RA-2, RA-4 and RA-5 would limit the migration of highly contaminated groundwater from the Site to areas to the north and east, thereby preventing an increase in current potential risks in the portion of the plume to the north and east of the Site. Alternatives RA-2 through RA-5 would also prevent discharge of contaminated groundwater to the River to some extent. Over a five-year period, alternative RA-5 would provide the most effective removal of contaminants, because wells would be placed at many locations throughout the study area. Alternative RA-3 would be the least effective of the active alternatives (RA-2, RA-3, RA-4, and RA-5) because the large mass of contamination found on-site would have to migrate to the plume management wells to the north and north-east of the Site before collection. Alternative RA-2 would remove a significant amount of contaminants, since it deals directly with the areas where the highest concentrations of groundwater contaminants have been found and will draw contaminants from a large percentage of the known plume area.

Each of alternatives RA-2, RA-4, and RA-5, when viewed as interim remedies, would provide similar information leading to the choice of a final remedy. Alternative RA-3 would provide less information, since it would not be drawing groundwater from the most contaminated area near the vault.

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

When comparing interim remedies, it is appropriate to analyze compliance only with those laws and regulations that are applicable or relevant and appropriate to the limited scope of the interim action. For all groundwater that they would extract and treat, Alternatives RA-2 through RA-5 would meet the same ARARs for the discharge of the treated groundwater into the Sudbury River, the discharge of air, and the disposal of sludges resulting from the treatment process. In addition all location specific ARARs will be met. These ARARs would be met during the interim remedial period.

3. Long-term Effectiveness and Permanence:

Long-term effectiveness and permanence is not relevant to the comparison among interim measures. The long-term effectiveness and permanence of the actions will be considered in a final ROD, based in large part on the data collected during the interim remedial period of 5 years.

4. Reduction of Toxicity, Mobility or Volume through Treatment:

Alternative RA-1 provides no reduction in toxicity, mobility, or volume of the contaminants in the plume except through natural processes. As interim measures, alternatives RA-2 through RA-5 all reduce the toxicity, mobility, and volume of organic contaminants through groundwater extraction and treatment. Alternative RA-2 reduces the toxicity, mobility, and volume of organic compounds less than Alternatives RA-4, and RA-5, because it treats a smaller portion of the entire plume. However, RA-2 is superior to RA-3 with regard to toxicity, mobility, and volume since it attempts to capture contaminants closer to their source.

5. Short-Term Effectiveness:

Alternative RA-1 would pose the least short- term risk of adverse impacts on human health and the environment, because it does not include any disturbance of contaminated areas.

The short-term risks from Alternatives RA-2 through RA-5 consist of the possibility of airborne dust emissions and volatilization of contaminants during construction and operation of the groundwater extraction and treatment systems. Special engineering precautions, however, including air monitoring and contingency planning, would minimize these risks and protect workers and area residents. There is a very small chance that residents could be exposed to collected groundwater through leakage in the collection network which would be extended throughout the neighborhood under RA-3, RA-4, and RA-5. Alternative RA-2, which would be constructed primarily in an area f zoned as industrial, would pose the least potential risk to area residents during construction and operation of the extraction/treatment system. Alternative RA-5 would pose the greatest risk, because of the numerous extraction wells that would be located in residential areas.

6. Implementability:

Alternative RA-1 would be the most easily implemented, since it requires no construction and would require minimal administrative approvals, other

than those relating to institutional controls. The institutional control measures, as well as public education measures are common to all five alternatives under consideration, and therefore provide no basis to differentiate the alternatives in terms of implementability. The various components of Alternatives RA-2 through RA-5 are common elements of remedial projects that could be readily implemented. Each would involve some coordination with local agencies, which might include meeting with Town Boards and Department to apprise them of planning and construction activities. Alternatives RA-3, RA-4, and RA-5 would require the greatest degree of coordination with local agencies, as a result of the larger area that would be affected by these alternatives.

All the active alternatives would cause some levels of interferences with services, utilities, and existing structures. The extraction and piping systems for Alternatives RA-3, RA-4, and RA-5 would be located in residential and mixed use areas and would have a greater impact on residential and commercial activities than would RA-2. RA-2, with its focus primarily in an industrial area, would cause the least such disruption. Construction activities associated with Alternative RA-5 would cause the greatest such disruption because of its many extraction locations.

?. Cost:

The capital, operation and maintenance, and total cost for each alternative for the 5-year interim period is provided as part of the preceding "Description of Alternatives" section.

Construction and operation of the selected alternative will provide data on costs that can be used to assess the costs of the alternatives considered in the final ROD for this operable unit.

8. State Acceptance:

The Commonwealth of Massachusetts has indicated its concurrence with the selected remedy via its concurrence letter (Appendix II).

9. Community Acceptance:

Based on the written and oral comments received during the recent comment period, there is general acceptance of the selected remedy, although some commenters requested a larger scale remedy. Response to community comments are located in Appendix I.

X. THE SELECTED REMEDY

EPA has chosen RA-2 as the selected alternative. RA-2 is an interim remedy whose goals are to manage the migration of contaminants, to treat the highest levels of groundwater contamination in the plume, and to collect operational groundwater cleanup data. Based on the information collected during operation of the interim remedy, EPA will then prepare a final ROD, which will specify the ultimate goals, remedy and the anticipated time frame for remediation. The final ROD will also include the groundwater target cleanup levels or, if the evidence indicates that it is impracticable to achieve all such target cleanup levels, waivers of ARARs.

EPA's selection of this interim remedy is consistent with current EPA guidance for groundwater remediation at Superfund sites, the requirements of CERCLA, and to the extent practicable, the National Contingency Plan. Specifically, evaluation of currently operating groundwater remedies at other Superfund sites has shown that extraction systems are effective in containing plumes, thus preventing further migration of contaminants, and in achieving significant mass removal of contaminants from groundwater. Many factors, including the hydrogeologic characteristics of the aquifer and the physical and chemical properties of the contaminants, may limit the effectiveness of the selected remedy to reach drinking water standards. This will be evaluated during the interim remedy's operational period.

Based on these findings, the EPA Office of Solid Waste and Emergency Response has recommended the following approaches to developing and implementing groundwater response actions at Superfund sites: 1) initiation of an early response action to reduce further migration of contaminants; 2) incorporation of flexibility in the selected alternative to allow for changes in the remedy; and 3) collection of data to better assess the movement of contamination and the effectiveness of the extraction system. EPA has followed these recommendations in developing the selected interim remedy for Operable Unit II.

EPA's selected alternative (RA-2) will allow for remediation of the most highly contaminated areas of the groundwater, immediately reducing potential risks in this area and preventing migration into less contaminated areas. The alternative will also provide some protection to the Sudbury River by limiting discharge of contaminated groundwater to the river north of the Site. (The full impact of groundwater discharge on the river is one of the subjects of Operable Unit III, and is not within the scope of Operable Unit II.) The selected alternative is more protective and would provide more reduction of toxicity, mobility or volume of the contamination than the no- action alternative, RA-1. Finally, because it anticipates that extraction and treatment will take place primarily in an industrial area, the selected alternative will cause the least disruption to residential areas in comparison to alternatives RA-3, RA-4 and RA-5.

In the portion of the study area to the north and east of the Site, institutional controls will provide protection from exposure to contaminants that would not be remediated as part of the interim remedy. Levels of contamination in this area are expected to be reduced gradually over time as the highly contaminated portion of the plume is remediated. Wells at the eastern and southern boundary of the plume will be monitored to assess any further migration of contaminants. The final ROD will address the potential need for groundwater remediation in the plume to the east of the Site.

In summary, the selected alternative will best serve the purposes of an interim remedy by reducing further migration of contaminants, providing flexibility, and

allowing the collection of data to test the effectiveness of the extraction system. At the same time, the selected alternative would achieve the best balance among criteria used by EPA to evaluate the alternatives. The selected alternative is more cost-effective and readily implementable than the other alternatives, has fewer short-term effects, and achieves all ARARs applicable to its limited scope.

A. Cleanup Levels

As an interim step to meeting the remedial response objectives outlined in Section VII., the selected remedy will extract and treat groundwater from the northern border of the Site, including the most highly contaminated portion of the plume. The FS indicates that the time required to attain drinking water standards in groundwater could range from decades to centuries, even using the alternative employing the most extraction wells. Because of the uncertainty as to when and whether active remediation will achieve groundwater-guality ARARs, EPA has selected a five-year interim remedy. During operation of the 5-year interim remedy, EPA will assess the performance of the remedy in achieving progress toward the cleanup objectives. Based on this assessment, EPA will issue a final ROD, identifying the target groundwater cleanup levels that will comply with ARARs and evaluate whether a remedy capable of attaining those cleanup levels could be implemented. Thus, EPA will not identify the target groundwater cleanup goals at this time. This interim remedy, including the groundwater treatment plant, will continue to operate at least until the final ROD has been signed.

B. Description of Remedial Components

EPA's selected interim alternative (RA-2) to remediate contaminated groundwater consists of groundwater extraction wells at the northern border of the Site; treatment of the collected groundwater; and discharge of the treated effluent to the Sudbury River. The alternative may also employ a collection trench at the northern border of the cap now under construction on Megunko Hill, depending on whether further study indicates that such a trench is feasible and necessary. Figure 10-1 shows the approximate location of the proposed extraction wells and/or trenches. It is anticipated currently that the discharge will be made on-site, although the cost estimate for RA-2 includes the installation of a pipe to the river if it is found to be necessary during design. The selected alternative will operate for a period of five years, during which time environmental monitoring will be performed. After this time period, EPA will evaluate the performance of the extraction and treatment systems in a final RI/FS and make a final remedy selection in a subsequent final ROD for this Operable Unit. The system will continue to operate at least until the final ROD has been signed.

The selected remedy will reduce contaminant migration in the direction of groundwater flow (including into the Sudbury River) by cleaning up the most highly contaminated area and sources of the contamination. This selected remedial alternative will not remediate groundwater contamination in the eastern part of the plume in downtown Ashland during the interim remedial period. By extracting groundwater near the northern boundary of the Site, the selected alternative will prevent contaminant concentrations within the eastern portion of the plume from increasing, thereby preventing current potential risks from increasing in this area.

The selected remedy also includes the following elements: 1) Using institutional and access controls to limit exposure to contaminants. Institutional controls

in the form of deed and well permit restrictions which may require cooperation from local and state authorities are examples of institutional controls which could be implemented. The deed restrictions could be used to detail restrictions and safeguards on future excavation activities on the Site. The well permit restrictions could be imposed by the Town of Ashland to restrict the ability of land-owners to install new wells in the area of known groundwater contamination; 2) Further testing in the eastern portion of the plume to help determine the feasibility of cleaning up groundwater in this area in the future; 3) Installing additional deep bedrock wells to more fully define the depths and locations to which contaminants may have migrated; 4) Continuing monitoring of existing residential and monitoring wells and limited surface water testing to track any further progress of the plume; 5) Inspecting the Megunko Road waterline to determine whether any deterioration has been caused by Site contamination; and 6) Pre-design studies to aid in the design of the selected interim remedy.

The construction of the groundwater treatment facility will require approximately one acre of land, a system of collection wells and/or trenches to collect the contaminated groundwater, and a piping network to transport groundwater to the treatment facility. This alternative would require less disruption to the nearby residential community than the other alternatives considered since the collection system would be located mainly on industrially zoned land.

The system will be designed to be flexible in order to accommodate potential changes in operation. This will allow for such operating techniques as pulsed pumping, or extraction well relocation based on operating experience. In addition, the treatment system will be designed so that it may be expanded if a subsequent decision to enlarge the collection system is made.

For the purpose of estimating the cost of the various remedial alternatives the FS analyzed, as a representative technology, a groundwater treatment plant consisting of precipitation, air stripping, and carbon adsorption treatment. EPA, in consultation with the Commonwealth of Massachusetts, will select the actual technology to be used in the interim remedy from among the following technologies: the air stripping technology outlined below, or **ultraviolet-oxidation or biological** treatment units in the place of the air-stripping process as part of a comprehensive treatment system. A predesign cost effectiveness evaluation of the three technologies will be conducted in order to select the two technologies for pilot testing. The final selection of a groundwater treatment technology will be based on data collected during the predesign pilot studies.

Figure 10-2 illustrates how the air stripping treatment process could remove contaminants from the aquifer and treat the collected water to levels that are safe for discharge. Groundwater extracted from the aquifer would undergo precipitation, a chemical treatment method that converts dissolved metals to an insoluble form and allows **suspended solids** to accumulate and settle. After precipitation, water would pass through a ' sand or cartridge filter to remove suspended solids and would then enter an air stripper unit. **Air stripping** is an aeration process that reduces concentrations of VOCs and some SVOCs by changing contaminants in the groundwater into a gaseous form. A final treatment process, carbon adsorption, would remove any remaining organics in the water to levels acceptable by federal and state requirements for discharge to the Sudbury River. Carbon adsorption removes organic compounds by filtering and adsorbing dissolved and suspended contaminants in the treated groundwater. Air emissions would also be controlled through the use of carbon adsorption.

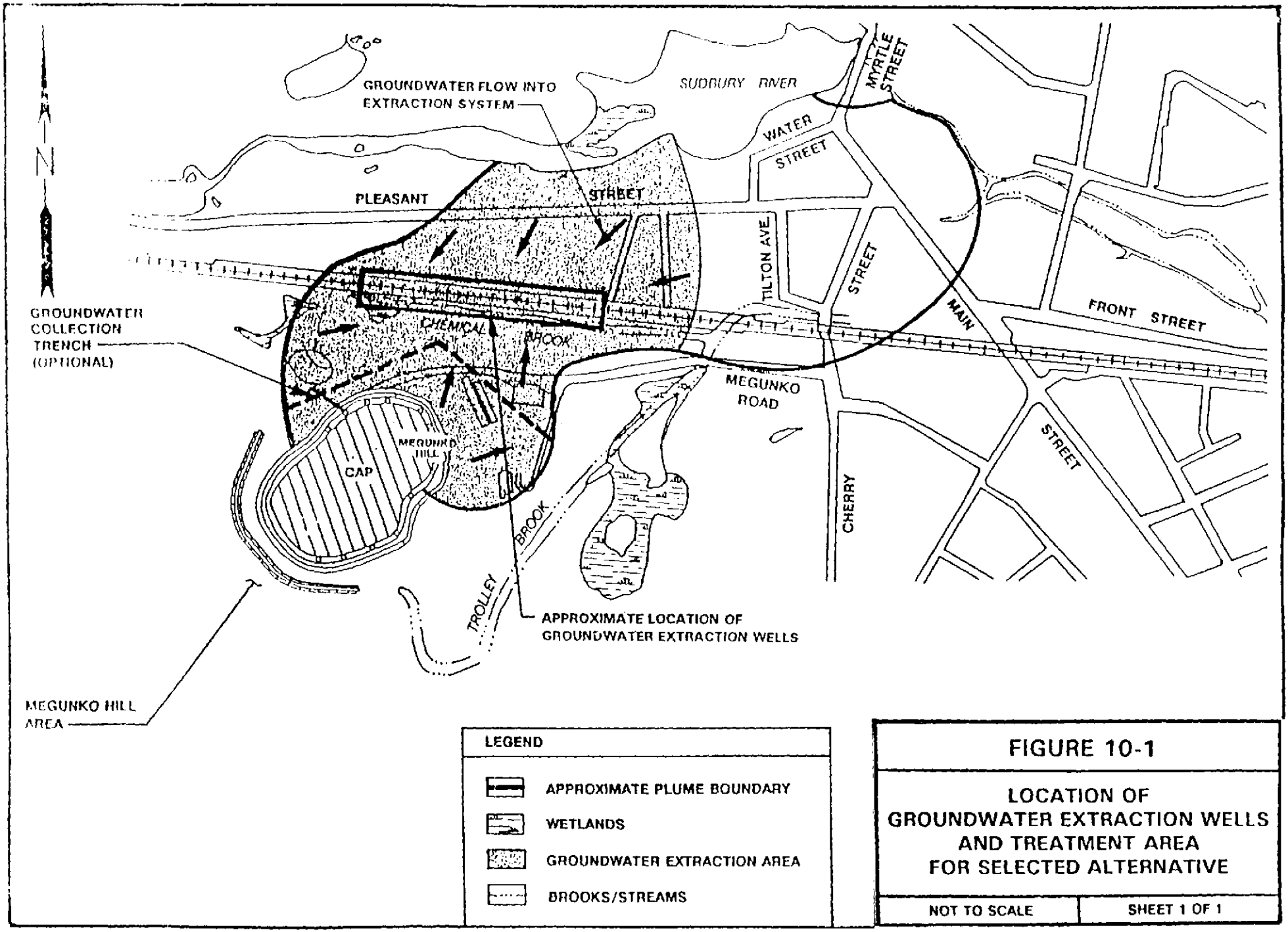


FIGURE 10-1

LOCATION OF GROUNDWATER EXTRACTION WELLS AND TREATMENT AREA FOR SELECTED ALTERNATIVE

NOT TO SCALE | SHEET 1 OF 1

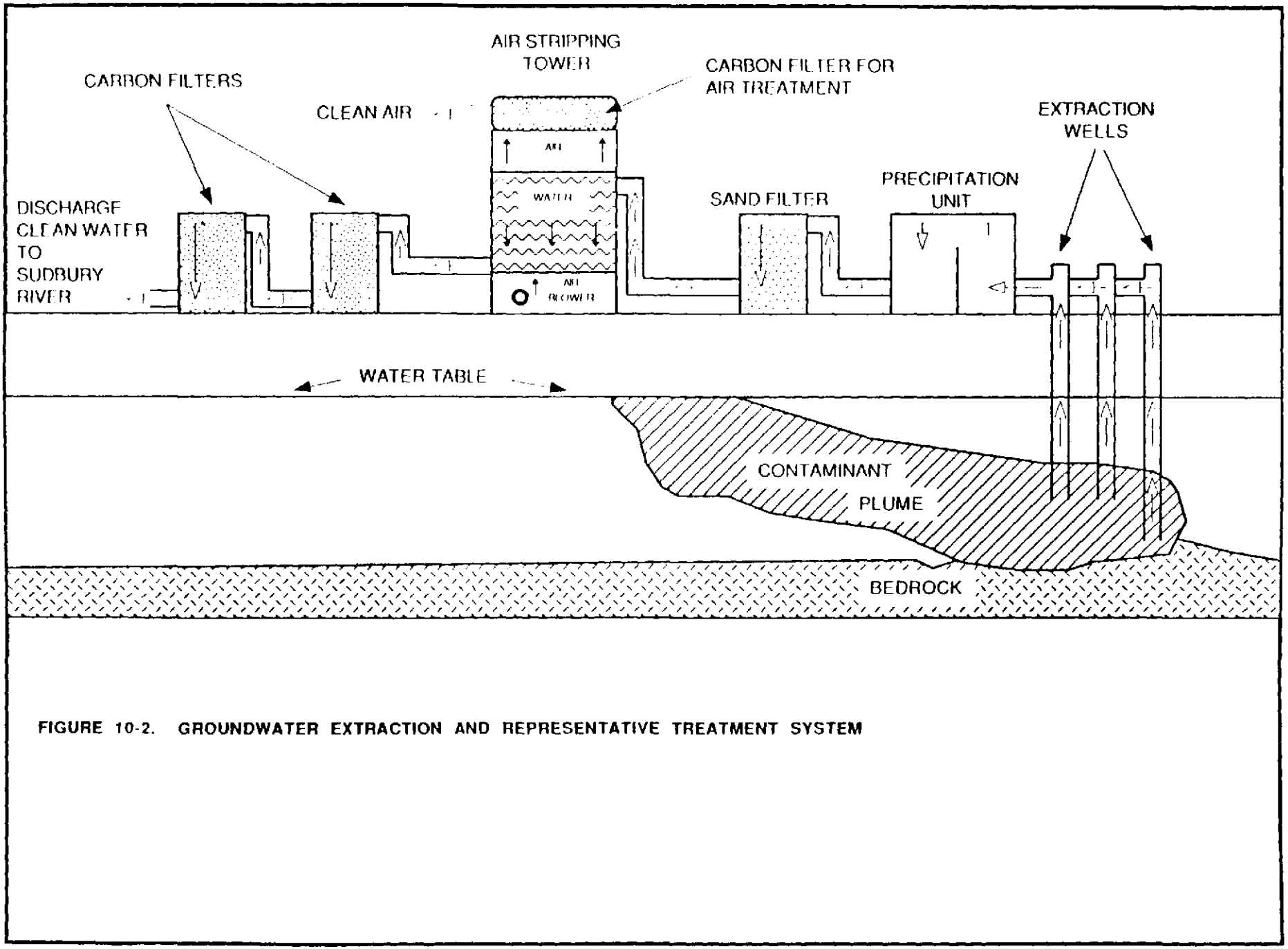


FIGURE 10-2. GROUNDWATER EXTRACTION AND REPRESENTATIVE TREATMENT SYSTEM

Estimated Time for Design and Construction: 3 years
Estimated Time of Operation: 5 years
Estimated Capital Cost: $5,260,000
Estimated Operation and Maintenance Cost (5 years, present worth): $2,180,000
Estimated Total Cost (present worth): $7,440,000

To the extent required by law, EPA will review the Site at least once every five years after the initiation of remedial action at the site as long as any hazardous substances, pollutants or contaminants remain at the Site to assure that the remedial action continues to protect human health and the environment. EPA will also evaluate risk posed by the Site at the completion of the remedial action (i.e., before the Site is proposed for deletion from the NPL).

XI. STATUTORY DETERMINATIONS

The remedial action selected for implementation at the Nyanza Chemical Waste Dump Site is consistent with CERCLA and, to the extent practicable, the NCP. The selected remedy is protective of human health and the environment during the interim operational period, attains ARARs which apply to this limited scope action, and is cost effective. The selected remedy, which is not designed or expected to be final, also satisfies the statutory preference for treatment which permanently and significantly reduces the mobility, toxicity or volume of hazardous substances as a principal element. The selected remedy represents the best balance of tradeoffs among alternatives with respect to the pertinent criteria in light of the limited scope of this action. Additionally, the selected remedy utilizes alternate treatment technologies or resource recovery technologies to the maximum extent practicable.

A. The Selected Remedy is Protective of Human Health and the Environment

The selected remedy, viewed as a five-year interim measure, would reduce the overall risk to human health and the environment. Over a five-year period, the remedy would limit the migration of highly contaminated groundwater from the Site to areas to the north and east, thereby preventing an increase in current potential risks in the portion of the plume to the north and east of the Site. It would also prevent discharge of contaminated groundwater to the Sudbury River to some extent. The selected remedy would remove a significant amount of contaminants, since it deals directly with the areas where the highest concentrations of groundwater contaminants have been found and will draw contaminants from a large percentage of the known plume area.

Finally, implementation of the selected remedy will not pose unacceptable short-term risks or cross- media impacts because controls will be placed on possible emissions from the treatment facility to be constructed, most of the remedy will be constructed in a non-residential area, and construction controls will limit any fugitive emissions.

B. The Selected Remedy Attains ARARs

This remedy will attain all applicable or relevant and appropriate federal and state requirements that apply to this limited scope interim action. Generally, ARARs for the selected interim remedial action are a subset of those found in Tables 3-1, 3-2, and 3-4 of the Feasibility Study. Because the Feasibility Study considered permanent remedial alternatives and the remedy selected is a interim remedy, some of the ARARs outlined in the FS do not apply to this limited interim action. The ARARs that do apply to this interim action are listed in Tables 11-1, 11-2, and 11-3 and are discussed below.

When considering interim remedies, it is appropriate to analyze compliance only with those laws and regulations that are applicable or relevant and appropriate to the limited scope of the interim action. For instance, for groundwater that is extracted and treated, the selected remedy would meet ARARs for the discharge of the treated groundwater into the Sudbury River, the discharge of air, and the disposal of sludges resulting from the treatment process.

TABLE 11-1
CHEMICAL-SPECIFIC ARARS
NYANZA CHEMICAL SITE
ASHLAND, MASSACHUSETTS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS
Surface Water			
State Regulatory Requirements	DEP - Surface Water Quality Standards (314 CMR 4.00)	Applicable	DEP Surface Water Quality Standards are given for dissolved oxygen, temperature increase, ph and total coliform. There is a narrative requirement for toxicants that incorporates Federal AWQC. Through the incorporation of the Federal AWQC, numerical criteria exist for several of the Nyanza Site contaminants of concern. These criteria are adopted as state standards and are subsequently used in determining effluent discharge limits (see Table 11-4)
Federal Criteria, Advisories, and Guidance	Clean Water Act (CWA) - Ambient Water Quality Criteria (AWQC) (Section 304)	Relevant and Appropriate	Federal AWQC are criteria for the protection of health and aquatic organisms which have been developed for 95 carcinogenic and noncarcinogenic compounds. AWQC can be used to characterize human health risks associated with either ingestion of water and/or consumption of aquatic organisms.
Air			
Federal Regulatory Requirements	CAA - National Ambient Air Quality Standards (NAAQS) - (40 CFR 50)	Relevant and Appropriate	These standards were primarily developed to regulate stack and automobile emissions. Standards for particulate matter will be used when assessing excavation and treatment emission controls. Standards are considered potentially relevant and appropriate as they were originally developed to control stack and auto emissions.
State Regulatory Requirements	DEP - Air Quality Air Pollution (310 CMR 6.00 - 8.00)	Applicable	Standards will be used for controlling excavation practices and emissions from groundwater treatment systems.
	DEP - Air Pollution Control (310 CMR 7.00)	Applicable	These regulations prevent air pollution from occurring in areas where such conditions do not currently exist and facilitate the abatement of conditions of air pollution where and when they do occur. All excavation, construction, and treatment activities will utilize Best Available Control Technology in order to prevent contaminant transfer between other media and air.
Massachusetts Criteria, Advisories, and Guidance	Massachusetts Guidance on Allowable Ambient Air Levels (AALs) - Threshold Effects Exposure Limit (TEL)	To be Considered	AALs must be considered for any new discharges from air pollution sources. TELs and AALs will be used to assess the baseline subchronic and chronic human health risks and to evaluate the public health impact of remedial alternatives.

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS
Wetland/Floodplains			
Federal Regulatory Requirement	Clean Water Act (CWA)	Applicable	Under this requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative that has less effect is available.
	Wetlands Executive Order (EO 11990)	To be Considered	Under this regulation, Federal agencies are required to minimize the destruction, loss or degradation of wetlands, and preserve and enhance natural and beneficial values of wetlands. Activities that involve construction must include all practicable means of minimizing harm to wetlands. Wetlands protection considerations must be incorporated into the planning and decision making about remedial alternatives.
	40 CFR Part 6, Appendix A	Applicable	Contains EPA's policy on implementing Executive Order (EO 11990)
State Regulatory Requirements	DEP - Wetlands Protection (310 CMR 10.00)	Applicable	These regulations regulate dredging filling, altering, or polluting inland wetlands. All work in or within 100 feet of a wetland will be evaluated for its ability to attain regulatory performance standards, including mitigation of impacted wetlands. The selected remedy is not anticipated to involve activities within 100 feet of a wetland.
Air			
	National Ambient Air Quality Standards (40 CFR Part 50)	Relevant and Appropriate	Federal agencies are required to determine if the site is located within a nonattainment area for ozone. Remediation of sites within nonattainment areas must consider the ozone attainment status in designing remediation systems.

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS

Table 11-1 (Continued)
Page 2

Air

Federal Occupational Regulations	OSHA Threshold Limit Values	Applicable	Standards for controlling air quality in work place environments. TLVs could be used for assessing inhalation risks for excavation exposures.

TABLE 11 2
POTENTIAL LOCATION-SPECIFIC ARARS
NYANZA CHEMICAL SITE
ASHLAND, MASSACHUSETTS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS
Wetland/Floodplains			
Federal Regulatory Requirement	Clean Water Act (CWA)	Applicable	Under this requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative that has less effect is available.
	Wetlands Executive Order (EO 11990)	To be Considered	Under this regulation, Federal agencies are required to minimize the destruction, loss or degradation of wetlands, and preserve and enhance natural and beneficial values of wetlands. Activities that involve contruction must include all practicable means of minimizing harm to wetlands. Wetlands protection considerations must be incorporated into the planning and decision making about remedial alternatives.
	40 CFR Part 6, Appendix A	Applicable	Contains EPA's policy on implementing Executive Order (EO 11990)
State Regulatory Requirements	DEP - Wetlands Protection (310 CMR 10.00)	Applicable	These regulations regulate dredging filling, altering, or polluting inland wetlands. All work in or within 100 feet of a wetland will be evaluated for its ability to attain regulatory performance standards, including mitigation of impacted wetlands. The selected remedy is not anticipated to involve activities within 100 feet of a wetland.
Air			
	National Ambient Air Quality Standards (40 CFR Part 50)	Relevant and Appropriate	Federal agencies are required to determin if the site is located within a nonattainment area for ozone. Remediation of sites within nonattainment areas must consider the ozone attainment status in designing remediation systems.

TABLE 3
POTENTIAL ACTION-SPECIFIC ARARS
NYANZA CHEMICAL SITE
ASHLAND, MASSACHUSETTS

ACTION(S)	ARARS	STATUS	REQUIREMENT SYNOPSIS
All	OSHA - General Industry Standards (29 CFR 1910)	Applicable	These regulations specify the 8-hr. time-weighted average concentration for various organic compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 9910.120.
All	OSHA - Safety and Health Standards (29 CFR 1926)	Applicable	This regulation specified the type of safety equipment and procedures to be followed during site remediation.
All	OSHA - Record keeping, Reporting, and Related Regulations (29 CFR 1904)	Applicable	This regulation outlines the record keeping and reporting requirements for an employer under OSHA.
All	Hazardous Substance Right-to-know (105 CMR 67) (454 CMR 21) (310 CMR 33)	Applicable	These regulations establish requirements to protect health and safety of employees and community residents through the communication of information regarding toxic and hazardous substance.
All	DEP - Hazardous Waste Regulations, (310 CMR 30.00)	Relevant and Appropriate	This regulation provides a comprehensive program for the handling, storage, generation, transportation, treatment, use, re-use, recycling and recordkeeping for hazardous waste.
All	DEP - Wetlands Protection (310 CMR 10.00)	Relevant and Appropriate	This regulation outlines the requirements necessary to work within 100 feet of a coastal or inland wetland.

ACTION(S)	ARARS	STATUS	REQUIREMENT SYNOPSIS

Table 11-3 (Continued)
Page 2

Onsite Water Treatment and Discharge	National Pollution Discharge Elimination System (NPDES) (40 CFR 122 and 125)	Applicable	Regulates the discharge of water into public surface waters. Among other things, major requirements are: • 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 will be determined on a case-by-case basis based in part on Pre-Design Pilot Testing. • A Best Management Practices Program should be developed and adhered to. • Applicable Federal 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. • The discharge must conform to applicable water quality requirements when the discharge affects a state other than certifying state. • The discharge must be consistent with the requirements of a Water Quality Management Plan approved by EPA. • Discharge limitations must be established for all toxic pollutants that are or may be discharged at levels greater than that which can be achieved by technology-based standards. • Discharge must be monitored to assure compliance. Discharger will monitor: the mass of each pollutant, the volume of effluent, and the frequency of discharge and other measurements as appropriate. • Approved test methods for waste constituents to be monitored must be followed. Detailed requirements for analytical procedures and quality controls are provided.

Table 11-3 (Continued)
Page 3

ACTION(S)	ARARS	STATUS	REQUIREMENT SYNOPSIS
Onsite Water Treatment and Discharge (Cont'd)			• Permit application information must be submitted, including a description of activities, listing of environmental permits, etc. Onsite discharges to surface waters are exempt from procedural NPDES permit requirements. (Section 121 or SARA exempts onsite CERCLA activities from obtaining permits. However, the substantive requirements of the permit must be met). Offsite discharges would be required to apply for and obtain an NPDES permit. • Monitor and report results as required by permit (minimum of at least annually). • Comply with additional permit conditions such as: duty to mitigate any adverse effects of any discharge; and proper operation and maintenance of treatment systems.
	Toxic Pollutant Effluent Standards (40 CFR 129)	Relevant and Appropriate	NPDES permitting requirements for the following pollutants: aldrin/dieldrin, DDT, endrin, toxaphene, benzidine, and PCBs.
	MDWPC - Massachusetts Surface Water Discharge Permit Program (314 CMR 3.00)	Applicable	Stipulates the requirements for obtaining NPDES in State of Massachusetts.
	DEP - Water Resources Management Program - Withdrawal Permit Requirements (310 CMR 36.00)	Applicable	These regulations require registration of groundwater or surface water withdrawals greater than 100,000 gallons per day. Design activities will make final determination regarding the extraction flow expected.
	DEP- Surface Water Quality Standards (314 CMR 4.00)	Applicable	These regulations designate the most sensitive uses for which surface waters shall be enhanced, maintained, and protected; and prescribe the minimum water quality criteria required to sustain the designated uses. Federal AWQC are incorporated in determining effluent discharge limits under the NPDES Program. Where recommended limits are not available, site-specific limits shall be developed.
	MDWPC - Supplemental Requirements for Hazardous Waste Management Facilities (314 CMR 8.00)	Relevant and Appropriate	Outlines additional requirements for water treatment unit, surface impoundment and POTW which treats hazardous waste.

Table 11-3 (Continued)
Page 4

ACTION(S)	ARARS	STATUS	REQUIREMENT SYNOPSIS
Onsite Water Treatment and Discharge (cont'd)	DEP -Air Quality, Air Pollution (310 CMR 6.00 - 7.00)	Applicable	These standards apply to alternatives involving construction and operation of groundwater treatment systems.
	Proposed Standards for Control of Emissions of Volatile Organics - 52 FR 3748 (February 5, 1987)	To be Considered	Prescribes proposed standards for VOC emissions from unites such as air strippers.
	Threshold Limit Values (TLVs)	Applicable	These standards were issued as consensus standards for controlling air quality in work place environments. TLVs could be used for assessing site inhalation risks for excavation activities.
	CWA - Ambient Water Quality Criteria (AWQC) (Section 304)	Relevant and Appropriate	Federal AWQC are criteria for protection of human health which have been developed for 95 Carcinogenic and noncarcinogenic compounds.
	CAA - NAAQS for Total Suspended Particulates (40 CFR 50)	Relevant and Appropriate	This regulation specifies maximum primary and secondary 24-hr. concentrations for particulate matter. fugitive dust emissions from site excavation activities must be maintained below 150 ug/m^3, 24-hour arithmetic average for particles having a mean diameter of 10 microns or less.
	DEP - Air Quality (310 CMR 6.00)	Applicable	Regulations specify maximum primary and secondary 24-hour concentrations for particulate matter.
Excavation	Threshold Limit Values (TLVs)	Applicable	These standards were issued as consensus standards for controlling air quality in work place environments. TLVs could be used for assessing site inhalation risks for excavation activities related to the remediation.

1. Chemical-Specific ARARs

Chemical-specific ARARs are identified in Table 11-1. In the following discussion, these ARARs are described by affected media requiring emediation and media that may receive discharges as a result of remedial action (i.e., air).

Surface Water: Massachusetts has incorporated Federal Ambient Water Quality Criteria (Clean Water Act - Section 304) as state standards (314 CMR 4.00) for several of the contaminants of concern (see Table 11-1). These state standards are applicable as chemical-specific requirements in determining effluent discharge limits, although the discharge will be occurring from an on-site treatment facility, most likely to an on-site receiving water. The criteria will be met by setting effluent discharge limits, designing and constructing a treatment plant to meet those levels, and by monitoring the effluent and receiving waters to assure compliance with the criteria.

Air: Federal Primary and Secondary National Ambient Air Quality Standards (NAAQS) do not exist for volatile emissions of the compounds present at the Nyanza Site and downgradient area. Thus, there is no NAAQS applicable or relevant and appropriate to volatile emissions. Such emissions could potentially emanate from the treatment facility, especially if the air stripping technology is selected following pilot studies. Federal Air Quality Standards for particulate matter do exist and will be used in assessing excavation and treatment emission controls. These standards are relevant and appropriate, rather than applicable, since they were originally developed to control stack and automobile emissions. Threshold Limit Values (TLVs) established by OSHA regulations provide an extensive list of control levels which are applicable to on- site remediation Activities such as construction of the extraction wells and collection network. Massachusetts Air Pollution Control Regulations (310 CMR Section 6.00-8.00) are applicable to the evaluation of air emissions associated with remedial actions at the Site (e.g., groundwater treatment systems). Also, Massachusetts Guidance on Acceptable Ambient Air Levels (AALs) and Threshold Effects Exposure Limits (TELs) will be considered rather than being deemed relevant and appropriate since they are not promulgated criteria.

Air related ARARs will be met through the use of engineering controls and monitoring during design and construction of the remedy, and by the possible utilization of emissions controls during operation of the treatment facility.

2. Location-Specific ARARs

Potential location- specific ARARs for the Nyanza Site and its environs are identified in Table 11-2.

Wetlands/Floodplains; Several Federal and State Laws and Regulations regulate activities in wetlands and floodplains. Under Federal Law, the Clean Water Act (Section 404) regulates activity in the vicinity of wetlands. The CWA requires that the effects on wetlands be evaluated and no activity that adversely affects a wetland be permitted if a particular alternative having less effect is available. This requirement is applicable and will be met by avoidance of activities in the vicinity of wetlands. EPA's regulations contained in 40 CFR Part 6, Appendix A describes EPA's policy on implementing Executive Order 11990 (Wetlands Protection). The procedures substantiatively require that EPA conduct its activities to avoid to the extent possible, the long- and short-term adverse impacts associated with the destruction of or modification of wetlands. The procedures also require EPA to avoid direct or indirect support of new construction in wetlands wherever there are practicable alternatives and to minimize potential harm to wetlands when there are no practicable alternatives.

The selected alternative is not likely to have any significant impact on wetlands. Although there are wetlands located on the Site, remedial activities will not be carried out in the wetlands. In addition, the remedial activities in the selected remedy will not take place in a floodplain, and thus the requirements relating to floodplains are not applicable.

The Massachusetts DEP Wetlands Protection Laws (310 CMR 10.00) are applicable to all remedial alternatives involving work in or within 100 feet of a wetland. Specific requirements and restrictions of these ARARs are presented in Table 11-2. It is not anticipated at this time that activities within 100 feet of a wetland will be required. If during the design phase it appears that the remedial alternative will affect wetlands, the requirements described in Table 11-2 will be complied with.

3. Action-Specific ARARs

Action specific ARARs for the selected remedy are presented in Table 11-3. Major requirements that must be attained are discussed in the following brief descriptions.

Water Regulations: Several regulations promulgated under the Clean Water Act (CWA) are applicable to remedial activities that involve groundwater treatment, and discharges to surface water. Although on-site CERCLA actions do not require permits, the substantive NPDES permit requirements for point-source discharges are applicable. These regulations include, but are not limited to, requirements for compliance with water quality standards, a discharge monitoring system, records maintenance, development of and adherence to an NPDES Best Management Practice Program, and construction and operation of a treatment system which meets the technological requirements of the CWA. Toxic Pollutant Effluent Standards (40 C.F.R. Section 129), special requirements under NPDES for several pollutants including benzidine, are relevant and appropriate because the on-site discharge is subject only to the substantiative requirements of the permitting program. Table 11-4 details the expected influent concentrations and calculated discharge standards to meet the water quality criteria in the Massachusetts Surface Water Quality Standards based on the FS assumptions of the discharge location and dilution rates. Case- by case technologically based discharge limitations will be established during design based in part on Pre-Design studies of the treatment systems described in Section X.

Substantive requirements of the Massachusetts Surface Water Discharge Permit Program will be applicable to on-site surface discharges. Numerical standards that Massachusetts has adopted (under 314 CMR 4.00) from the Federal Aquatic Water Quality Criteria for several contaminants of concern will be applicable in determining effluent discharge limits to the receiving water.

Massachusetts also has a Withdrawal Permit requirement for registration of groundwater or surface water withdrawals greater than 100,000 gallons per day (Massachusetts Water Resources Management Program). The current estimated withdrawal of 70,000 gallons per day for the selected remedy will not trigger the substantiative requirements of this program, but this estimate is subject to change pending pre-design work. If the withdrawal rate of the selected remedy exceeds 100,000 gallons per day, 310 CMR 36.00 nay be applicable. A groundwater hydraulic analysis would be required which includes the following components: the identification of all surface water resources within a 1000 ft. radius; and a prediction of the drawdown impact of the extraction system on all identified users and resources.

Table 11-4
INFLUENT CONCENTRATIONS AND EFFLUENT STANDARDS TO MEET WATER QUALITY CRITERIA

COMPOUND	INFLUENT CONCENTRATION[2] (mg/L)	REFERENCE STANDARD[3]	REFERENCE[3]	CALCULATED DISCHARGE STANDARD[4] (mg/L)	DETECTION LIMIT (mg/L)
ORGANICS					
ACETONE	0.052	0.7	C-AAF	365.12	0.01
ANILINE	1.9224	0.006	D-AAF	3.130	0.01
BENZENE	0.0211	0.0012	A-AAF	0.626	0.005
BENZIDINE	0.0589	1.2×10^{-7}	A-AAF	6×10^{-5}[7]	0.05
CHLOROBENZENE	3.1324	0.1	C-AAF	52.16	0.005
1,2-DICHLOROBENZENE	4.5562	0.6	B-AAF	312.96	0.01
1,4-DICHLOROBENZENE	1.2741	0.005	B-AAF	2.608	0.01
1,2-DICHLOROETHYLENE (cis)	0.1254	0.07	B-AAF	36.512	0.005
3,3-DIMETHYLBENZIDINE	0.0624	3.8×10^{-7}	D-AAF	0.00128[7]	0.05
ETHYLBENZENE	0.03	0.7	B-AAF	365.12	0.005
NAPHTHALENE	0.0195	0.14	D-AAF	73.024	0.01
NITROBENZENE	4.4318	0.017	A-AAF	8.867	0.01
n-NITROSO-di-n-propylamine	0.0021	5×10^{-7}	A-AAF	0.00261[7]	0.01
PENTACHLOROPHENOL	0.0255	0.001	A-AAF	0.522	0.05
PHENOL	0.0531	0.021	B-AAF	10.954	0.01
TETRACHLOROETHENE	0	0.005	B-AAF	2.608	0.005
TRICHLOROETHENE	2.7496	0.005	B-AAF	2.608	0.005
1,2,4-TRICHLOROBENZENE	0.1063	0.009	B-AAF	4.694	0.01
INORGANICS					
ALUMINUM	3.2587	0.05	C-AAF	26.08	0.2
ANTIMONY	0.0168	0.005	B-AAF	2.608	0.06
ARSENIC	0.0038	1.8×10^{-5}	A-AAF	0.00939[7]	0.01
BARIUM	0.0398	1	B-AAF	521.60	0.2
CADMIUM	0.0026	0.00044	A-7Q10	0.00638	0.005
CALCIUM	301.54	--	(5)	(5)	5.0

Table 11-4 (Cont'd)
INFLUENT CONCENTRATIONS AND EFFLUENT STANDARDS TO MEET WATER QUALITY STANDARDS

COMPOUND	INFLUENT CONCENTRATION[1] (mg/l)	REFERENCE STANDARD[2]	REFERENCE[2]	CALCULATED DISCHARGE STANDARD[3] (mg/l)	DETECTION LIMIT (mg/l)
INORGANICS (continued)					
CHROMIUM (TOTAL)	0.0069	0.1	B - AAF	52.16	0.01
COPPER	0.004	0.00423	A - 7Q10	0.06134	0.025
IRON	137.40	0.3	B* AAF	156.48	0.1
LEAD	0.0018	0.000069	A - 7Q10	0.01001	0.003
MAGNESIUM	76.267		(5)	(5)	5.0
MANGANESE	18.888	0.05	B* AAF	26.08	0.015
MERCURY	0.0174	1.2×10^{-5}	A - 7Q10	0.00017[4]	0.0002
SELENIUM	0.005	0.005	A - 7Q10	0.0725	0.005
THALLIUM	0.002	0.001	B - AAF	0.5216	0.01
ZINC	0.2424	0.038	A - 7Q10	0.5510	0.02

(1) Influent concentrations represent arithmetic averages of 1990 groundwater sampling results of wells in the plume area.

(2) Reference standards were selected based on the following priority:
A) State/Federal Ambient Water Quality Criteria (AWQC). Hardness based criteria are presented at 30 mg/l for cadmium, copper, and zinc.
B) Federal or State Maximum Contaminant Levels (MCL), if available,
B*)Federal or State Secondary MCL,
C) Massachusetts Office of Research and Standards drinking water guidelines (ORSGL), secondary State/Federal MCLs,
D) Health based criteria based on a 1×10^{-6} risk.

If both an AWQC and a MCL have been established for a compound, the lowest value was used as the reference standard.

(3) Discharge standards to meet water quality criteria contained in Massachusetts Water Quality Standards were calculated on the basis of reference standards, allowing for the 7Q10 (1.5 cfs) for the Sudbury River in the vicinity of the proposed effluent outfall for aquatic criteria and the Average Annual flow (58 cfs) for the human health. Instantaneous and complete mixing of the river and effluent was assumed at the point of discharge. The extraction flow was 50 gpm.

(4) The calculated discharge standard is less than the contract required detection limit (CRDL) of the Contract Laboratory Program. For treatment component costing purposes, the CRDL was used to calculate the effluent requirements.

(5) Compound has no effluent standard and therefore is not treated during remediation.

Clean Air Regulations: Relevant and appropriate requirements for activities that involve excavation (including well installation, collection system installation, and treatment plant construction) and air emissions from operating treatment facilities include the National Air Quality Standards for Total Suspended Particulates under the Clean Air Act (CAA). The specific standards are presented in Table 11-3. If a remedial alternative involves air stripping or other air emission from a stationary source, the Massachusetts Air Pollution Control regulations are also applicable. The specific requirements are presented in Table 11-3.

Proposed Standards for Control of Emissions of Volatile Organics - 52 FR 3748 (February 5, 1987) prescribes proposed standards for the emissions of volatile organics from units such as air strippers. Since these standards are proposed, this regulation is neither applicable nor relevant and appropriate, but is to be considered if the air stripper eventually is selected as the appropriate technology after pilot testing. Air emissions from a potential air stripper are to be controlled in accordance with OSWER directive 9355.0-28, June 15, 1989. This directive calls for the addition of controls should certain VOC emission rates be exceeded. Since VOC emissions contribute to ozone production and the Site is located in an ozone non-attainment area, the Region has determined it is necessary to Control VOC emissions from the air stripping unit (if implemented) regardless of the VOC emission rate, in accordance with Regional policy. Treatment of the air stream by carbon adsorption will prevent both exposure through inhalation and will prevent the production of ozone resulting from emissions of additional VOCs to the air.

Hazardous Waste Regulations: The Massachusetts Division of Water Pollution Control containing supplemental requirements for Hazardous Waste Management facilities are relevant and appropriate for the selected remedy, 314 CMR 8.00. The treatment facility planned is a "wastewater treatment unit" as defined in 314 CMR 8.02. The facility shall comply with:

a) the management standards of 310 CMR 30.500, including: general waste analysis; security; general inspection; personnel training; contingency plan; emergency procedures, preparedness and prevention; recordkeeping and reporting; general requirements for ignitable, reactive, or incompatible wastes; closure; and, where applicable, post-closure.

b) the technical standards of 310 CMR 30.600, including general requirements for all facilities.

The FS identified RCRA regulations set out in 40 CFR Part 264 as an ARAR applicable to the selected remedial alternative. However, after further consideration, EPA has determined that Part 264 is not an ARAR. This is because 40 CFR Part 264.1(g)(6) provides that the requirements of Part 264 not apply to the "Owner or operator of... a wastewater treatment unit as defined in Part 260.10..." The treatment facility planned for this remedial action is a "wastewater treatment unit" as defined in Part 260.10.

Although RCRA subtitle C Land Disposal Restrictions (LDRs) were identified on the FS as an ARAR applicable to the disposal of treatment residuals, because there will be no disposal of RCRA waste occurring on-site, RCRA disposal requirements are not an ARAR. ARARs address material that is left on-site. Material that is shipped off-site is subject to RCRA disposal requirements, but those requirements are not ARARs. If the residuals from the treatment unit are determined to be a RCRA waste, off-site disposal of the residual will be in compliance with LDR requirements.

Massachusetts has relevant and appropriate hazardous waste regulations at 314 CMR 30.00, providing a comprehensive program for the handling, storage, generation, transportation, treatment, use, re-use, and recycling of hazardous waste and record keeping requirements for the mentioned activities.

Other Action-Specific Regulations: Occupational Safety and Health Act (OSHA): Federal OSHA requirements that regulate worker safety and employee records must be followed during all site work. These regulations include safety and health standards for Federal service contracts and record keeping, reporting and related regulations. Since these regulations govern general working conditions within industry and provide minimum protection standards for workers involved in remedial actions, these regulations are applicable.

The FS identified Department of Transportation (DOT) rules for Transportation of Hazardous Materials and Standards Applicable to the Transporters of Hazardous Waste-RCRA section 3003, 40 CFR Sections 262 and : 63, 40 CFR 170 and 179 as ARARs applicable to the transportation of hazardous materials off-site. As explained above in connection with RCRA LDR requirements, because these requirements do not address the handling of hazardous waste on-site, they are not ARARs. Of course, these requirements will be met when waste is transported off-site.

Massachusetts has Hazardous Substance "Right to Know" regulations establishing requirements to protect health and safety of employees and community residents through the communication of information regarding toxic and hazardous substances. These regulations are applicable to on-site workers involved in the remedial action.

C. The Selected Remedial Action is Cost-Effective

In the Agency's judgment, the selected remedy is cost effective, i.e., the remedy affords overall effectiveness proportional to its costs. In selecting this remedy, once EPA identified alternatives that are protective of human health and the environment and that attain, or, as appropriate, waive such ARARs as are relevant to this interim action, EPA evaluated the overall effectiveness of each alternative by assessing the relevant two criteria—reduction in toxicity, mobility, and volume through treatment; and short term effectiveness, in combination. Long term effectiveness and permanence is not relevant to this interim remedy and is therefore not being considered. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs. The costs of this remedial alternative are:

Estimated Capital Cost: $5,260,000;
Estimated Operation and Maintenance Cost (5 years, present worth): $2,180,000
Estimated Total Cost (present worth): $7,440,000

D. The Selected Remedy Utilizes Permanent Solutions and Alternative Treatment or Resource Recovery Technologies to the Maximum Extent Practicable

Once the Agency identified those alternatives that attain or, as appropriate, waive ARARs and that are protective of human health and the environment, EPA identified which alternative utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. This determination was made by deciding which one of the identified alternatives provides the best balance of trade-offs among alternatives in terms of: 1) reduction of toxicity, mobility or volume through treatment; 2) short-term effectiveness; 3) implementability; and 4) cost to the extent that these factors are relevant to an interim remedy. Long-term effectiveness and permanence was not considered due to the interim nature of the selected remedy. The balancing test emphasized the reduction of toxicity, mobility and volume through treatment and considered the preference for treatment as a principal element, the bias against off-site land disposal of untreated waste, and community and state acceptance.

The selected remedy provides the best balance of trade-offs among the alternatives given the limited scope of the interim action selected. Consideration of long-term effectiveness does not apply due to the short-term nature of the selected remedy. The selected remedy will achieve reduction of toxicity, mobility, or volume through treatment of the most highly contaminated groundwater in a treatment facility, thereby reducing the migration of contaminants. The selected remedy is highly implementable since it is to be constructed in a limited area that is primarily industrial in nature and will therefore require a minimum amount of coordination with other government agencies and landowners. Finally the selected remedy will achieve the goals of the interim action, that is reducing migration of contaminants and gathering of further data for use in selecting the final remedy, while costing the least of the active options considered as interim options.

E. The selected Remedy Satisfies the Preference for Treatment Which Permanently and Significantly reduces the toxicity, Mobility or Volume of the Hazardous Substances as a Principal Element

The principal element of the selected remedy is the extraction and treatment of groundwater at the northern boundary of the Site and its subsequent discharge to the Sudbury River. This element addresses the primary exposure pathway at the Site for this Operable Unit; contamination of groundwater in both the overburden and bedrock aquifers. The selected remedy satisfies the statutory preference for reduction in the toxicity, mobility or volume to the extent possible in light of its limited scope by extracting and treating contaminated groundwater at a location where it is most contaminated and preventing its further migration to downgradient areas. This interim Record of Decision will be followed by a final ROD which will determine what further actions, if any, will be necessary to meet the preference for treatment which will permanently and significantly reduce toxicity, mobility, or volume of hazardous substances.

XII. DOCUMENTATION OF NO SIGNIFICANT CHANGES

EPA presented a proposed plan for remediation of the Site in June 1991. The management of migration portion of the selected alternative included extraction of contaminated groundwater, treatment of the collected groundwater and discharge of the treated effluent to the Sudbury River.

There have been no significant changes made to the plan as stated in the Proposed Plan of June 1991.

XIII. STATE ROLE

The Massachusetts Department of Environmental Protection (DEP) has reviewed the various alternatives and has indicated its support for the selected remedy. The State has also reviewed the Remedial Investigation, Risk Assessment and Feasibility Study to determine if the selected remedy is in compliance with applicable or relevant and appropriate State Environmental laws and regulations. The Massachusetts DEP concurs with the selected remedy for the Nyanza Chemical Waste Dump Site. A copy of the declaration of concurrence is attached as Appendix II.

APPENDIX I: RESPONSIVENESS SUMMARY

Kyanza Chemical Waste Dump Responsiveness Summary

Preface

The United States Environmental Protection Agency held a 30 day public comment period from June 27, 1991 until July 26, 1991 to provide an opportunity for interested parties to comment on the Remedial Investigation (RI) report, Feasibility Study (FS) and the June 1991 Proposed Plan prepared for the second Operable Unit addressing groundwater contamination from the Nyanza Chemical Waste Dump Site in Ashland Massachusetts. For more information regarding the remedial alternatives evaluated in the Feasibility Study and Proposed Plan, please see copies of both documents, which are included in the administrative record for this Operable Unit.

EPA signed the first Operable Unit ROD on September 4, 1985 addressing on-site sludges. The third Operable Unit, addressing contamination of the Sudbury River and its tributaries by the Site, is currently still in the RI/FS Phase.

The purpose of this Responsiveness Summary is to document EPA responses to the comments and questions submitted to EPA during the public comment period. EPA has considered all of the comments summarized in this document before selecting a final remedial alternative to address the groundwater of contamination at the Site. For information regarding community concerns and site history see Sections II and III of the OU II Record of Decision.

This Responsiveness Summary is organized into the following sections:

I. Overview of Remedial Alternatives Considered in the Proposed Plan - This section briefly outlines the remedial alternatives evaluated in the Proposed Plan, including EPA's preliminary recommendation of a preferred alternative.

II. Site History and Background on Community Involvement and Concerns - This section provides a brief site history, and a general overview of community interests and concerns regarding the Site.

III. Summary of Comments Received During the Public Comment Period and EPA Responses to These Comments this section summarizes and provides EPA responses to the comments received from residents and other interested parties during the comment period. In addition, comments received from the Potentially Responsible Parties (PRPs) are also summarized and EPA's responses to these comments are provided.

IV. This section contains the transcript of the July 18, 1991 informal hearing on the OU II proposed plan held in Ashland. Massachusetts.

V. This section contains the written comments received by EPA during the comment period.

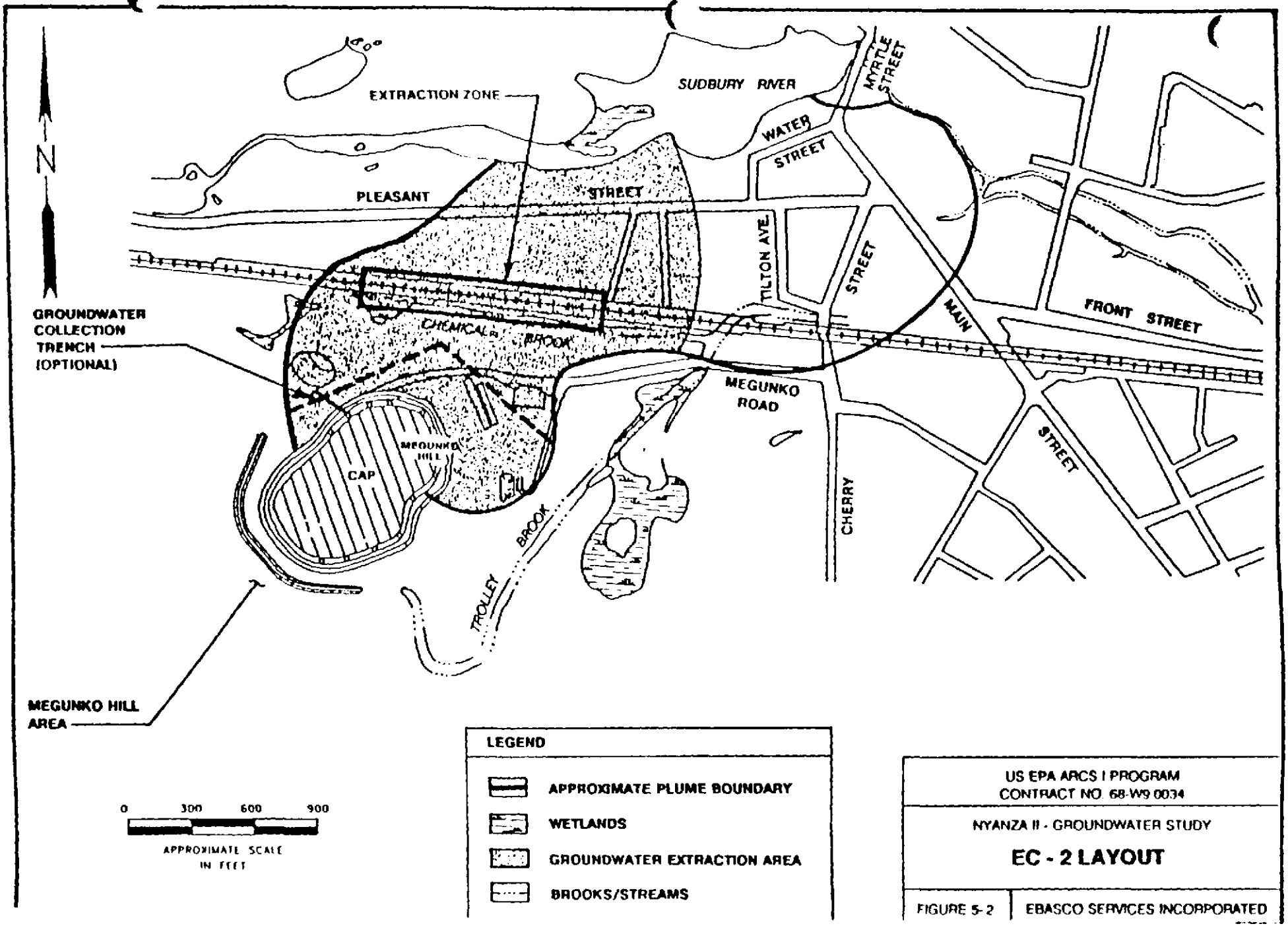
I. Overview of Remedial Alternatives Considered in the Proposed Plan

EPA's selection of the preferred cleanup alternative for the Site as described in the Proposed Plan was the result of a comprehensive evaluation screening process. The FS for the Site was conducted to identify and analyze the alternatives considered for addressing contamination at the Site over the long term. The FS report for the Site describes the alternatives considered, as well as the process and criteria EPA used to identify the five potential remedial alternatives (designated Alternatives RA-1 through RA-5 in the FS report) to address groundwater contamination. The cleanup plan EPA has selected in the accompanying ROD is essentially the same as the preferred alternative in the Proposed Plan, RA-2.

After analyzing the results of the FS, EPA proposed an interim remedy, not a permanent remedy, as the preferred alternative. The main factors for this choice were the length of time projected in the FS that may be necessary to attain the target levels set forth in the FS and the uncertainty inherent in making such projections. The main factors contributing to the protracted cleanup times are: 1) the physical and chemical properties of some of the target contaminants; 2) the limited rate at which groundwater can be extracted from the aquifer; and 3) the high levels of groundwater contamination found throughout the study area. By implementing the interim remedy, it will be possible to more accurately predict how these factors will affect cleanup. In addition, the degree to which contamination will continue to migrate from the Megunko Hill area will not be known until the cap, which is scheduled for completion in late 1991, has been in operation for some time. Therefore, the interim approach selected here will serve to collect data with which to refine the cleanup time estimates for the final ROD.

EPA’s preferred interim alternative (designated as RA-2 in the following discussion) to remediate contaminated groundwater consisted of groundwater extraction wells at the northern border of the Site; treatment of the collected groundwater; and discharge of the treated effluent to the Sudbury River. The alternative may also employ a collection trench at the northern border of the cap now under construction on Megunko Hill, depending on whether further study indicates that such a trench is feasible and necessary. Figure 5-2 of the Feasibility Study shows the approximate location of the proposed extraction wells and/or trenches for RA-2 (designated on Figure 5-2 as its companion, Extraction Component 2, or "EC-2") . The preferred alternative will operate for a period of five years, during which time environmental monitoring will be performed. After this time period, EPA will evaluate the performance of the extraction and treatment systems in a final RI/FS and make a final remedy selection in a subsequent final ROD for this Operable Unit. The system will continue to operate at least until the final ROD has been signed.

The preferred alternative will reduce contaminant migration in the direction of groundwater flow (including into the Sudbury River) by cleaning up the most highly contaminated area and sources of the contamination. The FS estimated that attainment of groundwater cleanup objectives using this alternative may take from several decades to potentially several hundred years in the groundwater extraction area (Figure 5-2). This selected remedial alternative will not remediate groundwater contamination in the eastern part of the plume in downtown during the interim remedial period. By extracting groundwater near northern boundary of the Site, however, the preferred alternative will prevent contaminant concentrations within the eastern portion of the plume from


N
EXTRACTION ZONE
SUDBURY RIVER
MYRTLE STREET
WATER STREET
PLEASANT STREET
TILTON AVE.
MAIN STREET
FRONT STREET
GROUNDWATER COLLECTION TRENCH (OPTIONAL)
CHEMICAL BROOK
MEGUNKO ROAD
MEGUNKO HILL
CAP
CHERRY STREET
TROLLEY BROOK
MEGUNKO HILL AREA
0 300 600 900
APPROXIMATE SCALE IN FEET
LEGEND
APPROXIMATE PLUME BOUNDARY
WETLANDS
GROUNDWATER EXTRACTION AREA
BROOKS/STREAMS
US EPA ARCS I PROGRAM
CONTRACT NO. 68-W9 0034
NYANZA II - GROUNDWATER STUDY
EC - 2 LAYOUT
FIGURE 5-2
EBASCO SERVICES INCORPORATED

increasing, thereby preventing current potential risks from increasing in this area.

The preferred alternative also included: 1) using institutional and access controls to limit exposure to contaminants; 2) performing further testing in the eastern portion of the plume to help determine the feasibility of cleaning up groundwater in this area in the future; 3) installing additional deep bedrock wells to more fully define the depths and locations to which contaminants may have migrated; 4) performing continuous monitoring of existing residential and monitoring wells to track any further progress of the plume; 5) inspecting the Megunko Road waterline to determine whether any deterioration has been caused by Site contamination; and 6) performing pre-design studies to aid in the design of the selected interim remedy.

The construction of the groundwater treatment facility will require approximately one acre of land, a system of collection wells and/or trenches to collect the contaminated groundwater, and a piping network to transport groundwater to the treatment facility. This alternative would require less disruption to the nearby residential community than the other alternatives considered since the collection system would be located mainly on industrially zoned land. The system will be designed to be flexible in order to accommodate potential changes in operation. For the purpose of estimating the cost of the various remedial alternatives the FS analyzed, as a representative technology, a groundwater treatment plant consisting of precipitation, air stripping, and carbon adsorption treatment. EPA, in consultation with the Commonwealth of Massachusetts, will select the actual technology to be used in the interim remedy from among the following technologies: the air stripping technology outlined below, or **ultraviolet-oxidation or biological** treatment units in the place of the air-stripping process as part of a comprehensive treatment system. A predesign cost effectiveness evaluation of the three technologies will be conducted in order to select the two technologies for pilot testing. The final selection of a groundwater treatment technology will be based on data collected during the predesign pilot studies.

Figure 10-2 of the Record of Decision illustrates how the air stripping treatment process could remove contaminants from the aquifer and treat the. collected water to levels that are safe for discharge. Groundwater extracted from the aquifer would undergo precipitation, a chemical treatment method that converts dissolved metals to an insoluble form and allows **suspended solids** to accumulate and settle. After precipitation, water would pass through a sand or cartridge filter to remove suspended solids and would then enter an air stripper unit. **Air stripping** is an aeration process that reduces concentrations of VOCs and some SVOCs by changing contaminants in the groundwater into a gaseous form. A final treatment process, carbon adsorption, would remove any remaining organics in the water to levels acceptable by federal and state requirements for discharge to the Sudbury River. **Carbon adsorption** removes organic compounds by filtering and adsorbing dissolved and suspended contaminants in the treated groundwater. Air emissions would also be controlled through the use of carbon adsorption.

Estimated Time for Design and Construction: 3 years
Estimated Time of Operation: 5 years
Estimated Capital Cost: $5,260,000
Estimated Operation and Maintenance Cost (5 years, present worth): $2,180,000
Estimated Total Cost (present worth): $ 7,440,000

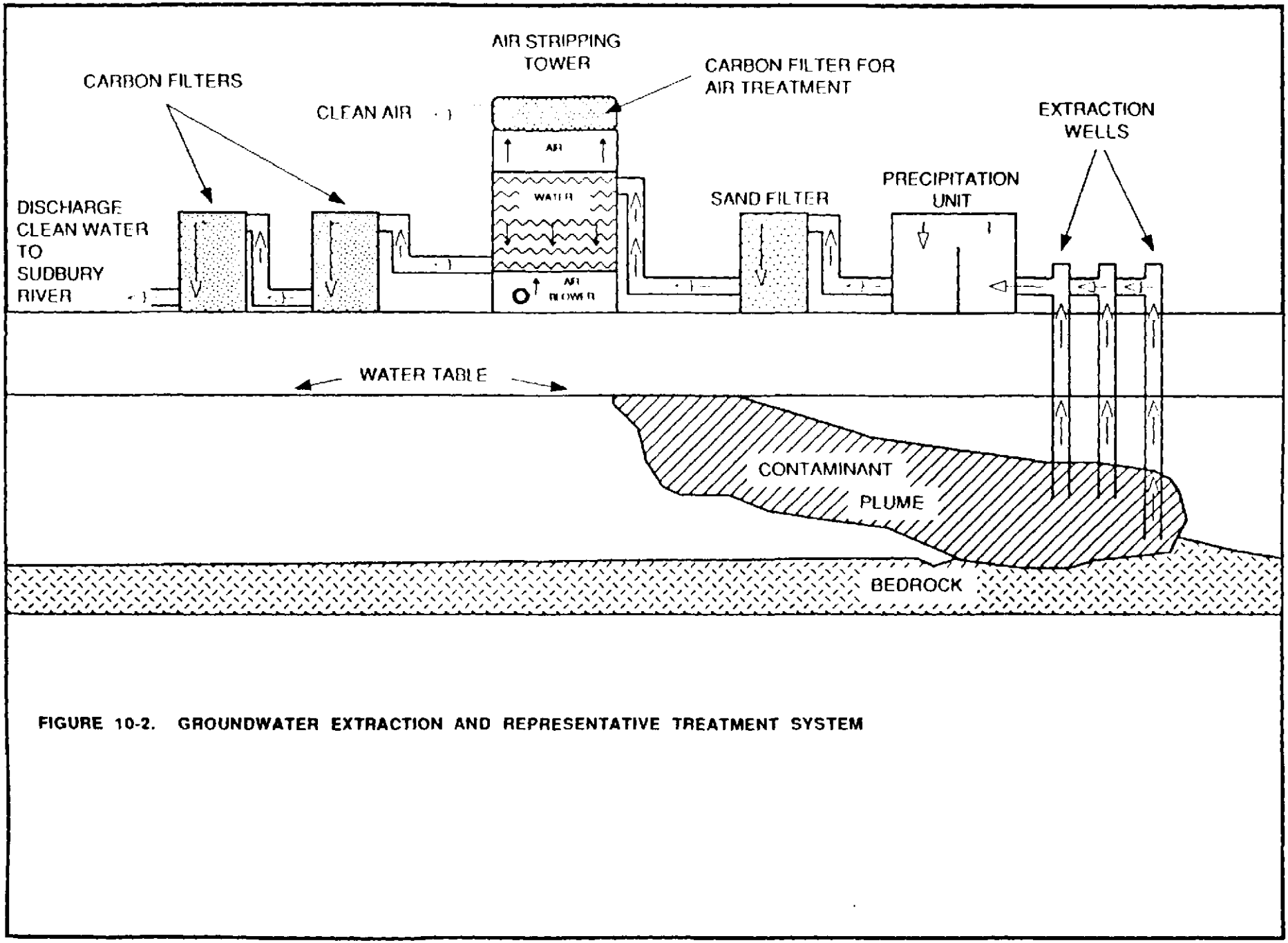


FIGURE 10-2. GROUNDWATER EXTRACTION AND REPRESENTATIVE TREATMENT SYSTEM

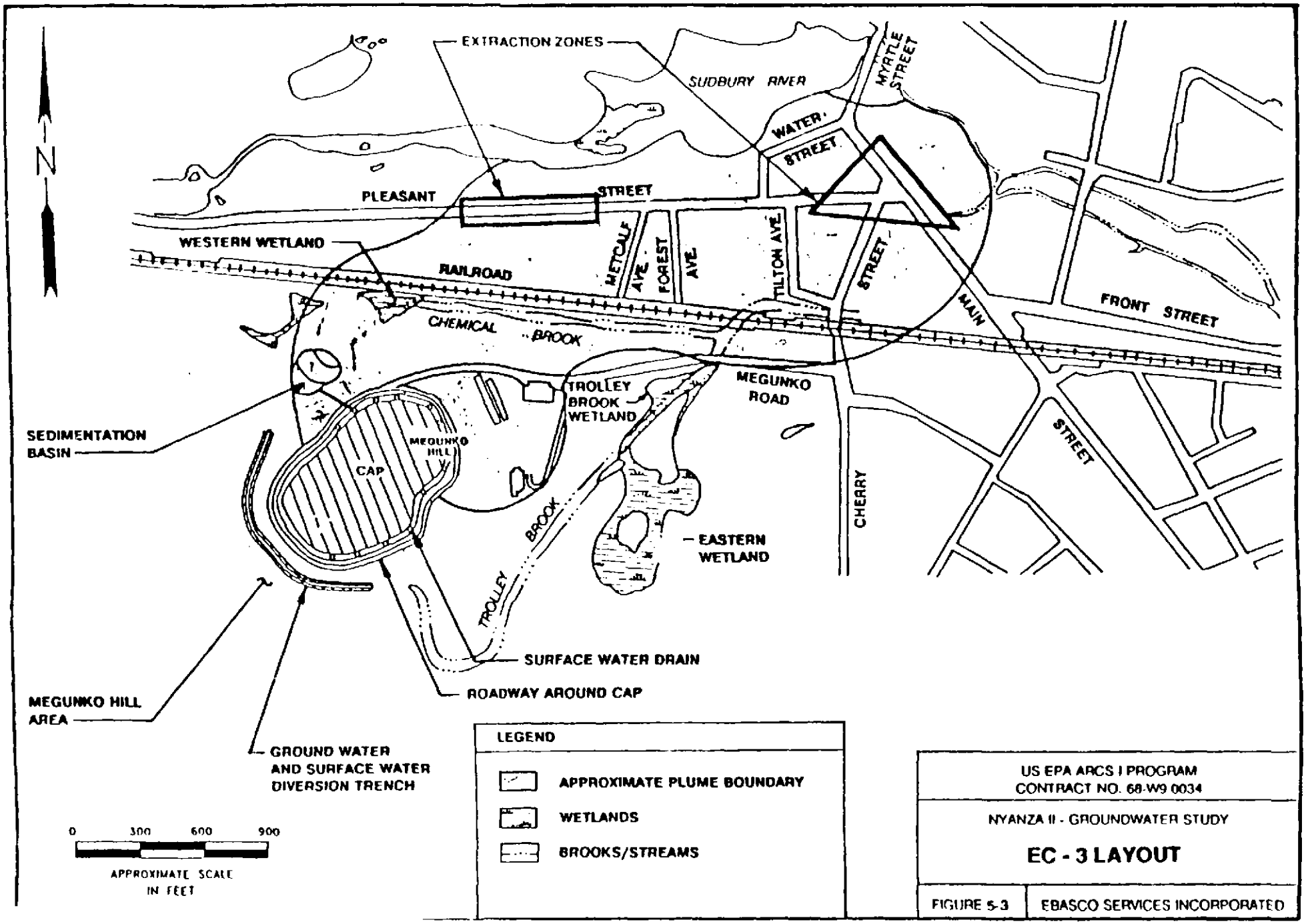
The Proposed Plan compared the preferred interim alternative to the other alternatives that EPA retained for detailed analysis. The interim Alternatives discussed here are identical to the long-term alternatives discussed in the FS, except that their comparison is based on a 5-year operational period, rather than the 30-year time frame used for cost purposes in the FS. Each of these alternatives is described briefly below, along with a discussion of how each would function as an interim remedy.

Alternative RA-1: Minimal/No Action: The FS evaluated this alternative in detail to serve as a baseline for comparison with other remedial alternatives under consideration. Under this alternative, no treatment or containment of groundwater contamination would occur. The objectives of this alternative are to restrict public access and potential exposure to Site contamination, prohibit use of contaminated groundwater, and evaluate Site conditions and contaminant migration periodically over time. These objectives would be accomplished using Site access control measures and institutional controls to limit exposure to contaminants and installation of wells and long-term environmental monitoring. The FS estimates that a period on the order of thousands of years could be required to meet the groundwater cleanup objectives through natural flushing processes. Consequently, the Site control described here would be in effect for an indefinite period of time.

Estimated Time for Design and Construction: one year
Estimated Time of Operation, interim alternative: 5 years
Estimated Capital Cost: $320,000
Estimated Operation and Maintenance Costs (5 years, present worth): $721,000
Estimated Total Cost (present worth): $1,041,000

Alternative RA-2: Management of Migration with extraction at the Northern Boundary of the Site; treatment of collected groundwater; discharge of effluent to the Sudbury River: This alternative was the preferred alternative and is discussed above.

Alternative RA-3: Management of Migration with extraction to the north and north- east of the Site as depicted in Figure 5-3 of the Feasibility Study (enclosed); treatment of collected groundwater; discharge of effluent to the Sudbury River: This remedial alternative involves contaminated groundwater extraction in the portion of the plume to the north and north-east of the Site; treatment of the groundwater; and discharge of treated groundwater into the Sudbury River. The treatment process is the same one as was described under EPA's preferred alternative. This alternative also includes the Site control features described for RA-1, which would be in effect until cleanup objectives are met. The objective of this alternative is to prevent the contaminants from expanding beyond current limits of the plume and thereby prevent the discharge of contaminants to the Sudbury River. The FS estimated that attainment of groundwater cleanup objectives using this alternative may take from several decades to potentially several hundred years. Although this clean-up time is essentially the same as the estimate for RA-2 (the preferred alternative), this alternative would not directly remediate the source area of the contaminated groundwater, thus allowing potentially high levels of contamination to migrate by natural processes to the extraction wells to the north and north-east of the Site being removed from the aquifer.



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NYANZA II - GROUNDWATER STUDY

EC - 3 LAYOUT

FIGURE 5-3 | EBASCO SERVICES INCORPORATED

As an interim remedy, this alternative would permit the collection of some operational data, but it would also allow the continued migration of groundwater contaminants from the Site.

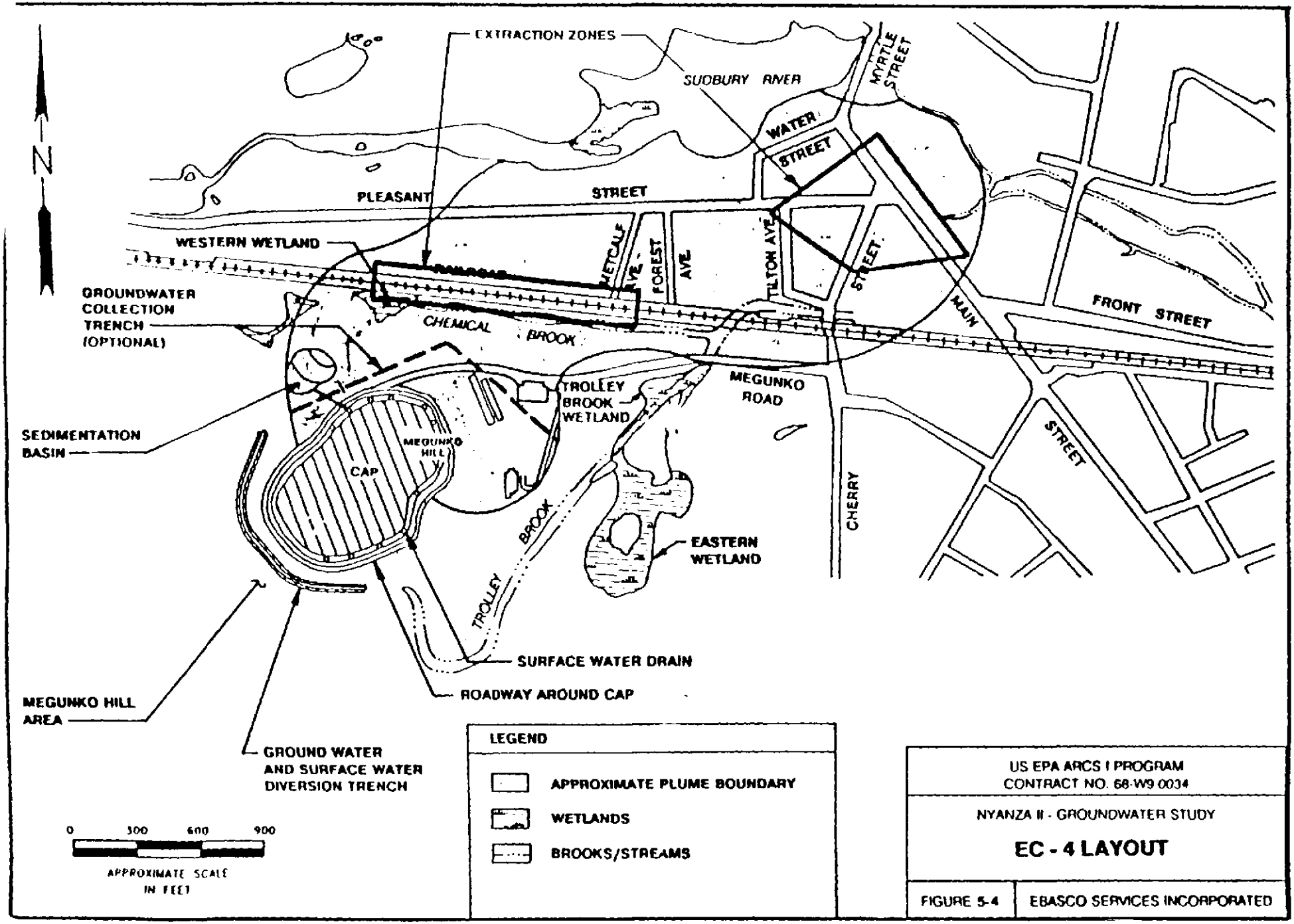
Estimated Time for Design and Construction: 3 years
Estimated Time of Operation, interim alternative: 5 years
Estimated Capital Cost: $3,870,000
Estimated Operation and Maintenance Costs (5 years, present worth): $1,820,000
Estimated Total Cost (present worth): $5,690,000

Alternative RA-4: Management of Migration with extraction both at the northern boundary of the Site and to the north-east of the Site; treatment of the collected groundwater; discharge of effluent to the Sudbury River: This alternative extracts highly contaminated source area groundwater by combining the extraction components of the preferred Alternative RA-2 with those of Alternative RA-3 as depicted in Figure 5-4 of the Feasibility Study (enclosed). The collected groundwater would undergo treatment to remove contaminants as described in the preferred Alternative RA-2. Following treatment, the water would be discharged to the Sudbury River. This alternative would include the Site control features described for Alternative RA-1, which would be in effect until cleanup objectives are met. The objective of this alternative is to prevent the contaminated groundwater from expanding beyond its current boundaries and ultimately into the Sudbury River. This alternative would also extract the most highly contaminated groundwater to prevent increases in contamination to the north and east of the Site. Based on estimates in the FS, the time required to achieve groundwater cleanup objectives may range from several decades to potentially several hundred years. This is essentially the same as that for the preferred alternative, but would require much more disruption to the community surrounding the Site, while capturing contaminants over a larger area.

As an interim remedy, this alternative would permit the collection of operational data, while reducing the migration of contaminants throughout the plume.

Estimated Time for Design and Construction: 3 years
Estimated Time of Operation, interim alternative: 5 years
Estimated Capital Cost: $6,050,000
Estimated Operation and Maintenance Costs (5 years, present worth): $3,140,000
Estimated Total Cost (present worth): $9,190,000

Alternative RA-5: Active Plume-Wide Extraction; treatment of the collected groundwater; discharge of effluent to the Sudbury River: This alternative is a comprehensive plume-wide alternative that differs from the others because it involves extraction of contaminated water at many locations throughout the plume as depicted in Figure 5-5 of the Feasibility Study (enclosed). It also includes groundwater treatment as described for the preferred Alternative RA-2, followed by discharge of the treated water into the Sudbury River. Alternative RA-5 would also include the site control features described for Alternative RA-1, which would be in effect until cleanup objectives are met. The objective of this alternative is two-fold. The first objective is to restore the aquifer by using numerous extraction wells to minimize the transport of contamination through the aquifer and to minimize the time frame required to complete treatment of the aquifer; the second is to prevent migration and discharge of contaminated groundwater into the Sudbury River. Uniformly distributed extraction wells would


EXTRACTION ZONES
SUDBURY RIVER
MYRTLE STREET
WATER STREET
PLEASANT STREET
WESTERN WETLAND
RAILROAD
METCALF AVE.
FOREST AVE.
TILTON AVE.
STREET
MAIN
FRONT STREET
GROUNDWATER COLLECTION TRENCH (OPTIONAL)
CHEMICAL BROOK
TROLLEY BROOK WETLAND
MEGUNKO ROAD
SEDIMENTATION BASIN
MEGUNKO HILL
CAP
TROLLEY BROOK
CHERRY STREET
EASTERN WETLAND
SURFACE WATER DRAIN
ROADWAY AROUND CAP
MEGUNKO HILL AREA
GROUND WATER AND SURFACE WATER DIVERSION TRENCH
N
0 300 600 900
APPROXIMATE SCALE IN FEET
LEGEND
APPROXIMATE PLUME BOUNDARY
WETLANDS
BROOKS/STREAMS
US EPA ARCS I PROGRAM
CONTRACT NO. 68-W9-0034
NYANZA II - GROUNDWATER STUDY
EC - 4 LAYOUT
FIGURE 5-4
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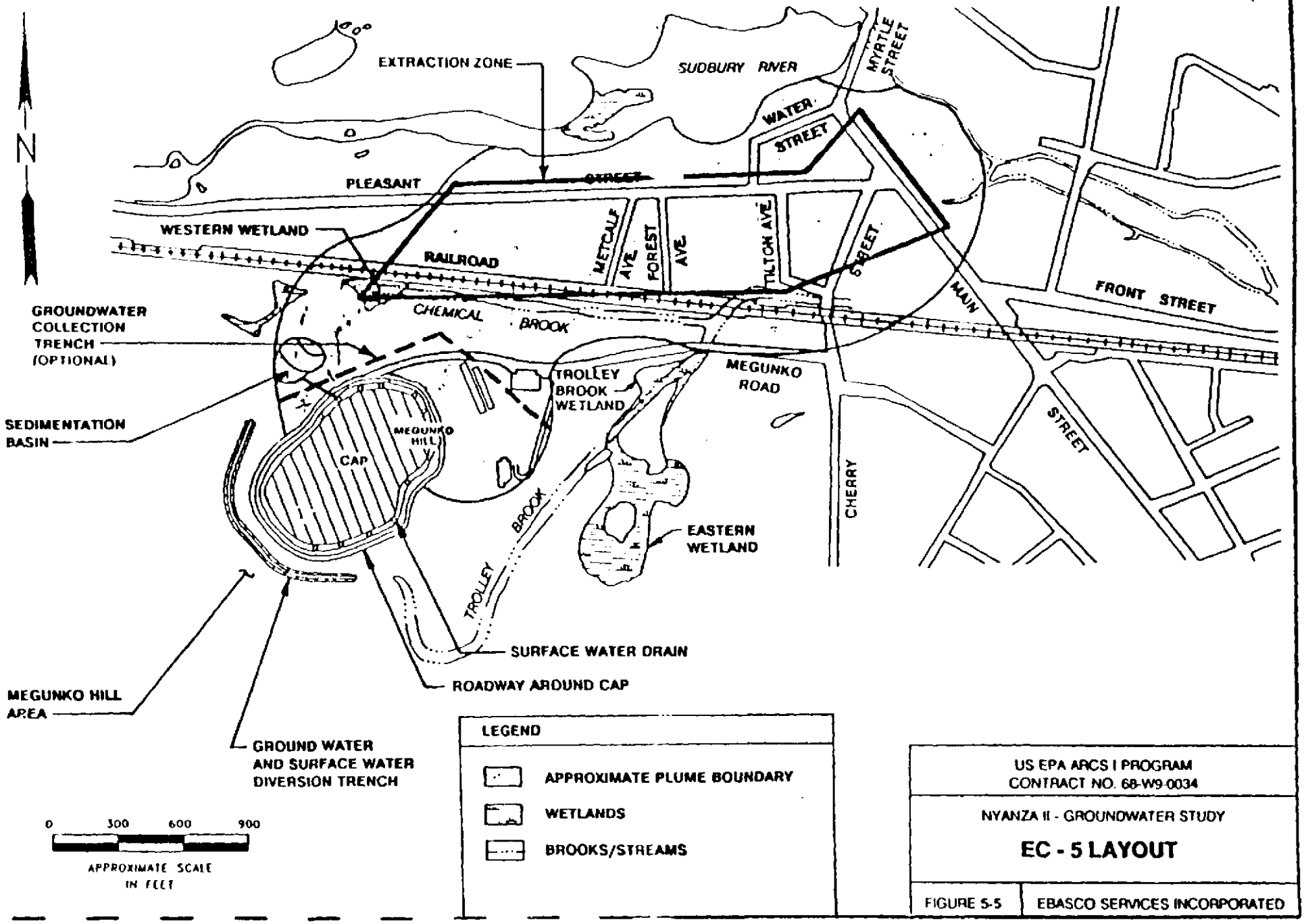
N
EXTRACTION ZONE
SUDBURY RIVER
MYRTLE STREET
WATER STREET
PLEASANT STREET
WESTERN WETLAND
RAILROAD
METCALF AVE
FOREST AVE
TILTON AVE
MAIN STREET
FRONT STREET
GROUNDWATER COLLECTION TRENCH (OPTIONAL)
CHEMICAL BROOK
TROLLEY BROOK WETLAND
MEGUNKO ROAD
SEDIMENTATION BASIN
MEGUNKO HILL
CAP
CHERRY STREET
TROLLEY BROOK
EASTERN WETLAND
SURFACE WATER DRAIN
ROADWAY AROUND CAP
MEGUNKO HILL AREA
GROUND WATER AND SURFACE WATER DIVERSION TRENCH
LEGEND
APPROXIMATE PLUME BOUNDARY
WETLANDS
BROOKS/STREAMS
0 300 600 900
APPROXIMATE SCALE IN FEET
US EPA ARCS I PROGRAM
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NYANZA II - GROUNDWATER STUDY
EC - 5 LAYOUT
FIGURE 5-5
EBASCO SERVICES INCORPORATED

prevent highly contaminated groundwater from migrating to areas of lower concentrations. The Feasibility Study estimates the time required to achieve groundwater cleanup objectives by this alternative as ranging from several decades to potentially more than two hundred years. As an interim remedy, this alternative would permit the collection of operational data, while reducing the migration of contaminants throughout the plume.

Estimated Time for Design and Construction: 3 years
Estimated Time of Operation, interim alternative: 5 years
Estimated Capital Cost: $6,650,000
Estimated Operation and Maintenance Costs (present worth, 5 years): $3,430,000
Estimated Total Cost (present worth): $10,080,000

II. Site History and Background on Community Involvement and Concerns - This section provides a brief site history, and a general overview of community interests and concerns regarding the Site.

1. Background

The Nyanza Chemical Waste Dump Superfund Site - Groundwater study area is located in the Town of Ashland, Middlesex County, Massachusetts (see Figure 1-1 of the ROD). Ashland is located in the Metrowest area of eastern Massachusetts, bordered by Sherborn to the east, Southborough to the west and northwest, Framingham to the north, and Hopkinton and Holliston to the south. Ashland is 25 miles west-southwest of Boston, and 20 miles east-southeast of Worcester.

The "Site", for purposes of describing the Operable Unit II - Groundwater Study, consists of all areas in and adjacent to the Nyanza property which appear to be sources of groundwater contamination. 2 The "Nyanza property", which is a part of the Site, consists of approximately 35 acres formerly owned by Nyanza, Inc. (Figure 1-2 of the ROD) and includes several wetlands, the Megunko Hill area, and the lower industrial area along Megunko Road. The Hill is located in the southern part of the property and was formerly used as a landfill/disposal area. This area is currently the focus of Operable Unit I remediation activities. The lower industrial area was formerly the location of dye manufacturing facilities, the wastewater treatment system and a series of settling lagoons south of Megunko Road. The areal extent of the Site is approximately bounded by an active Conrail railroad line and Chemical Brook to the north, wetland areas and Cherry Street to the east, and undeveloped mixed hardwood forest land to the south, southeast, and west. The Sudbury River is approximately 700 feet north of the Site.

The "study area" of the Operable Unit II - Groundwater Study is larger than the Site. It consists of the Site plus the areal extent of wells (approximately 395 acres) installed off the Nyanza property thus far.

2. Land Use and Response History

From 1917 through 1978, the property was occupied by several companies involved in manufacturing of several products. Textile dyes and dye intermediates were produced on the Site until 1978 when Nyanza, inc. apparently ceased operations. Products manufactured on the property in addition to those previously mentioned included inorganic colloidal solids and acrylic polymers. Starting in 1917, several types of chemical wastes were disposed in various on-site locations with the majority of these wastes deposited on Megunko Hill, which was used as an unsecured landfill. Wastes included partially-treated process wastewater; chemical sludge from the wastewater treatment process; solid process wastes (e.g., chemical precipitate and filter cakes) in drums; solvent recovery distillation residue in drums; and off-specification products. Process chemicals

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[2] For purposes of CERCLA § 121(e)(l) in so far as it relates to permits, "on-site" shall be "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response actions". National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR § 300.400(e).

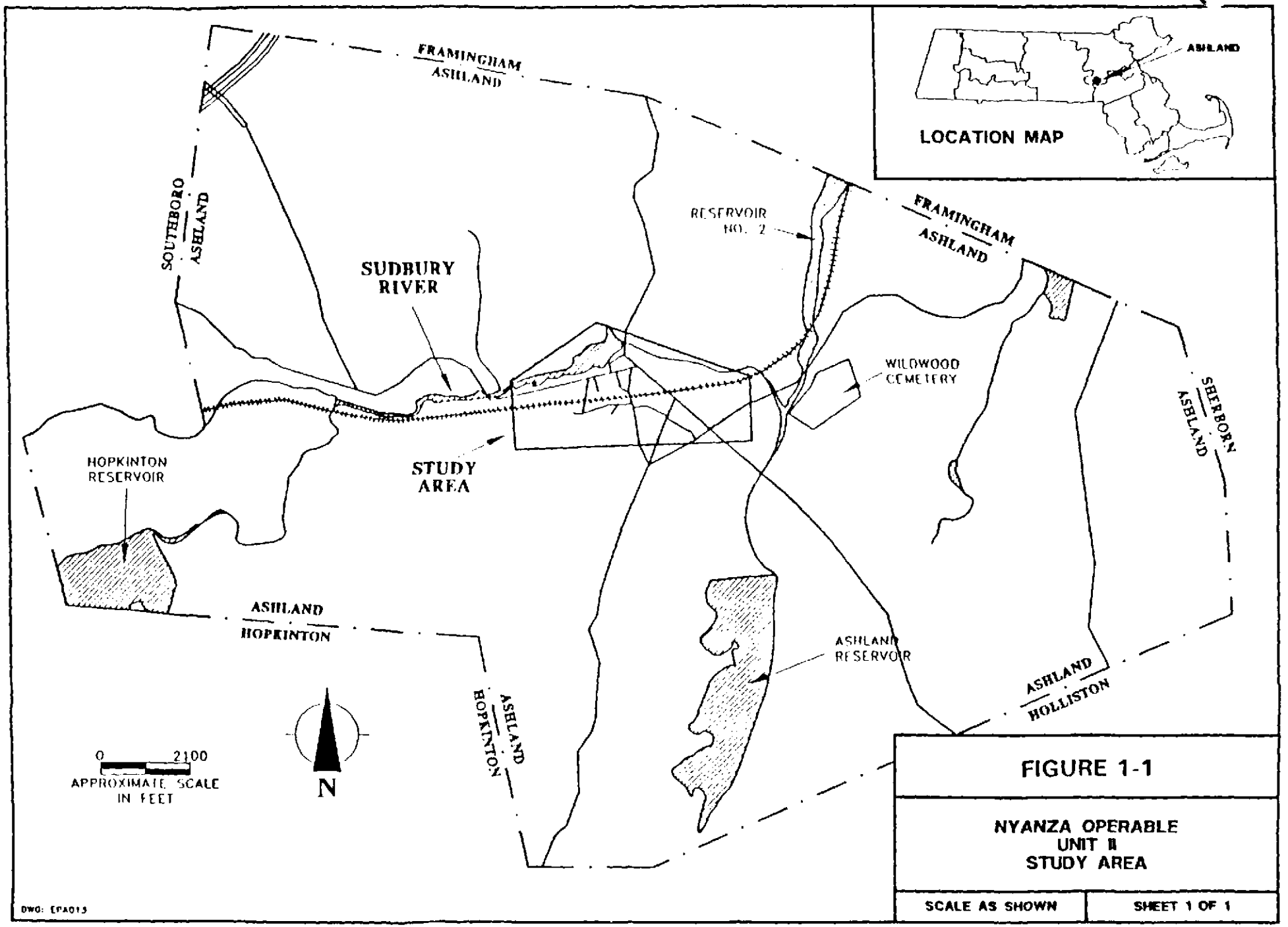

FIGURE 1-1

NYANZA OPERABLE UNIT II STUDY AREA

SCALE AS SHOWN | SHEET 1 OF 1

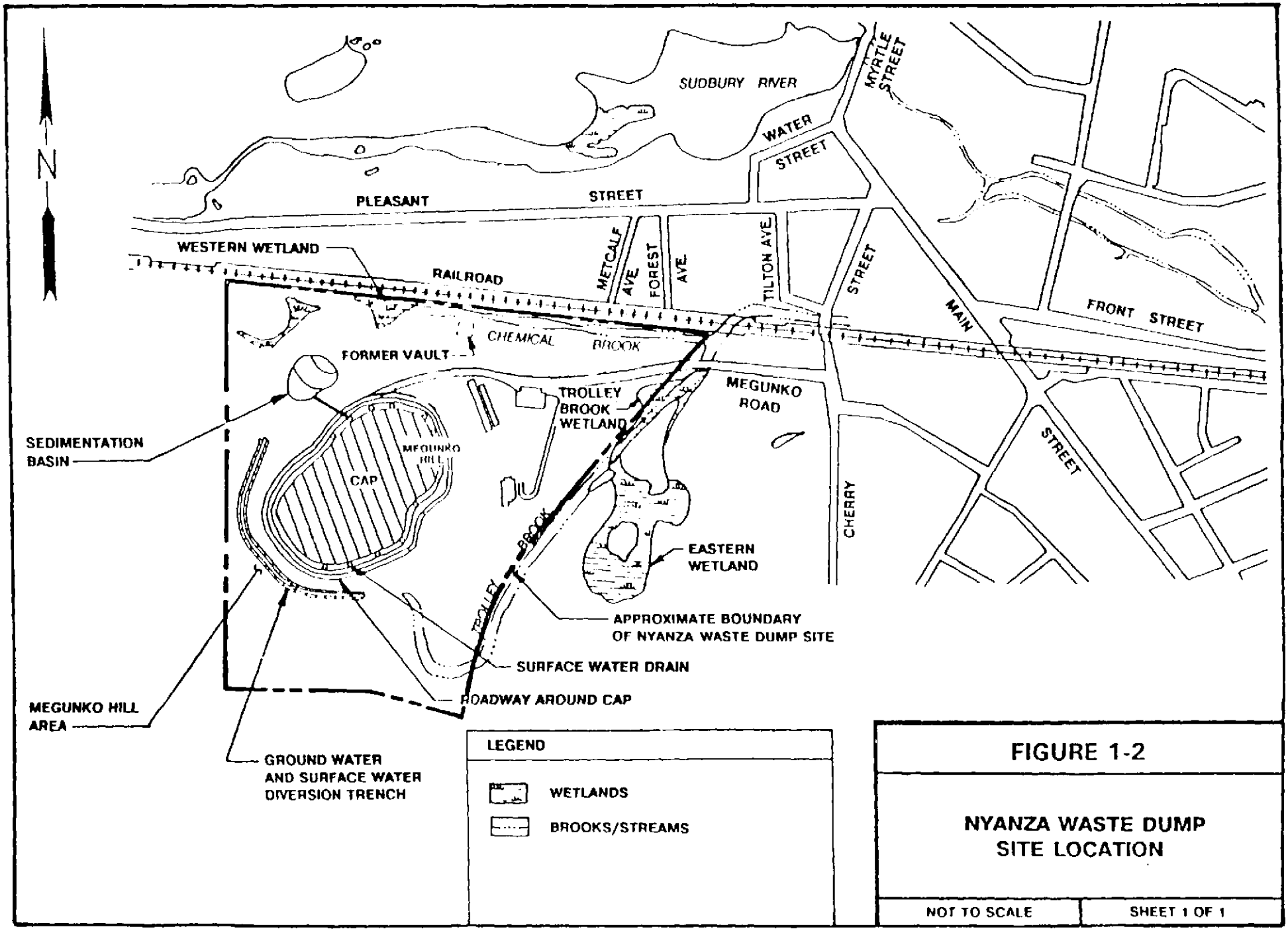

FIGURE 1-2

NYANZA WASTE DUMP SITE LOCATION

NOT TO SCALE | SHEET 1 OF 1

that could not be recycled or reused (including phenol, nitrobenzene, and mercuric sulfate) were also disposed of on-site.

Chemical wastes were also disposed of in the wetland areas. The eastern wetland area received waste effluent discharge from various manufacturing operations in the area. The northwest wetland area at the headwater of Chemical Brook contained wastewater treatment sludge and possibly received overflow from an underground concrete wastewater vault that discharged into Chemical Brook.

Nyanza, Inc., which apparently ceased operations in Ashland in 1978, was the most recent dye manufacturing company to occupy the Site. The former plant grounds now are occupied by several industrial concerns, the largest of which is Nyacol Products, Inc.

Nyanza, Inc. and its predecessors originally discharged the dye waste stream to a concrete "vault" or settling basin adjacent to the main process building. The vault was used as a central sump for the collection of wastewater from the entire Nyanza, Inc. operation, as well as for other generating tenants housed in the immediate vicinity. This vault was approximately 40 x 80 feet and approximately 10 feet deep. The liquid occasionally overflowed via a pipe into Chemical Brook which flowed into Trolley Brook and through a culvert to the raceway that entered the wetlands along the Sudbury River. The vault was taken out of service in the 1960’s or 1970’s and was subsequently filled with sludge and covered over with fill. As part of an ongoing effort to ease river pollution, the Massachusetts Division of Water Pollution Control (DWPC) ordered Nyanza, Inc. to install a pretreatment system for industrial process water and to discharge the treated waste to the Metropolitan District Commission (MDC) sewer collection system. Nyanza, Inc. connected to the MDC system in March

The first type of contamination linked to the Site was mercury, discovered in the Sudbury River in 1970, as part of an overall investigation of mercury problems in Massachusetts for the DWPC. A follow up study in 1972 focusing on Nyanza, Inc. revealed mercury contamination in the Sudbury River caused by uncontrolled sludge and wastewater disposal at the Site.

Since 1972, several investigations have been prompted by contamination present at or originating from the Site. From 1972 through 1977, the Massachusetts Department of Water Pollution Control (DWPC) and Department of Public Health (DPH) cited Nyanza, Inc., for several contamination problems associated with dumping activities. Following a 1973 DWPC order to implement a plan to stop further groundwater pollution, Camp Dresser and McKee, Inc. (CDM), working for Nyanza, Inc., performed a 1974 Site investigation aimed at source identification and devised plans to control groundwater contamination on the Nyanza property; however, the plans were not implemented. In 1979, Edward J. Camille, a property owner, hired Connorstone Engineering, Inc. to complete the CDM groundwater pollution control program. However, the Massachusetts Department of Environmental Quality Engineering (DEQE; now known as the Department of Environmental Protection or DEP) halted these plans, pending further investigation. In 1980, DEQE released a Preliminary Site Assessment Report summarizing the Site history and findings of previous investigations at the Site. MCL Development Corporation acquired much of the property in 1981, and hired Connorstone Engineering, Inc. and Carr Research Laboratory, Inc. to characterize soil composition and locate sludge deposits.

The Site was included on the original National Priority List (NPL) of Superfund Sites in 1982 and a preliminary Remedial Action Master Plan (RAMP) was prepared.

In 1984, the Environmental Protection Agency (EPA) authorized NUS Corporation (NUS) to perform an Remedial Investigation/Feasibility Study.

The September 4, 1985 Record of Decision (ROD) divided the Agency's remedial response into Operable Units for the purpose of addressing distinct problems. The September 1985 ROD was designated Operable Unit I. The ROD selected soil and wetland excavation at nine localized areas of contamination; solidification of water bearing excavated sludge, sediments, and soil; and placement, capping and consolidation of those materials with material left in place on the "Hill" area in the southern part of the Site. A diversion trench has been constructed on the side of Megunko Hill above and around the capped area to divert surface water flow and lower the groundwater table beneath the cap as part of Operable Unit I. Construction of the project began in early 1989 and will be complete in late 1991.

In 1985 the DEQE undertook an Interim Response Measure at the Site consisting of the following activities: fencing the Trolley Brook Road embankment; placing one foot of clean fill in one of the Site areas to remove the threat of direct contact; and culverting Chemical Brook through neighboring property.

In 1986, EPA authorized COM to conduct additional field investigations to define source locations and design the remedial action stipulated in the ROD. The remedial design is complete and construction began in early 1989.

In January 1987, DEQE and the EPA Environmental Services Division (ESD) initiated a sludge removal action of the contents within the vault (see Figure 1-2 of the ROD). Prior studies by a DEQE contractor indicated that the vault, and contaminated soil and groundwater in the vicinity of the vault, were a significant source of organic contamination in the groundwater downgradient of the area. Contaminants present included, but were not limited to, trichloroethene (TCE), chlorobenzene, and nitrobenzene, all by-products of aniline dye production. Inorganic contaminants found in the sludge included heavy metals such as antimony, cadmium and chromium. Initially, the vault contamination investigation was planned within the scope of Operable Unit II. DEQE and the EPA conducted a subsurface investigation in the vault and surrounding area, culminating in a decision to proceed immediately with remediation of the vault area. The removal action was conducted by EPA's Emergency Response Team. From October to December 1987, 665 tons of soil adjacent to the vault were removed; 309 tons were incinerated, and 356 tons were shipped off-site to an approved landfill. In March and June 1988, 2,512 tons of sludge from the vault was solidified on-site and disposed of at an off-site RCRA landfill facility.

In June 1987, EPA authorized the REM III team to begin RI/FS activities for Operable Unit II. Operable Unit II comprises groundwater contamination related to the Site. A third set of RI/FS investigations, Operable Unit III, is focused on contamination in the Sudbury River. Work on Operable Unit III is being performed by NUS Corp. under an ARCS contract to EPA.

A more detailed description of the Site history can be found in Section 1.4 of the Remedial Investigation Report.

3. Enforcement History

On April 4, 1982, EPA sent general notice letters to 18 entities it believed were responsible parties. On January 22, 1991, based on newly acquired

information, EPA notified approximately 21 parties who either owned or operated the facility, generated wastes that were shipped to the facility, arranged for the disposal of wastes at the facility, or transported wastes to the facility of their potential liability with respect to the Site. Some of the 21 parties named in the January, 1991 letters had been previously notified in the 1982 letters. An additional owner/operator was notified on June 21, 1991 based on new information supplied by existing PRPs. On July 22, 1991, eleven parties were removed from the PRP list. EPA therefore considers twenty parties potentially liable to perform or pay for the cleanup of the Site. EPA generally conducts negotiations with potentially responsible parties (PRPs) as soon as possible regarding the settlement of their liability at the Site. The PRPs have formed a steering committee and substantial discussions between EPA and the steering committee have taken place.

The PRPs have been active in the remedy selection process for this Site. Technical comments presented by PRPs during the public comment period are summarized in this responsiveness summary, and the summary and written comments have been included in the Administrative Record.

4. Community Relations History

Throughout the Site's history, community concern and involvement has been high. EPA has kept the community and other interested parties apprised of the Site activities through informational meetings, fact sheets, press releases and public meetings which have been held on an almost monthly basis since 1986. These meetings served to update the public regarding the progress of various aspects of the cleanup, including the groundwater RI/FS.

During 1986, EPA released a community relations plan which outlined a program to address community concerns and keep citizens informed about and involved in activities during the planning and execution of remedial activities.

Upon the start of construction of the cap and diversion trench on-site in 1989, EPA intensified its community relations efforts in response to public concerns about safety issue related to the cleanup. For a several month period, weekly meetings were held with representatives of the police and fire departments, as well as with concern citizens and representatives of organized labor unions.

On June 27, 1991 EPA made the Administrative Record available for public review at EPA's offices in Boston and at the Ashland Public Library. EPA published a notice and brief analysis of the Proposed Plan in the Middlesex News on June 21, 1991.

On June 26, 1991, EPA held an informational meeting to discuss the results of the Remedial Investigation and the cleanup alternatives presented in the Feasibility Study and to present the Agency's Proposed Plan. Also during this meeting, the Agency answered questions from the public. From June 27 to July 26, 1991 the Agency held a 30 day public comment period to accept public comment on the alternatives presented in the Feasibility Study and the Proposed Plan and on any other documents previously released to the public. On July 18, 1991, the Agency held a public meeting to discuss the Proposed Plan and to accept any oral

comments. A transcript of this meeting, the public's written comments and the Agency's response to both written and oral comments are included in the following sections of this Responsiveness Summary.

III. Summary of Comments Received During the Public Comment Period and EPA Responses to These Comments

A. Summary of Potentially Responsible Party Comments and EPA Responses

Comment #1:

In general, all of the cited "options" for interim action are merely different versions of the same plan (i.e., pump-and-treat), with varying locations and numbers of extraction points. The National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), at 40 C.F.R. § 300.430(e)(4), provides that with regard to ground water response actions, the lead agency shall develop a limited number of remedial alternatives that attain site-specific remediation levels within different restoration time periods utilizing one or more different technologies.

Response: The "options" or remedial alternatives referred to were selected for final detailed analysis based on the screening process spelled out in the Feasibility Study. Since the "pump and treat" technology was the only one to survive that screening process, it was logical to compare collection networks of varying sizes in the detailed analysis. The remedial alternatives that were developed do, therefore " . . . attain site- specific remediation levels within different restoration time-periods utilizing one or more different technologies" as required.

Comment #2

Since pump-and-treat technology has yet to succeed in "cleaning up" any Superfund site ground water down to federal drinking water standards such a cleanup cannot be regarded as achievable using this technology. The sole objective should therefore be the prevention of the spread of the contamination plume (i.e., control versus remediation) and a general overall reduction in the level of toxics in the plume.

Response: EPA disagrees with this comment. CERCLA Section 121(b) and the National Contingency Plan state a preference for remedial actions that utilize treatment which permanently and significantly reduces the volume, toxicity, or mobility of the hazardous substances over remedial actions not involving such treatment. The National Contingency Plan, 40 C.F.R. § 430 (a)(iii)(F) states that:

> "EPA expects to return usable groundwaters to their beneficial uses, within a time frame that is reasonable given the particular circumstances of the site. When restoration of groundwater to beneficial uses is not practicable, EPA expects to prevent further migration of the plume, prevent exposure to the contaminated groundwater, and evaluate further risk reduction."

The selected remedy comports with the preference for treatment set out in CERCLA and the NCP. The remedy prescribes treatment for groundwater contaminated with high concentrations of highly mobile toxics which were released at the Site.

Further, since pump-and-treat cleanups are by their very nature long-term, the fact that no Sites have reached MCL levels may be irrelevant to the remedial

decision at Nyanza. It can not be said that pump-and-treat will not achieve groundwater cleanup goals.

"Pump and treat" technologies have been used at numerous Superfund and other Site where groundwater has become contaminated over the past decade. Specifically, a study of 19 case studies around the United States (OSWER Directive 9355.4-03) performed by EPA indicated that:

> "the extraction systems are generally effective in containing contaminant plumes, thus preventing further migration of the contaminants;
>
> Significant mass removal of contaminants (up to 130,000 pounds over three years) is being achieved;
>
> Concentrations of contaminants have generally decreased significantly after initiation of extraction but have tended to level off after a period of time;
>
> Data collection was usually not sufficient to fully assess contaminant movement and system response to extraction."

Further, the Directive continued to make the following recommendations:

> "initiate response action early;
>
> Provide Flexibility in the Selected Remedy to modify the system based on information gained during its operation;
>
> Collect data to better assess contaminant movement and likely response of groundwater to extraction."

The selected alternative recognizes all of the findings and recommendations in the Directive and reconciles them to the situation in groundwater in the Nyanza study area. The selection of RA-2 will limit the disruption of the community and access related problems in an attempt to initiate response actions early. The interim remedy, calling for the treatment of the plume, recognizes the technology's ability to remove a large quantity of pollutant mass in the relatively highly contaminated aquifer at the northern boundary of the Site and follows the recommendation of the directive to provide for longer term-flexibility. The interim remedy, of course, also provides a forum within which data can be collected to support the third recommendation of the directive.

Comment #3

The regulations require the lead agency, in regard to source control actions, to develop where appropriate alternatives that involve little or no treatment, but provide protection of human health and the environment by preventing or controlling exposure to hazardous substances through engineering controls such as containment. 40 C.F.R. § 300.430(e)(3)(ii). This requirement deserves further consideration and review.

Response: The Agency has in fact considered an alternative which satisfies 40 C.F.R. § 300.430 (e)(3)(ii). RA-1 involves no treatment but attempts to provide protection of human health and the environment by preventing or controlling exposure to hazardous substances through institutional controls.

The rejection of RA-1 as an interim remedy comports with the preference for remedial action that utilize treatment which permanently and significantly reduces the volume, toxicity, or mobility of the hazardous substances over remedial actions not involving such treatment, as set out in CERCLA Section 121(b) and the NCP. See response to Comment #2.

Comment #4

If there is no proven applicable technology which is more effective than pump-and-treat in five years (and there currently is no strong indication that there will be), it is highly unrealistic to expect that a "final decision" regarding remediation to MCL levels could be reached at that time.

Response: It is anticipated that within 5 years, operational history of the treatment plant and collection system will be obtained and a much more refined estimate of cleanup times developed. Based on the information developed, EPA will make a final remedial decision. That decision may be to set cleanup goals at MCL levels, to change cleanup objectives (for instance to contain the plume, rather than to meet ARARs) and to develop alternative concentration limits, or to waive certain ARARs if cleanup to levels set by such ARARs is in fact found to be unattainable. EPA disagrees that it is unrealistic to expect that a final decision will be reached.

Comment #5

Pump-and-treat systems may result in an initial reduction in contamination, followed by a plateau. A return of contamination to initial or even higher levels has been known to occur when the system ceases operation. This possibility does not appear to have been adequately considered in the Feasibility Study. Based on the contaminants identified, many of which are nearly insoluble nonaqueous-phase liquids (NAPLs) , and the fact that the overall quantity of these NAPLs released is not clearly known, such a situation is a distinct possibility for the site. Perhaps the "decades to centuries" cleanup estimate alludes to this factor. If so, this should be a predominant factor in the system design and more reason to have plume containment rather than aquifer restoration as the primary objective.

Response: Whether or not NAPLs are in fact present, the selected remedy including the pump and treat system is the only one known to have any chance of even containing highly concentrated organics. An important component in the selected remedy is further pre-design studies which will include further work to refine the locations of and the depths to which NAPLs (assuming such deposits exist) may have migrated. If such locations can be isolated and extraction systems placed in these strata, very large mass removals will become evident.

If the scenario spelled out by the commenter in fact is evident at the conclusion of the 5 year interim period, it is possible that the Agency will decide to change the objective of the long-term cleanup.

Comment #6

There does not seem to be ample justification for an interim 5 year pump-and-treat program versus, for example, a 2-3 year program. Specifically, it is not apparent that 5 years of operation will have a more permanent effect than 2-3 years. The information does not show that the goal of "control and containment" necessitates 5 years, nor does it indicate that the agency has truly considered whether this is a more realistic approach.

Response: Based on the clean-up time estimate in the proposed plan and ' Feasibility Study, it is apparent that the selected alternative will not reach ARARs for groundwater within the 5 year time frame.

The extraction is presently estimated to take place at the relatively low rate of 50 gallons per minute. This makes it likely that a significant number of years will be necessary to judge the removal rates the system is accomplishing. In addition, fluctuating hydrologic conditions which depend on seasonal weather patterns make 5 years of data a valuable asset in making a final decision. For instance two or three consecutive drought or very rainy years could lower or raise the amount of recharge available to the aquifer and skew the data reflecting aquifer response to the remedy. Hydrologic considerations over an extended period of time can be especially important in considering the need for the optional downgradient groundwater collection trench at the toe of the soon to be completed Operable Unit I Megunko Hill cap and upgradient diversion trench.

The five year time frame coincides with the Agency's mandate under 40 C.F.R. § Section 430 (f)(4)(ii) to review actions at sites every five years where remedial actions are selected that result in hazardous substances remaining at the Site at or above levels that allow for unlimited use and unrestricted exposure. Thus the five year period should require the least overlap in the required review cycle.

Comment #7

Finally, section 300.430(e)(5) of the NCP provides that one or more innovative treatment technologies should be considered if those technologies offer "the potential for comparable or superior performance or implementability; fewer or lesser adverse impacts than other available approaches; or lower costs for similar levels of performance than demonstrated treatment technologies. "In light of the ineffectiveness of the pump-and-treat technology for the remediation of ground water, the information reviewed for the Proposed Plan does not mention whether other so-called innovative technology (e.g., bioremediation) might be used independently or in conjunction with pump-and-treat.

Response: A full range of innovative technologies was considered in the Feasibility Study. The Feasibility Study describes the reasons that each of the innovative technologies were eliminated from consideration. In-situ biological treatment in particular was screened out due to its inability to operate in environments containing high levels of toxics, including metals; and the extremely slow rate at which such treatment (even if uninhibited by toxics) would presumably take place.

Comment #8

It is not clear why the ground water cleanup standards are set at federal drinking water levels when the water is not used for drinking or even for recreational purposes. Section 300.430(e)(2)(i)(B) states the following: "Maximum contaminant level goals (MCLGs), established under the Safe Drinking Water Act, that are set at levels above zero, shall be attained by remedial actions for ground or surface waters that are current or potential sources of drinking water, where the MCLGs are relevant and appropriate under the circumstances of the release... " Section 300.430(e)(2)(i)(C) states: "Where the MCLG for a contaminant has been set at a level of zero, the MCL promulgated for that contaminant under the Safe Drinking Water Act shall be attained by remedial

actions for ground or surface waters that are current or potential sources of drinking water, where the MCL is relevant and appropriate under the circumstances of the release... " Since the ground water at the site is not currently used and has little to no potential to be used in the future for drinking water (particularly considering the other industrial operations in the area), the federal drinking water standards should not be applied to the remediation goals.

Response: The Proposed Plan and the Record of Decision proposed and selected an interim remedy which does not set groundwater cleanup levels. Thus, the comment is not relevant to the interim remedy.

The Feasibility Study's cleanup time estimates for final remedies were based in part on reaching federal drinking water standards. The lengthy time estimates to attain such standards were a factor in choosing to select an interim, rather than a final remedy.

The Federal Drinking Water standards were appropriate for use in the Feasibility Study to evaluate final remedial alternatives. The aquifer is classified as a Class I aquifer under the terms of 314 C.M.R. Section 6.00, the Massachusetts Groundwater Classification standards. Thus, it is appropriate to consider the aquifer a potential source of drinking water in identifying cleanup levels in the FS for final remedies.

Comment #9

Since even the Feasibility Study accepts that "it may take many decades to Centuries of treatment" to achieve these federal drinking water levels, this statement implies that such levels are, for all practical purposes, unachievable using current technology. Thus, the distinction between "centuries" of treatment (at great cost) and thousands of years" of non-treatment/natural flushing is academic at best, if not highly speculative.

Response: As noted above, estimated times to reach target levels in the FS are not relevant to the interim remedy selected in this Record of Decision.

It should be noted that the most lengthy of the clean-up time estimates for any of the principal contaminants found in the plume are those for 1,4 dichlorobenzene, a relatively immobile, highly adsorptive, insoluble compound. These properties all add to the rather lengthy time estimate for cleanup cited in the proposed plan and feasibility study. Other compounds, which are more mobile, soluble, and less sorptive to soils such as trichloroloethene are expected to be cleaned up within a several decade time frame. Removing these compounds from the aquifer, while not reaching ARARs for the compounds less amenable to removal, will significantly lower the potential risks from consuming contaminated groundwater.

The final cleanup decision will be based, no doubt, on a greatly expanded data base and thus will be far less speculative than the current selected alternative. Even based on the comparatively small number of samples now available, an order of magnitude difference in restoration times is still significant.

Comment #10

The NCP provides generally that " [r]emediation goals shall establish acceptable exposure levels that are protective of human health and the environment. . . " 40 C.F.R. § Section 3O0.430 (e)(2)(i). Again, since there are no private or public drinking water supply wells in the vicinity, the current risk to human health from contaminated ground water is minimal. Therefore, it does not make sense that the proposed cleanup objectives include reduction in "risks to human health associated with potential future consumption and direct contact with ground water" when there is no reason to expect any requirement for such future consumption. Human exposure can be further controlled by deed restrictions and water use controls.

Response: Cleanup levels are not being set in the interim remedy selected and thus the comment is not relevant to the selected remedy. Human exposure is in fact being controlled by institutional controls including deed restrictions and water-use controls as a component of the selected remedy. EPA's response to the question regarding potential uses of the aquifer in the future are contained in the response to Comment #8.

Comment #11

The Risk Analysis determined that health risks from ground water seepage into basements was minimal, and implied that other health risks only arose if the water became a source of household supply (which is not anticipated). Moreover, it is highly speculative to determine what exactly are the true "risks from present and future inhalation of evaporated ground water contaminants" and the probability of such exposure ever occurring especially since exposure would be in open areas. The risks appear to be minuscule at best, if not imaginary.

Response: The inhalation risks which were considered in the EPA Risk Assessment concerned the possibility of such exposures to the residents whose basements overlie the contaminated plume and the possibility of exposures while showering in water collected from a private well. The Risk Assessment did conclude that such risks are minimal for the basement exposure scenario, however, the private well scenario (of which the showering exposure was a component) risk estimate was is in excess of EPA'S target risk range by a considerable margin.

Comment #12

In general, the information reviewed in the Risk Analysis does not support the preferred option nor any of the other options. EPA appears to have conducted a rather flawed evaluation process with their analysis conflicting with their recommended actions. Perhaps the agency was motivated by its perceived need to have to "do something", and by local pressures.

Response: The Risk Assessment indicated that the risks due to exposure to private well supplies within the plume area are above the target risk range cited in the NCP of 10^{-4} to 10^{-6}. The need to reduce those risks supports the recommended action, which is the selected alternative in this ROD.

Comment #13

Using the information reviewed, the proposed costs for installation and operation of the pump-and-treat system appear to be high. Moreover, the time to design and install the system also appears lengthy. Section 300.430(e)(7)(iii)

provides that cost shall be a factor in considering remedial alternatives. "Costs that are grossly excessive compared to the overall effectiveness of alternatives may be considered as one of several factors used to eliminate alternatives." In light of the highly questionable long-term effectiveness of pump-and-treat technology for this site, the costs for installing and operating this system for an excessive period of time raise additional questions about the selection of the preferred alternative.

Response: The cost estimates were developed in the Proposed Plan as 5 year alternatives. The selected alternative was not the least or most costly developed. Cost was considered in selecting the interim remedy as required by the NCP. Further, the question of long- term cost and effectiveness will be dealt with in the context of a final Record of Decision based on pre-design studies and the operational history of the remedy. The commenter's statement regarding long-term cost effectiveness is not relevant to the five year interim remedy.

Comment #14

Several commenters questioned whether EPA intended to add to the PRP list for the Site landowners who own property within the "Nyanza Contaminant Groundwater Plume" as shown on Figure 3 of the EPA's June 1991 Proposed Cleanup Plans for Operable Unit 2?

Response: This comment relates to enforcement matters and is not a comment relevant to remedy selection. It would be inappropriate for EPA to comment enforcement matters at this time.

Comment #15

A certain individual was a one time the plant manager for the Nyanza Chemical Company at the same time that he was the Chairman of the Ashland Board of Selectmen and the Ashland Board of Health. The Town of Ashland should therefore be named as a Potentially Responsible Party since this individual had a conflict of interest in not responding to complaints about disposal practices at the plant.

Response: This comment relates to enforcement matters and is not a comment relevant to the selection of the remedy. It would be inappropriate for EPA to comment on enforcement matters at this time.

Comment #16

It is apparent that the groundwater contamination has migrated beyond the Nyanza property boundary into what is called the Nyanza Site Study area. The possibility that bedrock and surficial geological compartments may act as sources of contaminants following remediation of site-specific sources (e.g. Megunko Hill, vault area) is noted. This finding may have significant implications on the costs and timetables for potential remediation strategies. We would like to review any additional future assessments of the effects of Nyanza I remediation actions on the Nyanza II process. We would like an opportunity to review the companion reports on risk assessment and the feasibility study. In particular, we would like to review cost/benefit analyses of various alternatives in relation to human health risk assessments. It is apparent that the Nyanza 1, II, and. Ill will be a very costly and long remediation program. Consequently we are concerned with the optimization of the cost/benefit relationship in future remediation actions.

Response: It is inferred that the comment regarding geologic compartments acting as "sources" of contaminants refers to the possible presence of NAPLs. See Response to Comment #6.

The effects of the Nyanza I remediation effort will be looked at during the implementation of RA-2 as part of the effort to ascertain whether a downgradient groundwater collection system near the Operable Unit 1 cap, now nearing construction, will be necessary.

The Feasibility Study and Risk Assessment, as well as all other supporting documents for this Operable Unit have been available since June 27, 1991 at the information repositories located at the Ashland Public Library and the EPA Records Center, 90 Canal Street, Boston, 1st Floor. A companion Administrative Record for the Operable Unit 1 Record of Decision is also located at the same repositories.

The consideration of costs in the remedy selection process are outlined in the Feasibility Study, Proposed Plan and in the attached Record of Decision.

EPA will make its final decision with regard to this Operable Unit based on information which will be made available to the public in an administrative record.

2. Summary of Resident and Town Official Comments r

Comment #17

Although supportive of the proposed plan's cleanup objectives and interim pump-and-treat approach, one commenter stated that the selected alternative would not meet the stated objectives as well as or as completely as remedial alternative 4 (RA-4) or an expanded version of the selected alternative in the area outside of the zone of influence of the proposed extraction alternative (RA-2). The commenter suggested that further consideration be given to an expansion of EPA's preferred alternative to effect groundwater cleanup over the entire area of contamination in an attempt to more fully achieve its goals. The additional wells in the Forest Avenue or Tilton Avenue area would more fully effect the cleanup, be less disruptive (than alternative RA-5), add a minimum of cost and more fully realize each of the cleanup goals.

Response: The migration of contaminants into the area unaffected by the extraction scheme in RA-2 will be reduced due to the removal of contaminant mass at locations feeding the plume in the vicinity of the Site. Reduction of risk to human health associated with potential future consumption and direct contact with groundwater and from risk due to present and future inhalation of evaporated groundwater contaminants will be achieved using institutional controls both within and outside the zone of influence of the Alternative RA-2 extraction scheme. In EPA's judgement, placing additional wells outside the immediate Site area at this time would cause disruption to residential areas and the selected remedy as an interim remedy is protective. As stated in the section of the June, 1991 Proposed Plan entitled "Proposed Cleanup Objectives and Levels", RA-2 is proposed as an interim step towards meeting a final Record of Decision to address the entire contaminated plume area. Thus, work will include performing further testing in the eastern portion of the plume to help determine the feasibility of cleaning up groundwater in this area in the future, and performing monitoring of existing monitoring wells to track any further progress

of the plume. Until this work is complete and the effectiveness of the alternative RA- 2 is monitored over the 5 year interim period, it is premature to decide upon the necessity of the construction of an enlarged collection network or to enumerate the exact numbers of extraction wells to be built.

Comment #18

One commenter suggested that Alternative RA- 5 should be implemented for the following reasons:

> "Although your report states that RA-2, RA-4 and RA-5 when viewed as interim remedies, would provide similar information leading tho the choice of a final remedy, it also states that "over a five year period, alternative RA-5 would provide the most effective removal of contaminants because wells would be placed at many locations throughout the study area.
>
> If alternatives RA-2 through RA-5 all reduce toxicity, mobility, and volume of organic contaminants; and alternative RA-2 reduces the mobility, toxicity, and volume of organic compounds less than alternatives RA-3, RA-4, and RA-5, because it treats a smaller portion of the entire plume; and if RA-2 is superior to RA- 3 since it attempts to capture contaminants closer to their source; then RA- 5 must be superior to RA-2 because it treats the entire plume.
>
> "The Proposed Plan also states that "RA-2 with its focus primarily in an industrial area would cause the least ... disruption because of its many locations". The residential area concerns presented in the short-term effectiveness and implementability criteria would be mitigated by using other available industrial and/or residential B land, located on the plume. Gordon-Mindick Properties could make available land/or buildings that would allow for the effective removal of contaminants from the entire plume in an area that would cause the least amount of disruption to a residential area."

Response: The Comparative Analysis in the proposed plan indicated that RA- 2 would be superior to the other active alternatives (RA-3 through RA-5) since it would allow for the collection of data to be used in the final selection process, while addressing the area of highest contamination, at the least cost, and with the least disruption to the community outside the Site area. All of these factors were balanced towards selecting the RA-2.

EPA understands that Gordon- Mindick Properties is at this time willing to make land available for the installation of facilities in the eastern area of the plume. Such land may be considered during the final decision making process, following implementation of the interim remedy. This offer does not however change EPA's judgement that RA- 2 is superior as an interim remedy because it will allow the collection of the information necessary to make a final decision while causing less disruption to the surrounding community.

Comment #19

The Ashland Board of Health endorses EPA's proposed remedial action plan, RA-2 because the more expansive extraction alternatives present the possibility that ".. a release of contaminants, either in the liquid or gaseous state, from the wells or the pipelines into the residential area" could occur.

Response: EPA acknowledges the support of the Ashland Board of Health. Although the possibility of such a release could probably be made very remote through conservative construction practices, it is nonetheless true that the risk is greater for alternatives using more wells and larger collection schemes.

Nyanza Chemical Waste Dump site Responsiveness Summary:

Section IV: Transcript of Comments Received During July 18, 1991 Public Hearing

COMMONWEALTH OF MASSACHUSETTS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PUBLIC HEARING before the Environmental Protection Agency, held at the Ashland High School, Ashland, Massachusetts, on Thursday, July 18, 1991, commencing at 7:10 p.m., concerning:

E.P.A. PROPOSED CLEANUP PLAN FOR THE
NYANZA CHEMICAL WASTE DUMP SITE

BEFORE:

Pamela Shields, Biologist, as Hearing Officer
David Lederer, Remedial Project Manager
Jay Naparstek, Senior Project Manager

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I N D E X

P R O C E E D I N G S

HEARING OFFICER SHIELDS: Okay. I guess we should get started. Good evening. My name is Pam Shields. I am a biologist at the U.S. Environmental Protection Agency, and I am going to be the Hearing Officer for tonight's hearing on the proposed cleanup for the groundwater contamination at Nyanza.

First, I would like to introduce the other members of the panel up here for those of you who don't know them. At the far right is Jay Naparstek, who is with the Massachusetts Department of Environmental Protection; and closest to me is David Lederer, who is the Project Manager for E.P.A.

For those of you who are unfamiliar with the Nyanza site, E.P.A. has divided the site into three phases or operable units. The first phase deals with soils and sediment on site, and these are currently being excavated, stabilized, and consolidated with the rest of the waste that is on the hill of the site and will then be capped after the consolidation. This phase is currently

under way and is under the management of the U.S. Army Corps of Engineers, and is nearing completion. The cap should be completed this year.

The second phase of the project addresses contaminated groundwater and is the subject of tonight's hearing.

The third phase of the project addresses contamination in the Sudbury River, as well as the wetland area immediately adjacent to the site. The third phase is currently undergoing a remedial investigation to determine the nature and extent of the contamination and to evaluate the risk to human health and the environment based on contamination in the river.

Back on June 26, the E.P.A. held a public hearing here to present the results of a feasibility study, which examined the various alternatives to clean up the contaminated groundwater and then presented the E.P.A.'s preferred approach to the cleanup. This was followed by a question and answer period.

After I finish my introductory remarks tonight, Dave Lederer is going to present and

recap the proposed plan, and then we will begin the actual hearing.

The purpose of the hearing tonight is to allow the public comment on the E.P.A.'s proposed cleanup strategy for the groundwater. We will be transcribing the meeting and will later produce a printed transcript, which will become part of the administrative record which is used by the E.P.A. to make the final remedy decision. If you want to buy your own copy of the transcript, you should make arrangements directly with the transcription service.

In order to ensure accuracy of the record, I ask that anyone who wishes to make a statement fill out an index card, which were provided outside, with their name, address and affiliation, if any. I will then call on people in the order that they have signed up, and they can make their statement. I have to reserve the right to limit time available for individual statements to ten minutes so that everyone who wants to make a statement will get a chance to.

I want to make it clear that tonight's hearing is not for questions and answers. E.P.A.

will not be responding to questions; however, you may ask questions, and they will become part of the record, and the E.P.A. will respond to them in our Responsiveness Summary, which will be part of our final decision document, which will be coming out later this fall.

In addition to statements of tonight's hearing, you can also submit written comments for E.P.A.'s consideration. These comments should be directed to David Lederer, and the address is given in the proposed plan. The written comments must be postmarked no later than July 26, 1991.

Finally, I want to remind you that copies of the Administrative Record are located at the Ashland Public Library and at E.P.A.'s offices in Boston and that you can review these materials at your convenience during normal business hours.

Before I turn it over to Dave, are there any questions regarding the hearing format or public participation in the process?

Dave.

MR. LEDERER: Hello, everyone. Glad to see we have so many people turn out tonight on such a hot night. I am going to very briefly

recap what is in the proposed plan so that we can get on with what the real business of tonight is, which is hearing from the people.

We are here to talk about the groundwater remedy, an intro groundwater remedy, for the Nyanza site. As you may or may not know, the original Record of Decision was signed in 1985 for the site, which involved a decision to build the cap project, which is now nearing completion. Since 1988, E.P.A. has been conducting studies of the groundwater contamination problem, which emanates from the site and has moved to areas which are north and east of the site.

Over the course of the investigation, E.P.A. drilled two sets of wells in 1988 and in 1990, and we discovered that groundwater contamination consisting of organic contaminants and inorganic contaminants had moved north and east of the site and are presumably intercepted by the Sudbury River. For those of you who have the proposed plan, the approximate extent of the groundwater plume is shown in figure three.

The preferred alternative, the one we are selecting, or the one we are proposing

tonight, we should say, is an interim remedy. An interim remedy is designed to take action to protect human health and the environment in the short term, while a final remedial action is being developed. The interim remedy, which we are talking about tonight, will operate for a minimum of five years. A final Record of Decision, or R.O.D. as you will hear us call it, for groundwater will be based on the data collected during the design, operation and monitoring of the remedial remedy.

Some of the things that the remedy includes are: Extracting contaminated groundwater for that five-year period from the northern portion of the site near the railroad tracks and the industrial park along Megunko Road and optionally at the southern boundary of the cap now being constructed on Megunko Hill; treating that groundwater with a combination of processes; discharging the treated water into the Sudbury River after treatment; using institutional and access controls to limit exposure to the underground contaminants; performing testing of groundwater extraction capacity in the eastern

portion of the plume to help determine the feasibility of cleaning up groundwater in that area; installing additional deep bedrock wells to more fully define the depths and locations to which contaminants may have migrated; performing continuous monitoring of existing residential and monitoring wells to track any further progress of the plume; inspecting the Megunko Road water line as a precautionary measure to make sure there isn't any possibility that wastes have caused the line to deteriorate; performing predesign studies to aid in the design of the selected remedy.

That pretty much summarizes what the proposed plan says. If people have questions about it, as Pam said, the format of the hearing is that statements are made by the people in attendance. We are not responding to the questions during the meeting. If people want to approach me after the meeting is over, that is fine.

With that, I will turn it back to Pam.

HEARING OFFICER SHIELDS: Thanks, David.

Okay. We will now begin the hearing, and the first person who is signed up to speak tonight is Joel Silverstein.

JOEL SILVERSTEIN: Thank you.

My name is Joel Silverstein. I am representing Morton Mindy Properties at 1050 Main Street here in Ashland.

What we would like to --

HEARING OFFICER SHIELDS: Could I ask that you speak up a little. We are having trouble hearing.

JOEL SILVERSTEIN: Sorry. My name is Joel Silverstein, and I represent Morton Mindy Properties at 1050 Main Street here in Ashland, and we would like to go on public record asking that the entire plume be treated, and that the alternative RA-5 be implemented. To that end, we can or could provide industrial land, residential B land and/or industrial buildings to meet those ends.

In addition, I would like to submit this statement, for the record. In the spirit of being brief, I just assume submit it rather than read it.

Thank you.

HEARING OFFICER SHIELDS: Okay. The next speaker is Doctor Henry Fassler.

HENRY FASSLER: For the record, I am Doctor Henry Fassler, Chairman of the Ashland Board of Health.

The Ashland Board of Health unanimously endorses the E.P.A.'s preferred remedial action plan, RA-2. In endorsing this plan, the Board would like to note that if the area in question is unpopulated or even populated low density we would have endorsed plan RA-5.

It is the understanding of the Ashland Board of Health that plan RA-2 calls for placement of approximately five recovery wells, all within the Megunko industrial area; that the product from these wells will be piped to a central filtration within the industrial area, and that the clean discharge from that facility will meet drinking water standards, and be returned to the Sudbury River.

The Ashland Board of Health, after studying RA-4, cannot endorse the Board of Selectmen's call for implementation of that plan.

It is the understanding of the Board of Health that plan RA-4 will do all the features of plan two, plus it includes four wells in place in the residential areas of Pleasant Street, Tilton Road, Cherry Street and Water Street, and that the contaminant will be taken by pipe from those wells to the treatment facility in the industrial area. Presently, monitoring wells have shown us the highest level of contaminants in that area are 40 to 70 feet below the surface of the ground. Monitoring in basements in that area indicated no contamination of those basements. Apparently, that 40 to 70 feet of soil is protecting those residents from the contaminated groundwater. The Board of Health does not feel that it would be proper to bring that groundwater to the surface and then pipe it in its contaminated form through the residential area.

Even though the Board of Health acknowledges that the E.P.A. and its contractors will do everything in its power to prevent the release of contaminants, either in liquid or in gaseous state from the wells or from pipelines in the residential area, the possibility of such a

leak does exist in the implementation of RA-4. The Board of Health believes in Murphy's Law. For the record, Murphy's Law states very simply, what can go wrong will go wrong. I believe in Fassler's Law, which for the record states Murphy was an optimist.

In weighing RA-4, you find that the risks from the wells and the pipelines in the residential area will not counter a slight decrease in cleanup time, which is measured in decades and hundreds of years. We do not feel that the decrease in cleanup time offsets an increase in potential dangers to the residents of that neighborhood having pipelines and wells in their neighborhood.

In endorsing the E.P.A.'s remedial action of RA-2, the Board of Health is only endorsing the rough concept put forth within the plan and urges the E.P.A. to work closely with all appropriate town departments when developing the details of the design, bidding and construction phases so that the problems similar to the experience in Phase I are not repeated.

Thank you.

HEARING OFFICER SHIELDS: Okay. That is it for people who have signed up to speak. I understand that there are people who didn't want to sign cards but still may want to get up and speak. So if people want to raise their hand or whatever, I will ask that you move up to the mike and speak your name and any affiliation, and then speak your statement clearly.

Would anyone else like to make a statement?

BARRY BRESNICK: Good evening.

I am Barry Bresnick. I am the Vice Chairman of the Board of Ashland Selectmen.

Again, I want to thank you all for coming out tonight and for holding this public hearing on what I think the Board of Selectmen and the Board of Health would all agree is a very positive proposal.

The Board of Selectmen have chosen to make comments which are slightly different, but in principle, I believe, very much the same as Doctor Fassler. We do support the fact that you are interested in coming and continuing with the Phase II cleanup of the groundwater, the details

of which we may not all agree on 100 percent, but I think we are certainly in agreement 90 percent. So I have a letter which I have drafted on behalf of the Board of Selectmen, and it will be in the mail most likely tomorrow to Mr. Lederer, and basically what the letter does is recognize the contribution of the E.P.A. and various other federal and state agencies towards the cleanup of the Nyanza site, and in general in support of the plan, certainly in principle. Where we differ a little bit from the Board of Health is that this letter that I would like to read into the record makes mention of the goals of the criteria which the E.P.A. set up as what they wanted to accomplish in this cleanup, and they were:

(1) To reduce migration of contaminants in groundwater;

(2) Reduce risk to human health associated with potential future consumption and direct contact with groundwater;

(3) Reduce risk from present and potential future inhalation of evaporated groundwater contaminants;

(4) Limit degradation of the Sudbury

River and wetlands from the discharge of contaminated groundwater;

And the fifth goal of your proposal was to comply with state and federal applicable, relevant and appropriate requirements, including drinking water standards.

In reviewing the five alternative scenarios as outlined in the plan, the Board of Selectmen supports in principle the E.P.A.'s recommendation for a pilot program to treat the groundwater contamination using the pump and treat method. We further support the five-year program of evaluating the technology and performance of the pump and treat method.

However, the Board of Selectmen believes that the E.P.A.'s preferred alternative two will not achieve the stated objectives as well or as completely as alternative four or by an expansion of alternative two. Alternative two will potentially over time effect and achieve each of the five standard objectives, but not throughout the entire contaminated area. Alternative two will begin the long and difficult task of cleansing the most heavily contaminated

area, and it will effect approximately two-thirds of the area. However, none of the five stated objectives will be met either in part or in full in the balance of the contaminated area.

It is the recommendation of the Board that further consideration be given to an expansion of the E.P.A.'s preferred alternative to effect groundwater cleanup over the entire area of contamination in an attempt to more fully achieve its goals. We do not recommend an evasive and potentially disruptive alternative, as presented in alternative five. Perhaps just one or two additional wells in the Forest Ave. or Tilton Ave. area would more fully effect the cleanup, be less disruptive add a minimum of cost and more fully realize each of the goals.

The Board of Selectmen, on behalf of the the town, wishes to once again express our thanks and support to the E.P.A. and others involved in the Nyanza odyssey. We look forward to working cooperatively with the E.P.A. towards the goal of continuing the cleanup of the Nyanza site; and as I mentioned before, there may be some disagreement on the details, but I think in

principle we are all very much behind you.

Thank you.

HEARING OFFICER SHIELDS: Okay. Is there anyone else who would like to make a statement?

Okay. Well, I guess if there are no further statements, I will close the hearing. Thanks for your participation, and I ask that people who wish to submit written comments make sure they do so before the deadline of July 26.

Yes.

JOHN ELLSWORTH: I would like to make a comment.

HEARING OFFICER SHIELDS: Okay.

JOHN ELLSWORTH: I didn't think it was going to go this quickly. My name is John Ellsworth. I am Chairman of the Board of Selectmen in the Town of Ashland.

I just would like to sort of put a cap on tonight and recognize individuals and maybe more people with a little bit of history. This thing started in the late '70s, early '80s, as far as Ashland was concerned through the efforts of a group of people known as the Ashland Advocates for

a Cleaner Environment, and at times they were pushing a very, very large boulder up a very steep hill. Until the Superfund types of things were funded, were recognized as required, they were following the Love Canal model, talking daily, weekly, whatever Lois gives trying to get people's attention, and slowly, but surely, things began to come around, and Superfund was finally voted.

The E.P.A. recognized Nyanza for what it was in the Town of Ashland, and for what it was not. Because of Nyanza, there was sort a collective sigh of relief breathed by a lot of people. I think most of the townspeople were very, very pleased to see the E.P.A. come into the town along with the D.E.P. and all the other agencies that were involved.

I suspect at times, for those who were involved in the process, and now I think I am understating things just a little bit, that it may have been an example of the democratic process working at its best, but I have to believe that those who were involved in some of the discussions were probably dealing with excessive amounts of Excedrin headache number whatever at various times

of the process, and I would particularly like to note two individuals who were deep into that process, Dave Lederer and Ira Nadelman.

These people stuck with it, basically pushed the plans through, got the project onto track, answered our questions. There were valid questions raised and valid issues raised. There were issues raised by people who were concerned. People had definite worries about the health of themselves and their children, and I think that these two gentlemen in particular, but I think the whole E.P.A. handled the process in what I have to basically point out is an exemplary fashion.

I would like sincerely on behalf of the town and Board of Selectmen to thank you two gentlemen for what you have done for us. I would also like to just thank the E.P.A. for not basically looking at Phase II and saying, hey, it's way down in the ground. We have to leave it there, and we will go do something else.

It has been characterized as an experiment. I characterize it is an experiment that is going to do good, because it is going to get junk out of the ground that is potentially a

health risk to the folks in the neighborhood, and my reading of the plan and the other people who have spoken tonight is that on balance it is a solid, good plan for the Town of Ashland. For that, we thank you very much.

We look forward to the process proceeding, and we look forward to the next phase being implemented, and I personally would like to lead this audience in a round of applause.

(Applause.)

HEARING OFFICER SHIELDS: Okay. Is there anyone else who would like to submit a statement?

Okay. On that note, I will close the meeting. Again, if people want to submit written comments, they can do so. They should do so by July 26, and thank you very much for coming.

(Whereupon, at 7:30 p.m., the hearing was adjourned.)

C E R T I F I C A T E

I, Marianne Kusa-Ryll, Registered Professional Reporter, hereby certify the foregoing to be a true and complete transcript of the proceedings held at the Ashland High School, Ashland, Massachusetts, on Thursday, July 18, 1991.

Marianne Kusa-Ryll

Marianne Kusa-Ryll, RPR

Nyanza Chemical Waste Dump Site Responsiveness Summary:
Section V: Written Comments Received During Comment Period

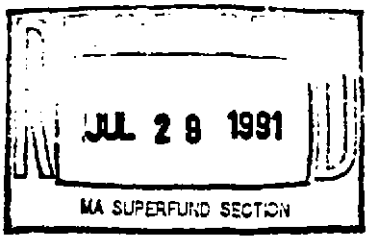
Law Offices of
CATANZARO & EFFREN, P.C.
25 West Union Street
Ashland, Massachusetts 01721

(508) 881-4950

FAX No.:
(508) 881-7563

Jerry C. Effren

Rosemary A. Bosselait
Ronald M. Stone



FEDERAL EXPRESS

July 26, 1991

Mr. David Lederer
Remedial Product Manager
U.S. ENVIRONMENTAL PROTECTION AGENCY
Wast Management Division (HRS-CAN2)
J.F.K. Federal Building
Boston, Massachusetts 02203-2211

RE: *NYANZA SUPERFUND SITE*
ASHLAND, MASSACHUSETTS

Dear Mr. Lederer:

Enclosed please find comments on the Nyanza Operable Unit II Report on behalf of AIF Realty Trust and Environmental Restoration Engineering Realty Trust.

If you have any questions, please do not hesitate to contact me.

Very truly yours,

CATANZARO & EFFREN, P.C.

Jerry C. Effren, Attorney for
AIF Realty Trust and
Environmental Restoration
Engineering Trust

JCE/dpm
Enclosures
JCE058/40/

MEMORANDUM ON NYANZA II

TO:

FROM: George Camougis, Consultant to AIF Realty Trust and Environmental Restoration Engineering Realty Trust

DATE: July 26, 1991

RE: Nyanza Superfund Site, Nyanza Operable Unit II Report

==========

1. AIF Realty Trust and Environmental Restoration Engineering Trust are hereby submitting comments on the Draft Final Remedial Investigation Report, Nyanza II - Groundwater Study, Ashland, Massachusetts, April 1991, (Nyanza II Report).

2. These comments are based on review of Nyanza II Report, Volume I and Volume II (Appendices). We would like these comments to become part of the public comment records supporting a final Record of Decision (ROD) on the Nyanza Operable Unit II (groundwater contamination).

3. We note the extensive geophysical and geological investigations (Sections 2.0 and 3.0; Appendices), plus the equally extensive investigation of the chemical contaminants (Section 4.0; Appendices) in the groundwater and soil. It is apparent that the groundwater contamination has migrated beyond the Nyanza property boundary into what is called the Nyanza Site Study Area, (Sections 4.0, 5.0 and 6.0).

4. With some exceptions, most of the oganic chemicals (volatiles and semivolatiles) are below the 1-10 ppm concentration range in the groundwater (sections 4.0 and 5.0). Metals, especially chromium, lead and mercury, are also present in significant levels in the study area. The assessment that sodium may act as a conservative indicator of contaminant migration (Section 5.0) is noted.

5. The possibility that bedrock and surficial geological compartments may act as sources of contaminants following remediation of site-specific contaminant sources (e.g., Megunko Hill, vault area) is also noted. These findings have significant implications on the costs and timetables for potential remediation strategies.

6. The Nyanza II Report indicates that there is time overlap between the implementation of the Nyanza Operable Unit I remediation schedule and the Nyanza Operable Unit II investigation. We would like to review any additional future assessments of the effects of Nyanza I remediation actions on the Nyanza II RI/FS process.

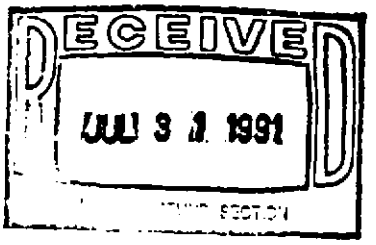
7. We would like an opportunity to review the companion reports on risk assessment and the feasibility study. In particular, we would like to review cost/benefit analyses of various remediation alternatives in relation to the human health risk assessments.

8. It is now clear that Nyanza I, II and III will be a very costly and long remediation program. Consequently, we are concerned with the optimization of the cost/benefit relationship in future remediation actions.

Arent Fox Kintner Plotkin & Kahn

Katherine H. Nam
202/857-6081

July 26, 1991



VIA CERTIFIED MAIL

Mr. David Lederer, Remedial Project Manager
U.S. Environmental Protection Agency
Waste Management Division (HRS-CAN2)
J.F.K. Federal Building
Boston, Massachusetts 02203

Re: Nyanza Superfund Site, Ashland, Massachusetts
Cleanup Alternatives for Groundwater Remediation

Dear Mr. Lederer:

On behalf of Rohm Tech, Inc., enclosed are our comments to EPA's preferred alternative, as well as the other cleanup alternatives under consideration, concerning the groundwater remediation at Nyanza. These technical comments have been prepared by AFTECH Limited Partnership, an environmental consulting firm, which reviewed the cleanup alternatives.

We look forward to EPA's response to our comments.

Sincerely,

Marc L. Fleischaker KHN

Marc L. Fleischaker

Attachment

1050 Connecticut Avenue, NW
Washington, DC 20036-5339

Telephone: 202/857-6000
Cable: ARFOX
Telex: WU 892672
ITT 440266
Facsimile: 202/857-6395

7475 Wisconsin Avenue
Bethesda, Maryland 20814-3413

8000 Towers Crescent Drive
Vienna, Virginia 22182-2733

AFTECH

COMMENTS TO PROPOSED PLAN
NYANZA SUPERFUND SITE

These comments were developed from a review of the EPA Region I Summary of the Proposed Plan for the Nyanza Chemical Waste Dump Site, Ashland, Massachusetts, dated June 1991, Summary document.

1. Pump-and-Treat Technology

In general, all of the cited "options" for interim action are merely different versions of the same plan (i.e., pump-and-treat), with varying locations and numbers of extraction points. The National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), at 40 C.F.R. § 300.430(e)(4), provides that with regard to ground water response actions, the lead agency shall develop a limited number of remedial alternatives that attain site-specific remediation levels within different restoration time periods utilizing one or more different technologies.

Since pump-and-treat technology has yet to succeed in "cleaning up" any Superfund site ground water down to federal drinking water standards 1/, such a cleanup cannot be regarded as achievable using this technology. The sole objective should therefore be the prevention of the spread of the contamination plume (i.e., control versus remediation) and a general overall reduction in the level of toxics in the plume. The regulations require the lead agency, in regard to source control actions, to develop where appropriate alternatives that involve little or no treatment, but provide protection of human health and the environment by preventing or controlling exposure to hazardous substances through engineering controls such as containment. 40 C.F.R. § 300.430(e)(3)(ii). This requirement deserves further consideration and review. If there is no proven applicable technology which is more effective than pump-and-treat in five years (and there currently is no strong indication that there will be), it is highly unrealistic to expect that a "final decision" regarding remediation to MCL levels could be reached at that time.

Moreover, over time, pump-and-treat systems may result in an initial reduction in contamination, followed by

---

1/ Travis, C.C. and Doty, C.B. (1990): "Can contaminated aquifers at Superfund sites be remediated?" Environ. Sci. Technol. 24, 1464-1466.

a plateau[2/]. A return of contamination to initial or even higher levels has been known to occur when the system ceases operation[3/]. This possibility does not appear to have been adequately considered in the Feasibility Study. Based on the contaminants identified, many of which are nearly insoluble nonaqueous-phase liquids (NAPLs), and the fact that the overall quantity of these NAPLs released is not clearly known, such a situation is a distinct possibility for the site. Perhaps the "decades to centuries" cleanup estimate alludes to this factor. If so, this should be a predominant factor in the system design and more reason to have plume containment rather than aquifer restoration as the primary objective.

Given the above considerations, there does not seem to be ample justification for an interim 5 year pump-and-treat program versus, for example, a 2-3 year program. Specifically, it is not apparent that 5 years of operation will have a more permanent effect than 2-3 years. The information does not show that the goal of "control and containment" necessitates 5 years, nor does it indicate that the agency has truly considered whether this is a more realistic approach.

Finally, section 300.430(e)(5) of the NCP provides that one or more innovative treatment technologies should be considered if those technologies offer "the potential for comparable or superior performance or implementability; fewer or lesser adverse impacts than other available approaches; or lower costs for similar levels of performance than demonstrated treatment technologies." In light of the ineffectiveness of the pump-and-treat technology for the remediation of ground water, the information reviewed for the Proposed Plan does not mention whether other so-called innovative technology (e.g., bioremediation) might be used independently or in conjunction with pump-and-treat.

2. Ground water Cleanup Standards

It is not clear why the ground water cleanup standards are set at federal drinking water levels when the

---

2/ Mackay, D.M. and Cherry, J.A. (1989): "Groundwater contamination: Pump-and-treat remediation", Environ. Sci. Technol. 23, 630-636.

3/ "Evaluation of Ground-Water Extraction Remedies", USEPA OSWER (1989) EPA/540/2-89/054, Vol. 1, pp 2.14.

water is not used for drinking or even for recreational purposes. Section 300.430(e)(2)(i)(B) states the following: "Maximum contaminant level goals (MCLGs), established under the Safe Drinking Water Act, that are set at levels above zero, shall be attained by remedial actions for ground or surface waters that are current or potential sources of drinking water, where the MCLGs are relevant and appropriate under the circumstances of the release. . . " Section 300.430(e)(2)(i)(C) states: "Where the MCLG for a contaminant has been set at a level of zero, the MCL promulgated for that contaminant under the Safe Drinking Water Act shall be attained by remedial actions for ground or surface waters that are current or potential sources of drinking water, where the MCL is relevant and appropriate under the circumstances of the release . . . " Since the ground water at the site is not currently used and has little to no potential to be used in the future for drinking water (particularly considering the other industrial operations in the area), the federal drinking water standards should not be applied to the remediation goals.

Furthermore, since even the Feasibility Study accepts that "it may take many decades to centuries of treatment" to achieve these federal drinking water levels, this statement implies that such levels are, for all practical purposes, unachievable using current technology. Thus, the distinction between "centuries" of treatment (at great cost) and "thousands of years" of non-treatment/natural flushing is academic at best, if not highly speculative.

3. Risk Analysis

The NCP provides generally that "[r]emediation goals shall establish acceptable exposure levels that are protective of human health and the environment . . . " 40 C.F.R. § 300.430(e)(2)(i). Again, since there are no private or public drinking water supply wells in the vicinity, the current risk to human health from contaminated ground water is minimal. Therefore, it does not make sense that the proposed cleanup objectives include reduction in "risks to human health associated with potential future consumption and direct contact with ground water" when there is no reason to expect any requirement for such future consumption. Human exposure can be further controlled by deed restrictions and water use controls.

The Risk Analysis determined that health risks from ground water seepage into basements was minimal, and implied

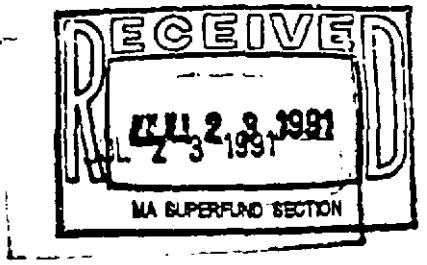
that other health risks only arose if the water became a source of household supply (which is not anticipated). Moreover, it is highly speculative to determine what exactly are the true "risks from present and future inhalation of evaporated ground water contaminants" and the probability of such exposure ever occurring especially since exposure would be in open areas. The risks appear to be minuscule at best, if not imaginary.

In general, the information reviewed in the Risk Analysis does not support the preferred option nor any of the other options. EPA appears to have conducted a rather flawed evaluation process with their Analysis conflicting with their recommended actions. Perhaps the agency was motivated by its perceived need to have to "do something", and by local pressures.

4. Cost

Using the information reviewed, the proposed costs for installation and operation of the pump-and-treat system appear to be high. Moreover, the time to design and install the system also appears lengthy. Section 300.430(e)(7)(iii) provides that cost shall be a factor in considering the remedial alternatives. "Costs that are grossly excessive compared to the overall effectiveness of alternatives may be considered as one of several factors used to eliminate alternatives." In light of the highly questionable long-term effectiveness of pump-and-treat technology for this site, the costs for installing and operating this system for an excessive period of time raise additional questions about the selection of the preferred alternative.

July 19, 1991



David Lederer, Remedial Project Manager
U. S. Environmental Protection Agency
Waste Management Division
JFK Federal Building (HRS-CAN 2)
Boston, MA 02203

Re: Comment/Question - Nyanza Operable Unit 2 - Groundwater Cleanup

Does the EPA intend to add the landowners to the PRP list who own property within the "Nyanza Contaminant Groundwater Plume" as shown on Figure 3 of EPA's June 1991 Proposed Cleanup Plans for Operable Unit 2? Why?

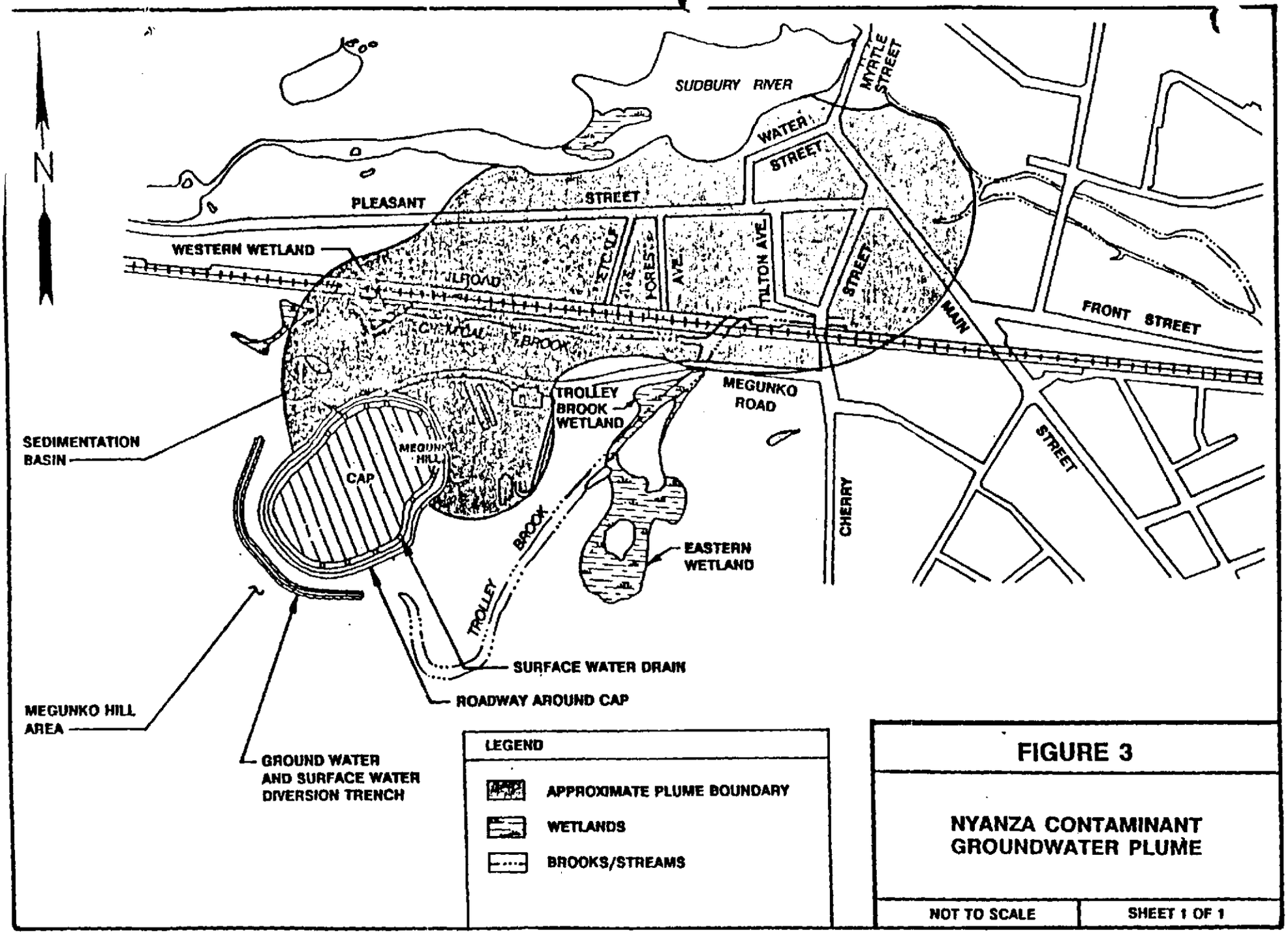
Sincerely,

Claudia Lefter

Claudia Lefter
165 Fountain St.
Ashland, MA 01721

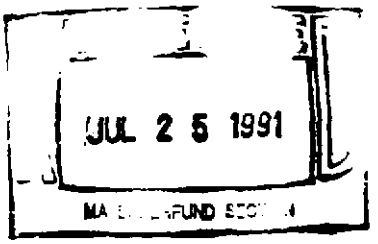
EPA Figure 3 Attached

Reference: Section 107(a)(1) of CERCLA - imposes liability for response costs on owners or operators of "facilities" from which there is a release or threatened release of a hazardous substance. A "facility" is defined under Section 101(9) as including, among other things, any building, structure, equipment, pit, pond, storage container, motor vehicle, etc., and any "area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located."



10 Nyanza Site

BARBARA A. BEAUDOIN
FOR
WILLIAM M. LEACU
BOX 182
ASHLAND, MASS. 01721



DAVID [illegible] REMEDIAL PROJECT MANAGER
U. S. ENVIRONMENTAL PROTECTION AGENCY
WASTE MANAGEMENT DIVISION(HRS_CAN 2)
JFK FEDERAL BUILDING
BOSTON, MASS. 02203

On July 27th, 1991, the public comment period will close for the Interim Groundwater Cleanup Plan, Operable Unit 2, Nyanza Superfund Site, Ashland.

Operable Unit 2 is designed to treat the contaminated groundwater plume as depicted in EPA Proposed Plan, "EPA Proposes Cleanup Plan for the Nyanza Chemical Waste Dump Site", June 1991.

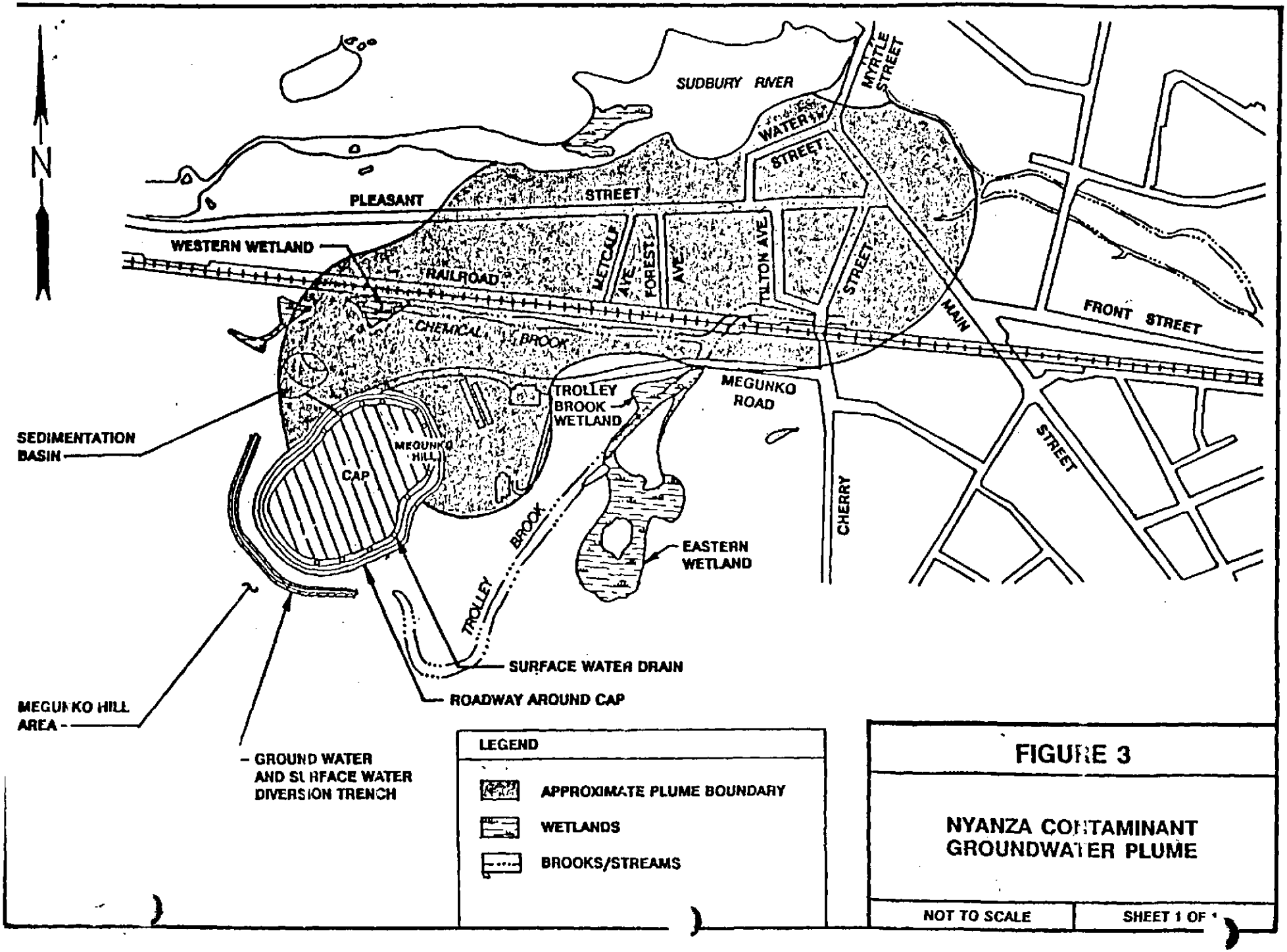
Since the groundwater plume covers approximately 1/2 mile east and northeast of Megunko Road (which includes all of the land adjacent to the following streets, Metcalf, Forest, Tilton, and Water Streets, and portions of Pleasant, Myrtle and Main Street) we respectifully submit that all landowners within the boundardies (as shown on the enclosed EPA Figure 3, Nyanza Contamnant Groundwater Plume) be added to the current PRP list as Operable Unit 2 is solely for the remediation of groundwater clean up activities.

Also, please note, you may also want to add Concord Street now affected by the Toxic Plume according to the newest EPA Diagram, and The Town of Ashland, as diagram shows Plume to be under the Ashland Town Hall, Ashland Police, and the Ashland Fire Station.

Sincerely,

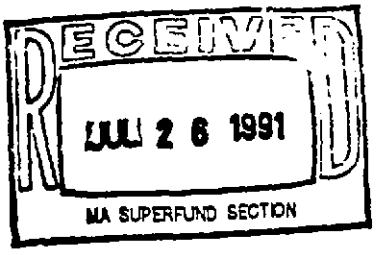
Barbara A. Beaudoin

Barbara A. Beaudoin



10 Nyanza Site

Mr. David Lederer
U.S Environmental Protection Agency
Waste Management Division (HRS-CAN2)
JFK Federal Building
Boston, MA 02203



July 24, 1991

Dear Mr. Lederer,

I am writing to express an important concern I have regarding the Nyanza Chemical Waste Dump Site in Ashland, Massachusetts.

I believe that the cleanup plan is very important since we would all like to have clean water and air. However I do have some concerns regarding who is responsible for the cost of implementing one of the plans outlined in the June, 1991 proposal.

It is my understanding that the EPA would like to collect from "PRP's" the cost of cleaning up Nyanza. I would like to know if the Town of Ashland falls under this category. Mr. Martin Mulhall was at one time the plant manager for the Nyanza Chemical Company. At the same time he was also Chairman of the Asland Board of Selectman and on the Ashland Board of Health. I believe this represents a conflict of interest in that while Mr. Mulhall received constant complaints about the chemical company, he also had a personal interest in not pursuing these complaints. Will there be any liability for the costs of cleaning Nyanza to the Town of Ashland? Has this issue been investigated?

If there is the possibility that the Town of Ashland may be responsible for the cost of the cleanup, I think it is important to make the citizens of Ashland aware of this so that they can make a better informed decision on which plan they would like to implement.

Sincerely,

Cynthia J. Leacu

Cynthia J. Leacu
Ashland Resident

Town of Ashland, Massachusetts
OFFICE OF
SELECTMEN & TOWN MANAGER
101 MAIN STREET, 01721

PAUL D. SHARON, *Town Manager*
Telephone (508) 881-1741
Fax (508) 881-7508

July 18, 1991

Mr. David Lederer,
Remedial Project Manager
U.S. Environmental Protection Agency
Waste Management Division (HRS-CAN2)
JFK Federal Building
Boston, MA 02203

Dear Mr. Lederer:

This letter shall serve as a formal response on behalf of the Ashland Board of Selectmen to the "EPA Proposed Cleanup Plan for the Nyanza Chemical Waste Dump Site" document.

The Town of Ashland recognizes and appreciates the long standing commitment of the U.S. Environmental Protection Agency and various other federal and state agencies to the cleanup of the Nyanza chemical waste dump site. The proposed plan, for which you seek public input, for phase 2 groundwater decontamination is a further example of the EPA's continuing commitment to the project and to the town.

The Board of Selectmen have reviewed and discussed areas of the proposed plan including; 1) cleanup objectives, 2) alternative scenarios 1-5, 3) EPA's preferred alternative and 4) preferred technology.

We are in full support of the plan's cleanup objectives which are as follows:

1. Reduce migration of contaminants in groundwater.

2. Reduce risk to human health associated with potential future consumption and direct contact with groundwater.

3. Reduce risk from present and potential future inhalation of evaporated groundwater contaminants.

4. Limit degradation of the Sudbury River and wetlands from the discharge of contaminated groundwater.

5. Comply with state and federal - applicable, relevant and appropriate requirements (ARAR) - including drinking water standards.

In reviewing the five alternative scenarios as outlined in the plan, the Board of Selectmen supports in principle the EPA's recommendation for a pilot program to treat the groundwater contamination using the "pump and treat" method. We further support the five year program of evaluating the technology and performance of the pump and treat method.

However, the Board of Selectmen believe that the EPA's preferred alternative 2 will not achieve the stated objectives as well or as completely as alternative 4 or by an expansion of alternative 2. Alternative 2 will potentially, over time, effect and achieve each of the five stated objectives but not throughout the entire contaminated area. Alternative 2 will begin the long and difficult task of cleansing the most heavily contaminated area and will effect approximately two-thirds of the area. However, none of the five stated objectives will be met either in part or in full in the balance of the contaminated area.

It is the recommendation of the Board that further consideration be given to an expansion of EPA's preferred alternative to effect groundwater cleanup over the entire area of contamination in an attempt to more fully achieve its goals. We do not recommend an evasive and potentially disruptive alternative as represented in alternative 5. Perhaps just one or two additional wells in the Forest Avenue or Tilton Avenue area would more fully effect the cleanup, be less disruptive, add a minimum of cost and more fully realize each of the goals.

The Board of Selectmen, on behalf of the Town, wishes to once again express our thanks and support to the EPA and others involved in the Nyanza cleanup odyssey. We look forward to working cooperatively with the EPA towards the goal of continuing the cleanup of the Nyanza site.

Sincerely,

BOARD OF SELECTMEN

Barry Bresnick
Vice Chairman

GORDON - MINDICK PROPERTIES

JUL 18 1991

P.O. BOX 409 • 10 MAIN STREET • ASHLAND, MASSACHUSETTS 01721 • (508) 881-4840

July 18, 1991

Based upon our attendance at the regularly scheduled meetings, the information distributed at the June 26 meeting, and the physical location of the plume, it is our opinion that Alternative RA-5 be implemented.

The summary of comparative analysis of alternatives presented at the June 26 meeting indicated nine criteria were used to evaluate each remedial alternative. The nine criteria, in our opinion, indicate that Alternative RA-5 should be the preferred alternative.

Listed below; using your own criteria, are the reasons we want the entire plume cleaned.

1. Overall protection of human health and the environment.

Although your report states that "RA-2, RA-4 and RA-5, when viewed as interim remedies, would provide similar information leading to the choice of a final remedy. It also states "over a five year period, alternative RA-5 would provide the most effective removal of contaminants, because wells would be placed at many locations throughout the study area."

2. Compliance with applicable or relevant and appropriate requirements (ARARs).

"Alternatives RA-2 through RA-5 would meet ARARs ..."

3. Long-term effectiveness and permanence.

Not relevant.

4. Reduction of toxicity, mobility or volume.

If alternatives RA-2 through RA-5 all reduce toxicity, mobility, and volume of organic contaminants; and alternative RA-2 reduces the toxicity, mobility and volume of organic compounds less than alternatives RA-3, RA-4 and RA-5, because it treats a smaller portion of the entire plume; and if RA-2 is superior to RA-3 since it attempts to capture contaminants closer to their source; then RA-5 must be superior to RA-2 because it treats the entire plume.

GORDON - MINDICK PROPERTIES

P.O. BOX 409 • 10 MAIN STREET • ASHLAND, MASSACHUSETTS 01721 • (508) 881-4840

5. Short-term effectiveness.

RA-1 would pose the least short-term risk of adverse impacts on human health and the environment. RA-2 would be constructed primarily in an area zoned industrial and RA-5 would pose the greatest risk because of the numerous wells located in residential areas

6. Implementability.

RA-1 is obviously the easiest to implement. "The various components of Alternatives RA-2 through RA-5 are common elements of remedial projects that could be readily implemented." "RA-2, with it focus primarily in an industrial area, would cause the least such disruption." RA-5 would cause the greatest disruption because of its many locations.

The residential area concerns presented in the short-term effectiveness and implementability criteria would be mitigated by using other available industrial and/or residential B land, located on the plume. Gordon-Mindick Properties could make available land and/or buildings that would allow for the effective removal of contaminants from the entire plume in an area that would cause the least amount of disruption to a residential area.

If the goal is to extract and treat contaminants in an industrial area, because the least amount of disruption would occur, then the offer of Gordon-Mindick Properties should allow for the full clean up of the plume.

It is our hope that your consideration of our comments and offer will prompt you to modify or select another preferred alternative.

Respectfully submitted,

Joel Silverstein
for Gordon-Mindick Properties

The Ashland Board of Health unanimously endorses the EPA's preferred remedial action plan, RA2. In endorsing this plan the Board would like to note that, if the area in question was unpopulated or even populated in low density we would have endorsed plan RA5.

It is the understanding of the Ashland Board of Health that plan RA2 calls for the placement of approximately five (5) recovery wells, all within the Megunko industrial area; that the product from these wells will be piped to central filtration facility within the industrial area, and that the clean discharge from this facility will be released into the Sudbury River. It is further understood that the placement of the recovery wells will be such that the draw will not only be from the industrial area, but will include contaminated waters from beneath the adjacent residential area.

The Ashland Board of Health, after studying plan RA4, cannot endorse the Board of Selectmen's call for the implementation of that plan of remedial action. It is the understanding of the Board of Health, that plan RA4 includes all the features of plan RA2 plus the placement of approximately four (4) additional recovery wells in the residential areas of Tilton Avenue, Cherry Street, Pleasant Street, and Water Street, and the piping of the contaminated product from these wells through that residential neighborhood to the treatment facility within the industrial area. It is further understood by the Board of Health that the most highly contaminated ground water in that residential area is found at a depth of between forty (40) and seventy (70) feet below the surface and that samplings of area basements have proven negative to contamination. Apparently, that thickness of soil between the residents and the contaminants are protecting the residents from the effects of the contaminants. Remedial Action Plan 4 would bring this contaminated water from this protective depth to the surface and then run it through the densely populated residential area in pipes that would be approximately four feet below the surface.

Although the Board of Health acknowledges that the EPA and its contractor(s) would do everything in their power to prevent a release of contaminants, either in the liquid or gaseous state, from the wells or the pipelines into the residential area, the possibility of such a release does exist in the implementation of plan RA4. Furthermore, the Ashland Board of Health feels that, when weighed against clean-up times that are estimated to last from decades to hundreds of years. the very small percentage of decrease in clean-up time afforded by plan RA4 is not offset by the increase in potential danger to the residents of that area from pipelines containing contaminants running through their neighborhood.

In endorsing the EPA's remedial action plan, RA2, the Ashland Board of Health is only endorsing the rough concept put forth within plan and urges the EPA to work closely with all appropriate Town departments when developing the details of the design, bidding, and construction phases so that problems similar to those experienced during Phase I, are not repeated.

July 9, 1991

United States Environmental Protection Agency - Region I
Attn: Mr. D. Lederer - Remedial Project Manager
Waste Management Division
JFK Federal Building (HRS - CAN 2)
Boston, MA 02203

Dear Mr. Lederer,

My wife and I are writing this letter to your agency to comment on your Phase II plan to clean up the ground water and to comment re the actions taken to this point in cleaning up Nyanza.

Phase II - we are very pleased that the EPA has decided to work on the groundwater situation. While we conclude that the health risk to individuals from groundwater contamination is low, we believe that the potential for future risks warrants investigating remediation alternatives. It appears that the clean-up measures you are recommending are conservative and in the interests of the town as a whole. Even if not totally effective, the attempt is being made and knowledge is being gathered. And the best news of all for Ashland is that "Nyanza is being fixed" in the process.

Phase I - We would like to commend your agency on way it has pursued the correction efforts. This has not been an easy job. At times it seemed that the various town entities were actively blocking action at the site.

We particularly want to note two individuals, who have made important contributions to the process of arriving at near completion for Phase I: David Letterer and Ira Nadelman. These gentlemen persevered and were able to effect accommodation between what were at times warring factions. It is a tribute to their abilities that the project has arrived at its current state of completion. It is also a fair statement to say that the history of this project is a good example of the democratic process working, and working well. It may have at times been a painful experience for these men, but they attained the goals under its pressure. Please have these comments recorded in the record of work for this project and communicate them to David and to Ira. Thank you.

Sincerely yours,

Margot Ellsworth

John Ellsworth

John Ellsworth
PO Box 293
Ashland, MA 01721

APPENDIX II: STATE CONCURRENCE LETTER

Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Protection

Daniel S. Greenbaum
Commissioner

September 23, 1991

Ms. Julie Belaga
Regional Administrator
U.S. EPA Region I
JFK Federal Building
Boston, MA 02103

RE: Nyanza Chemical Waste Dump Federal Superfund Site - Operable Unit Two Groundwater Contamination ROD Concurrence

Dear Ms. Belaga:

The Department of Environmental Protection (the Department) has reviewed the preferred remedial action alternative recommended by EPA for Operable Unit Two, groundwater contamination, at the Nyanza Chemical Waste Dump Federal Superfund Site. The Department concurs with EPA's selected remedy which implements an interim remedy.

While the Department agrees with the need for additional information in order to select a final remedy, the Department is requesting EPA to consider expanding the extraction system to include the eastern portion of the plume prior to the issuance of the final ROD if additional studies indicate groundwater recovery is feasible. This request is consistent with a recent OSWER Directive ("Considerations in Ground Water Remediation at Superfund Sites") which recommends that based on data gathered during the initial operation of a recovery system, the system could be modified and expanded as part of the remedial action phase to address the entire plume in the most efficient manner.

The Department has evaluated EPA's preferred alternative for consistency with M.G.L Chapter 21E and the Massachusetts Contingency Plan 310 CMR 40.00 (MCP) and has determined that EPA's selected remedy is consistent with the requirements of the MCP. The Department accepts the phased implementation of a temporary and permanent solution provided that the temporary solution be effective until a permanent solution is implemented, include

systems to monitor its effectiveness, and facilitate a permanent solution. However, a permanent solution determination cannot be made until it has been demonstrated that the remedial measure or combination of measures will meet the Total Site Risk Limits as defined in 310 CMR 40.00 for the entire site.

The Department generally identifies the MCP as an applicable requirement for sites in Massachusetts while reserving the right to argue that Chapter 21E constitutes an independent enforcement authority that is not subject to the waiver provisions of CERCLA section 121 (d) (4). The Department identifies the MCP and Chapter 21E as applicable requirements, within the meaning of CERCLA, for Operable Unit II of the Nyanza Chemical Waste Dump Federal Superfund Site.

The selected remedy appears to meet all Massachusetts state ARARs. This will continue to be evaluated as remedial design progresses and during implementation and operation.

The Department looks forward to working with you in implementing the preferred alternative. If you have any questions or require additional information, please contact Charla Reinganum at 292-5826.

Very truly yours,

Daniel S. Greenbaum, Commissioner
Massachusetts Department of Environmental Protection

cc: Richard Chalpin, NERO

APPENDIX III: ESTIMATED GROUNDWATER CONCENTRATIONS DERIVED FROM 1988 AND 1990 DATA

TABLE 4-3a

Exposure Point Concentrations for Groundwater
Downgradient Area
Hyanna II - 1986 Groundwater Study
Ashland, Massachusetts

Contaminant	Maximum (ug/l)	Arithmetic Mean (ug/l)	Frequency of Detection
VOCs			
Benzene	100	90.8	10/31
Methylene Chloride	930	116	6/31
1,2-Dichloroethene	1,600	217	21/31
2-Butanone	390	244	3/23
Trichloroethene	21,000	2,120	31/31
Toluene	600	107	5/31
Chlorobenzene	7,900	1,960	31/31
SVOCs			
1,3-Dichlorobenzene	330	45.8	6/31
1,4-Dichlorobenzene	710	160	20/29
1,2-Dichlorobenzene	9,600	1,470	23/27
N-Nitroso-di-n-propylamine	180	109	5/17
Nitrobenzene	94,000	3,470	7/30
1,2,4-Trichlorobenzene	5,100	434	15/28
Naphthalene	1,600	106	5/31
Aniline	24,000	1,720	15/24
Pesticides			
Heptachlor	7.3J	0.47	7/30
Dieldrin	0.19	0.086	3/31
Inorganics			
Antimony	67J	131	13/31
Arsenic	14.9	3.9	6/31
Beryllium	56.0	12.1	24/31
Cadmium	22.0	5.9	11/31
Chromium	76.0	0.16	15/31
Copper	89.0	12.9	10/31
Lead	33.8	12.9	26/31
Manganese	126,000	30,400	31/31
Mercury	11.1	1.27	16/31
Nickel	47J	94.1	24/31

TABLE 4-3b

Exposure Point Concentrations for Groundwater
Former Vault Area
Wyeth II - 1988 Groundwater Study
Ashland, Massachusetts

Compound	Maximum (ug/l)	Arithmetic Mean (ug/l)	Frequency of Detection
VOCs			
Benzene	---	---	0/5
Methylene Chloride	---	---	0/5
1,2-Dichloroethene	700	582	2/5
2-Butanone	---	---	0/5
Trichloroethene	58,000	22,200	5/5
Toluene	---	---	0/5
Chlorobenzene	50,000	13,400	5/5
SVOCs			
1,3-Dichlorobenzene	290	127	2/5
1,4-Dichlorobenzene	56,000	12,600	5/5
1,2-Dichlorobenzene	580,000	154,000	4/4
N-Nitroso-di-n-propylamine	---	---	0/5
Nitrobenzene	3,100,000	791,000	5/5
1,2,4-Trichlorobenzene	2,300	928	4/4
Naphthalene	---	---	0/5
Aniline	25,200	19,500	5/5
Pesticides			
Heptachlor	---	---	0/5
Dieldrin	---	---	0/5
Inorganics			
Antimony	106	56.8	2/5
Arsenic	4.10	2.30	3/5
Beryllium	45.0	13.0	5/5
Cadmium	20.8	8.30	2/5
Chromium	25	13.4	3/5
Copper	465	143	2/5
Lead	24.8	7.4	5/5
Manganese	91,100	22,200	5/5
Mercury	10.4	3.6	3/5
Nickel	286	101	5/5

--- Indicates contaminant not detected in this exposure area and therefore not evaluated.

TABLE 4-3a

Exposure Point Concentrations for Groundwater
Hill Area
Nyanza II - 1988 Groundwater Study
Ashland, Massachusetts

Contaminant	Maximum (ug/l)	Arithmetic Mean (ug/l)	Frequency of Detection
VOCs			
Benzene	2	51.8	1/16
Methylene Chloride	18	51.2	4/16
1,2-Dichloroethene	12,000	938	15/16
2-Butanone	650	131	4/16
Trichloroethene	17,000	2,420	16/16
Toluene	15	51.2	1/16
Chlorobenzene	540	110	10/16
SVOCs			
1,3-Dichlorobenzene	100	21.7	1/16
1,4-Dichlorobenzene	400	45.6	3/16
1,2-Dichlorobenzene	3,700	523	9/15
N-Nitroso-di-n-propylamine	96.0	23.3	1/10
Nitrobenzene	1,300	116	2/15
1,2,4-Trichlorobenzene	96	23.6	2/16
Naphthalene	---	---	0/16
Aniline	2,900	136	2/15
Pesticides			
Heptachlor	---	---	0/16
Dieldrin	---	---	0/15
Inorganics			
Antimony	---	---	0/16
Arsenic	11.9	3.04	3/16
Beryllium	1.00	0.30	1/16
Cadmium	---	---	0/16
Chromium	23.0	10.1	6/16
Copper	27.0	8.06	4/16
Lead	21.7	10.1	13/16
Manganese	6,090	1,690	16/16
Mercury	6.20	1.94	12/16
Nickel	---	---	0/16

--- Indicates contaminant not detected in this area and therefore not evaluated.

TABLE 4-3d

Exposure Point Concentrations for Groundwater
Downgradient Area
Hydrazine II - 1990 Groundwater Study
Ashland, Massachusetts

Contaminant	Maximum (ug/l)	Arithmetic Mean (ug/l)	Frequency of Detection
VOCs			
Benzene	96	22.8	13/29
Chlorobenzene	4,650	1,070	19/29
1,2-Dichloroethene	360	72.2	11/29
Tetrachloroethene	24	21.8	5/29
Toluene	6	19.4	2/29
Trichloroethene	5,600	1,083	20/29
SVOCs			
Aniline	9,200	1,461	17/29
Benzidine	19	25.4	1/22
Bis(2-ethylhexyl)phthalate	48	8.9	2/22
4-Chloroaniline	18	6.0	6/26
2-Chlorophenol	16	5.3	7/22
1,3-Dichlorobenzene	110	16.2	13/28
1,4-Dichlorobenzene	700	102.3	17/29
1,2-Dichlorobenzene	3,200	542	18/29
3,3'-Dimethybenzidine	8	25.7	1/22
n-Nitrosodiphenylamine	6	5.1	2/22
Naphthalene	213	32.2	12/29
Nitrobenzene	16,000	785	9/24
Pentachlorophenol	670	34.0	2/22
1,2,4-Trichlorobenzene	680	75.1	11/23
Inorganics			
Antimony	186	18.0	2/27
Arsenic	12.2	2.5	9/12
Beryllium	48.7	4.8	14/29
Cadmium	15.8	2.1	2/23
Chromium	1,140	45.7	6/28
Copper	50	7.5	4/27
Lead	28	3.4	10/28
Manganese	94,100	16,523	29/29
Mercury	17.4	1.4	13/28
Nickel	535	45.0	17/29

TABLE 4-3e
Exposure Point Concentrations for Groundwater
Former Vault Area
Nyanza II - 1990 Groundwater Study
Ashland, Massachusetts

Contaminant	Maximum (ug/l)	Arithmetic Mean (ug/l)	Frequency of Detection
VOCs			
Benzene	---	---	0/3
Methylene Chloride	---	---	0/3
1,2-Dichloroethene	290	333	1/3
2-Butanone	---	---	0/3
Trichloroethene	26,000	10,933	3/3
Tetrachloroethene	---	---	0/3
Toluene	---	---	0/3
Chlorobenzene	34,000	13,333	3/3
SVOCs			
Benzidine	---	---	0/2
1,3-Dichlorobenzene	4,400	1,521	3/3
1,4-Dichlorobenzene	15,000	5,410	3/3
1,2-Dichlorobenzene	45,000	23,467	3/3
3,3'-Dimethylbenzidine	---	---	0/2
Bis(2-ethylhexyl)phthalate	18	93	1/3
N-nitrosodiphenylamine	---	---	0/2
N-nitroso-di-n-propylamine	---	---	0/2
Nitrobenzene	36,000	17,267	3/3
1,2,4-Trichlorobenzene	330	193	3/3
Naphthalene	9	5.3	2/3
Aniline	9,700	6,800	3/3
4-Chloroaniline	4	4	2/3
2-Chlorophenol	---	---	0/2
Pesticides			
Heptachlor	---	---	0/3
Dieldrin	---	---	0/3
Inorganics			
Antimony	---	---	0/3
Arsenic	4.2	4.3	2/3
Beryllium	1.2	2.1	1/3
Cadmium	---	---	0/3
Chromium	7.8	5.7	1/3
Copper	---	---	0/3
Lead	---	---	0/3
Manganese	3,690	2,830	3/3
Mercury	10.8	4.2	3/3
Nickel	11.7	10.2	3/3

--- Indicates contaminant not detected in this area and therefore not evaluated.