United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R01-90/033
September 1990

EPA

Superfund
Record of Decision:

Old Springfield Landfill, VT

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. EPA/ROD/R01-90/033	2	3. Recipient's Accession No

4. Title and Subtitle	5. Report Date
SUPERFUND RECORD OF DECISION Old Springfield Landfill, VT Second Remedial Action - Final	09/29/90
	6.
7. Author(s)	8. Performing Organization Rept. No
9. Performing Organization Name and Address	10. Project/Task/Work Unit No
	11. Contract(C) or Grant(G) No (C) (G)
12. Sponsoring Organization Name and Address U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460	13. Type of Report & Period Covered 800/000
	14

15. Supplementary Notes

16. Abstract (Limit: 200 words)

The Old Springfield Landfill site is a 27-acre inactive municipal/industrial landfill approximately one mile from the Springfield city center in Windsor County, Vermont. Land use within a one-mile radius of the site includes commercial activities, low density housing, light agriculture, and undeveloped forest land. The landfill was operated by the town of Springfield between 1947 and 1968, accepting industrial waste and municipal trash. The site was closed in 1968, and subsequently sold and developed for use as a mobile home park. Municipal water lines were extended to serve the mobile homes. A nearby resident's complaint about foul-smelling water prompted an investigation of the site by the State, which revealed VOC contamination in a nearby spring and the residential well. Because of the VOC-contaminated water, the affected home near the mobile home park was connected to the public water supply. Currently the mobile home park is unoccupied except for the property owner who still resides onsite. The site has been divided into two operable units. Operable unit one is documented in a 1988 Record of Decision (ROD) which addressed management of migration of the contaminated seeps and ground water from the site and required that additional studies would be conducted to determine the source control remedy for the site. This second operable unit ROD

(See Attached Page)

17. Document Analysis a. Descriptors

Record of Decision - Old Springfield Landfill, VT
Second Remedial Action - Final
Contaminated Media: soil, gw
Key Contaminants: VOCs (benzene, PCE, TCE, toluene, xylenes), other organics (PAHs, PCBs)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 371
	20. Security Class (This Page) None	22. Price

(See ANSI-Z39.18) *See Instructions on Reverse* OPTIONAL FORM 272 (4-77) (Formerly NTIS-35) Department of Commerce

Abstract (Continued)

documents the source control remedy, which addresses the risks associated with the inhalation of landfill gases and dermal contact with and ingestion of contaminated soil. In addition, this ROD also addresses risks associated with the ingestion of contaminated ground water. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, PCE, TCE, toluene, and xylenes; and other organics including PAHs and PCBs.

The selected remedial action for this site includes placing a multi-layer cap over approximately eight acres (120,000 cubic yards of contaminated soil) where waste has been disposed of or has come to be located or where the soil cleanup levels are exceeded; collecting ground and surface water in french drains and extracting ground water with source control wells with treatment, as necessary, in the treatment system developed in operable unit one or other equivalent treatment system (not specified); stabilizing the side slopes of the waste mounds; active gas collecting and passive gas venting of landfill gases, followed by treatment using vapor phase carbon adsorption; operating and maintaining these components; ground water and air monitoring; and implementing institutional controls, including deed restrictions. The estimated present worth cost of this remedial action is $8,692,800, which includes an annual O&M cost of $123,000.

PERFORMANCE STANDARDS OR GOALS: Goals for soil cleanup (i.e., areas of contamination to be capped) are based on total carcinogenic risk levels of 10^{-5} and include PCBs 6,000 ug/kg (5 x 10^{-6} level of risk) and PAHs 3,000 ug/kg (5 x 10^{-6} level of risk). Chemical-specific ground water treatment goals are based on SDWA MCLs and State standards and include benzene 5 ug/l (MCL), TCE 5 ug/l (MCL), xylenes 400 ug/l (State standard), and PCE 5 ug/l (proposed MCLs/quantitative limit). Because EPA has determined that in this circumstance it is technically impracticable, from an engineering perspective, to establish a standard below a practical quantitative level, EPA is invoking a waiver from compliance with the State standard for PCE.

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Old Springfield Landfill
Springfield, Vermont

STATEMENT OF PURPOSE

This decision document presents the second selected remedial action for the Old Springfield Landfill site (the "site"), located in Springfield, Vermont. This document was 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 *et seq.* (1990). The Regional Administrator for Region I of the United States Environmental Protection Agency (EPA) has been delegated the authority to approve this Record of Decision.

The State of Vermont has concurred on the selected remedy and determined, through a detailed evaluation, that the selected remedy is consistent with Vermont laws and regulations.

STATEMENT OF BASIS

This decision is based on the administrative record compiled for the site which was developed in accordance with Section 113(k) of CERCLA. The administrative record is available for public review at the Springfield Public Library in Springfield, Vermont, and at the EPA Region I Waste Management Division Record Center in Boston, Massachusetts. The administrative record index (attached as Appendix F to the ROD) identifies each of the items which comprise the administrative record upon which the selection of the remedial action is based.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

This operable unit is the second remedial action selected for the site. The first operable unit at the site involved the management of migration portion of the remedy, and included the construction of leachate collection and groundwater extraction systems. This second operable unit addresses the risks associated with ingestion of contaminated groundwater, inhalation of landfill gases, and dermal contact with and ingestion of contaminated soils through source control remedial actions.

The remedy selected in the ROD incorporates the following components:

* capping of Waste Areas 2, 3 and 4;
* collection of ground and surface water in french drains;
* extraction of groundwater with source control wells;
* stabilization of the side slopes;
* collection and venting of landfill gases;
* operation and maintenance of these components;
* institutional controls; and
* five-year reviews.

Capping of Waste Areas 2, 3 and 4

The principal component of the selected remedy will be the placement of a multi-layer cap over those areas in or contiguous with Waste Areas 2, 3 and 4 where waste has been disposed or has come to be located or where the soil cleanup levels are exceeded. The cap will reduce the infiltration of water into the waste areas which would otherwise come into contact with contaminated waste material or soil and leach contamination into the groundwater. The cap will also allow for the collection of landfill gases containing VOCs and prevent direct contact with soils containing PCBs and PAHs. The cap will be designed to meet or exceed the performance requirements set forth in 40 CFR sections 264.111, 40 CFR 264.310 and the technical guidance document Final Covers on Hazardous Waste Landfills and Surface Impoundments (EPA/530-SW-89-047, July 1989) or in a manner which achieves performance equivalent to that required by 40 CFR sections 264.111, 264.310 and the technical guidance.

Collection of Ground and Surface Water in French Drains

Two french drains will be constructed at specified locations around the perimeter of the above-noted waste areas. A french drain involves the placement of perforated pipe along the bottom of a trench so that water flowing through or over the soil will drain into the trench and be collected in the pipe. The first french drain will be constructed along the upgradient western and southern perimeters of Waste Area 4 to intercept both overland and shallow subsurface groundwater flows from the surrounding uplands and to prevent this water from entering Waste Area 4. The second french drain will be constructed in the uncapped area along the northern edge of Waste Area 4 and the western edge of Waste Area 3. The purpose of the second drain is to prevent shallow subsurface water which may flow horizontally above the till from entering Waste Area 3.

Extraction of Groundwater with Source Control Wells

Source control extraction wells will be installed in Waste Area 3. Source control extraction wells will be placed in locations that allow for the capture of groundwater which would otherwise move east towards the Black River. The number of wells will be sufficient to maintain maximum practical contaminant removal.

Collection and Venting of Landfill Gases

Active gas collection and passive gas venting will be used to prevent the harmful buildup or release of landfill gases from the areas beneath the cap and the stabilized slopes. Waste Areas 2 and 4 will have a passive gas venting system installed as part of the cap. An active gas collection system will be used in Waste Area 3. The landfill gases will be treated using vapor phase carbon or an equivalent method of treatment.

Stabilization of the Side Slopes

The eastern slopes of Waste Areas 2 and 3 will be stabilized to prevent any slope failure which could damage the cover system, allowing releases of waste and leachate to surrounding soils and groundwater. Each slope will be designed to withstand the loading and hydraulic conditions to which it will be subject during the cap's construction and post-closure periods. In addition, the slopes of Waste Areas 2 and 3 will be stabilized so that a greater than 1.25 long-term factor of safety is achieved. Each slope will be stabilized to prevent or minimize, to the degree practicable, shifts, cracks or slumpage in the slope in excess of those expected by waste settlement and to prevent a decrease in the integrity, permeability or effectiveness of the cap.

Operation and Maintenance

All of the components of the selected remedy described above will be operated in order to maintain the effectiveness of the remedial response action. The cap must be maintained for at least thirty years and thereafter until EPA determines that further maintenance is not necessary. This maintenance may include reconstruction of all or a part of the cap, active gas collection and passive gas venting systems, french drains, water treatment systems, and/or stabilized slopes.

The french drain and source control extraction wells will be operated and maintained until the cleanup levels described in section X.A for groundwater at the boundary of the waste management unit and in the water collected in the french drain and source control extraction wells are achieved. Landfill gas monitoring will be used to optimize the gas collection and treatment processes to meet the performance standards and ensure that the concentration of contaminants in air emissions and ambient air are protective of human health and the environment. Monitoring will also be required to ensure compliance with 40 CFR Part 264, Subparts F, G and N.

Sampling and/or testing will be performed as soon as practicable after the completion of the respective components and continue through the operation and maintenance period for the following: (1) water collected from the french drains and source control wells; (2) landfill gas; and (3) the stability of side slopes. Groundwater sampling and testing will begin during remedial design activities and will continue through remedial action and operation and maintenance.

Institutional controls

In conjunction with this remedy, a public information program will be used to educate the public about the hazards of the site. Deed restrictions will be imposed to restrict the use of the site within the fenced area. This will include restricting excavation or any activity that might compromise the integrity or performance of the cap, french drains, wells, slopes or other remedial features. Institutional controls restricting groundwater use at the site and land use beyond the fenced area are contained in the ROD for the first operable unit. This remedy does not limit or modify the institutional controls found in the first operable unit ROD.

Five-year review

As required by law, EPA will review the site at least once every five years after the initiation of remedial action at the site if 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).

DECLARATION

This selected remedy is protective of human health and the environment, attains all Federal and State requirements that are applicable or relevant and appropriate (ARAR) to this remedial action except one State ARAR for which EPA has justified a waiver, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. The remedy does not meet the preference for remedies that employ treatment as a principal element.

Additionally, because the remedy will result in hazardous substances remaining in the soil on the site above health-based levels, a review will be conducted (at a minimum) within five years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

9/29/90
Date

Julie Belaga
Julie Belaga
Regional Administrator
U.S. EPA, Region I

REGION . I

RECORD OF DECISION SUMMARY

SEPTEMBER 28, 1990

OLD SPRINGFIELD LANDFILL

SPRINGFIELD, VERMONT

Old Springfield Landfill

TABLE OF CONTENTS

Contents | Page Number

I.	SITE NAME, LOCATION AND DESCRIPTION	1
II.	SITE HISTORY & ENFORCEMENT ACTIVITIES	2
	A. Land Use & Response History	2
	B. Enforcement History	4
III.	COMMUNITY PARTICIPATION	5
IV.	SCOPE & ROLE OF OPERABLE UNIT OR RESPONSE ACTION	6
V.	SUMMARY OF SITE CHARACTERISTICS	7
VI.	SUMMARY OF SITE RISKS	10
VII.	DEVELOPMENT AND SCREENING OF ALTERNATIVES	15
	A. Statutory Requirements/Response Objectives	15
	B. Technology and Alternative Development and Screening	15
VIII.	DESCRIPTION OF ALTERNATIVES	17
IX.	SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES	21
X.	THE SELECTED REMEDY	27
	A. Cleanup Levels	27
	B. Description of the Remedial Components	31
XI.	STATUTORY DETERMINATIONS	37
	A. The Selected Remedy is Protective of Human Health and the Environment	37
	B. The Selected Remedy Attains ARARs	37
	C. The Selected Remedial Action is Cost Effective	41
	D. The Selected Remedy Utilizes Permanent Solutions and Alternative Treatment or Resource Recovery Technologies to the Maximum Extent Practicable	41
	E. The Selected Remedy Satisfies the Preference for Treatment as a Principal Element	42
XII.	DOCUMENTATION OF SIGNIFICANT CHANGES	43
XIII.	STATE ROLE	44

APPENDIX A - Figures
APPENDIX B - Contaminants of Concern
APPENDIX C - ARARs
APPENDIX D - Letter of Concurrence
APPENDIX E - Responsiveness Summary
APPENDIX F - Administrative Record Index

ROD DECISION SUMMARY
September 28, 1990

I. SITE NAME, LOCATION AND DESCRIPTION

The 27 acre Old Springfield Landfill (the site) is located approximately one mile southeast of the city center in the Town of Springfield, Windsor County, Vermont (See Figure 1, Appendix A). The site is situated on an upland plateau with slopes that descend steeply to the north, east, and west. Seavers Brook runs west of the site and the Black River runs east of the site. Seavers Brook flows northward until it reaches the Black River, which flows to the south and empties into the Connecticut River. Will Dean Road is located along the western side of the site. Will Dean Road intersects Route 11 just north of the site. Route 11 runs past the eastern side of the site.

The 1980 National Census lists the population of the Town of Springfield at 10,180. The Villages of Goulds Mill and Hardscrabble Corner are located within a one-mile radius of the site. The land use within a one-mile radius of the site is primarily low density residential housing, light agriculture, undeveloped forest land and commercial. Approximately 15 homes are located within a one-half mile radius of the site, along with a few commercial establishments. Three homes are on the plateau adjacent to a former mobile home park. Approximately 200 homes and condominiums are located within a one-mile radius of the site, housing an estimated population of between 650 and 750 people.

Natural resources in the vicinity of the site include groundwater, surface water, fish and game, arable land, forest, woodland and minerals.

A bedrock aquifer is a current source for drinking water in the area of the site. Users of the bedrock aquifer groundwater in the site vicinity are located primarily upgradient of the site. Groundwater users have also been identified downgradient of the site, but presently their water supply remains unaffected by the site. All other residents in close proximity to the site receive municipal water from the Town of Springfield.

A more complete description of the site can be found in Section 1.1 of the 1988 Feasibility Study (FS) Report.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

A. Land Use and Response History

The Old Springfield Landfill, also referred to as the Will Dean Dump, was operated by the Town of Springfield between 1947 and 1968. Hazardous industrial waste from local industries was co-disposed with municipal trash. The industrial waste was disposed both in discrete trenches and mixed with municipal solid waste. Most hazardous material was disposed in bulk liquid and semi-liquid form. Shortly after the site was closed in 1968, it was sold and developed for use as a mobile home park, known as the Springfield Mobile Home Estates. At the time of the mobile home park's development, the Vermont Department of Health (DOH) recommended that drilled wells not be used to supply water to the mobile homes because the development was located over areas that had been used for chemical disposal. Municipal water lines were extended to serve the mobile homes. Springfield Mobile Home Estates is no longer occupied. Only the owner of the property still resides on the site. A six-building condominium complex and 13 single family residences are located north of the site.

Shortly after the opening of Springfield Mobile Home Estates, a nearby resident's complaint about foul-smelling water prompted an investigation of the site by the Vermont DOH and the Vermont Agency of Environmental Conservation (VTAEC). In response to finding volatile organic compounds (VOCs) contamination in a spring located near Seavers Brook and in the residential well near the mobile home park, the spring was abandoned and the affected home near the mobile home park was connected to the public water supply.

In 1976, EPA reviewed the Vermont Department of Environmental Conservation's (VTDEC) data on residential wells near the site. In 1982, after the VTDEC requested that the site be reviewed for inclusion in the Superfund Program, the site was added to the National Priorities List of hazardous waste sites eligible to receive federal funding for study and cleanup. The results of EPA's initial Remedial Investigation (RI), released in September 1985, showed contamination in site soils, seeps and groundwater. EPA determined that a supplemental RI was necessary to delineate the former waste areas, and to better define the nature, extent, and potential adverse human health effects of site contamination.

Supplemental RI activities included taking samples from soil, leachate seeps, residential wells, groundwater and sediment at the site, as well as instituting a soil boring program in the mobile home area. The soil boring program took place between July 6 and July 18, 1987. Because of the potential for mobile home park residents to be exposed to contamination during the soil boring program, EPA temporarily relocated mobile home park residents during that period. EPA completed Phase I field investigations in October 1987, and Phase II in May 1988, and released the final Supplemental RI report in June 1988. EPA conducted the Phase II investigations simultaneously with the FS, released in June 1988, to identify and evaluate cleanup alternatives for the site.

In June 1988, EPA issued a Proposed Plan for remedial activities at the site. As a result of comments submitted during the public comment period on the Proposed Plan, EPA decided to separate the remedial action into two operable units. On September 22, 1988, EPA signed a Record of Decision (ROD) for the first operable unit, which involved the management of migration of contaminated seeps and groundwater from the site. The 1988 ROD also required that additional studies be done in order to determine the source control remedy for the site. These studies were needed to provide a better understanding of the relationship between groundwater and the waste areas.

In 1989, EPA entered into an Administrative Order by Consent (AO), with two potentially responsible parties (PRPs) at the site. Under the AO, the PRPs agreed to perform the additional studies called for in the 1988 ROD and to prepare a Focussed Feasibility Study (FFS) Report based upon the results of those studies. The 1988 ROD and 1989 AO defined the scope of the FFS. The field work for the FFS began in August 1989. The first draft FFS Report was submitted to EPA in April 1990 and a second draft in June 1990. In response to deficiencies in the FFS Report, EPA prepared a Detailed Evaluation Memorandum (Detailed Evaluation Memo) in July 1990 evaluating the alternatives retained for final consideration in the FFS based upon the nine criteria set forth in the National Contingency Plan (NCP) for review of remedial alternatives (40 CFR section 300.430(c)(9)(iii)). The Detailed Evaluation Memo also contains a comparative analysis of all alternatives retained for final consideration. EPA also prepared a Supplemental Feasibility Study (SFS) Report which reevaluated alternative 2 from the 1988 FS based upon new site information. All of these documents are available in the Administrative Record.

A more detailed description of the site history can be found in the 1985 RI and 1988 Supplemental RI Reports at section 1.2, and in the 1988 FS Report at section 1.1.

B. Enforcement History

On January 6, 1984, April 17, 1987 and May 14, 1987, EPA notified approximately nine parties who either owned or operated the site, generated wastes that were shipped to the site, arranged for the disposal of wastes at the site, or transported wastes to the site of their potential liability with respect to the site.

In January 1984, EPA had discussions with Emhart Industries, Inc.(Emhart), Textron Inc.(Textron), the Town of Springfield and other PRPs about installing a water line to two private homes and conducting a Remedial Investigation and Feasibility Study (RI/FS) at the site. Emhart, Textron and the Town of Springfield reached an agreement with EPA on the installation of the water line only. EPA then used Superfund monies to conduct the RI/FS which formed the basis for the first operable unit ROD.

EPA met with a committee of PRPs several times between June 26, 1987 and September 19, 1987 to keep them apprised of findings at the site. EPA also met with a committee of PRPs on June 29, 1988 to present the results of the FS and the Proposed Plan for remedial action at the site. EPA continued to meet with the PRP committee in July and August of 1988. In June 1988, EPA published a Proposed Plan for remediation of the site which included both management of migration and source control components. As a result of comments received from the public, the State of Vermont and PRPs, EPA decided to delay the source control remedy until additional studies were conducted. In the Responsiveness Summary issued with the 1988 ROD, EPA did not respond to comments it received relating to the source control portion of the remedy. The Responsiveness Summary for this ROD addresses those comments.

In March 1989, EPA and two PRPs, Emhart and Textron, entered into an Administrative Order by Consent (AO) under which these PRPs would implement the additional studies required by the 1988 ROD. The results of these studies were to be included in a FFS Report. As previously mentioned, these PRPs submitted the first draft FFS Report to EPA in April 1990 and a second draft in June 1990.

In May 1989, EPA sent special notice letters to fourteen PRPs announcing the beginning of the 60 day negotiation period concerning the implementation of the first operable unit remedy as described in the 1988 ROD. These negotiations resulted in a Partial Consent Decree between the United States, the State of Vermont, and four settling parties. The four settling parties are Emhart, Textron, Browning Ferris Industries of Vermont, Inc, and the Town of Springfield. The Partial Consent Decree required these parties to reimburse EPA for its past costs and to implement the management of migration remedy under EPA oversight.

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 site activities through informational meetings, fact sheets, press releases and public meetings.

In April 1990, EPA released a community relations plan which outlined a program to address community concerns and keep citizens informed about and involved in remedial activities.

On July 12, 1990, EPA made the Administrative Record for the second operable unit available for public review at EPA's offices in Boston and at the Springfield Public Library. EPA published a notice and brief analysis of the Proposed Plan for the second operable unit in the Springfield Reporter on July 9, 1990 and on July 12, 1990 made the Proposed Plan available to the public at the Springfield Public Library.

Also, on July 12, 1990, EPA held an informational meeting to discuss the cleanup alternatives presented and discussed in the 1988 FS, 1990 FFS and 1990 SFS, the Detailed Evaluation Memo and EPA's Proposed Plan. The Agency answered questions from the public during this meeting. From July 13 to September 10, 1990, EPA held a 60 day public comment period to accept public comment on the alternatives presented in the three feasibility studies, the Detailed Evaluation Memo, the Proposed Plan and any other documents previously released to the public. On August 2, 1990, EPA held a public hearing to discuss the Proposed Plan and to accept any oral comments. A transcript of this hearing, copies of the written comments and EPA's response to comments received during the public hearing or in writing during the public comment period are included in the attached Responsiveness Summary.

IV. SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

In response to public and State concerns over the need for additional studies concerning the hydrology of the site, EPA decided in 1988 to delay a decision on the source control portion of the remedy and to remediate the site in operable units. EPA proceeded with the management of migration portion of the remedy at that time. The ROD for the management of migration operable unit was signed in September 1988. The 1988 ROD required the construction of leachate collection and groundwater extraction systems. The ROD also included a requirement for additional studies relating to the source control operable unit.

The additional studies required by the 1988 ROD have been completed and the selected remedy described in this ROD addresses the source control portion of the cleanup. The remedy provides for the following components: capping of Waste Areas 2, 3 and 4; collection of water in french drains; extraction of groundwater with source control wells; stabilization of the side slopes; collection of landfill gases; institutional controls; and operation and maintenance of these components. The source control operable unit in combination with the previously decided management of migration operable unit will result in the comprehensive remediation of the Old Springfield Landfill. The first operable unit will mitigate the risks associated with the leachate seeps, but only partially addresses the risks associated with ingestion of groundwater, ingestion or contact with soils, and inhalation of contaminants. This second operable unit remedial action will address the following principal threats to human health and the environment posed by the site:

- ingestion of contaminated groundwater;

- long-term exposure to PCB and PAH contamination in the soil from handling or ingestion of the soil; and

- inhalation of contaminants in landfill gas.

Thus, the source control operable unit will complete the mitigation of the site related risks as described in section 1.4 of the 1988 FS.

V. SUMMARY OF SITE CHARACTERISTICS

Chapter 1 of the 1988 FS contains an overview of the 1988 Supplemental RI. The significant findings of the investigations at the site are summarized below.

A. Soil

Four waste areas were described in the 1988 RI/FS reports (See Figure 2 Appendix A). These are areas where drilling encountered evidence of buried wastes. Further investigations have revealed that Waste Area 1 is not a significant source of waste or contamination. Waste Area 1 was originally identified as a result of low level contamination in a single soil boring. Other borings in the area of Waste Area 1 were not contaminated. Further consideration of the information and the absence of contamination in wells downgradient of Waste Area 1 led to the determination that Waste Area 1 did not represent a threat to human health or the environment.

Waste Areas 2, 3 and 4 are clearly the major locations of soil contamination at the site. Waste Areas 2 and 3 are ravines filled with 6400 and 72,000 cubic yards of contaminated waste and soil, respectively. Waste Area 4 is not a filled ravine, but is most likely a series of trenches dug for waste disposal. Waste Area 4 has an estimated volume of 42,500 cubic yards. Waste Area 4 was the last active portion of the landfill.

The waste areas contain both industrial and municipal waste. Volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) have been identified in the soils of the three major waste areas. Waste Areas 2 and 3 are mostly unsaturated, which means that the majority of the waste is above the water table. Waste Area 4 is mostly saturated and the water table is at ground surface for most of the year.

PCBs and PAHs are found in the surface soils and near surface soils of all three waste areas. Waste Area 3 has the highest levels of VOCs. Waste Areas 2 and 4 have lower levels of these compounds. The VOCs are the most mobile of the contaminants found at the site. The majority of the SVOCs are found in Waste Areas 3 and 4, with smaller amounts in Waste Area 2.

The sediments of both the eastern and western leachate seeps contain detectable levels of site related contaminants.

The soils of the steep outslopes along Waste Areas 2 and 3 were not investigated due to the difficulty in accessing these locations.

B. Groundwater

One of the prime objectives of the 1990 FFS was to obtain a better definition of groundwater flow at the site. Each of the three major waste areas has a different flow system. The amount of water flowing into and exiting each waste area is important because this water can leach contaminants from the waste areas into deeper groundwater systems. Many of the potential cleanup alternatives focus on ways to reduce the flow of water into the waste areas.

The groundwater contamination at the site is located in:

1) the waste itself;
2) the soil below and downgradient of the three major waste disposal areas;
3) the sand and gravel unit which runs underground from waste area 3 to the western seeps near Seavers Brook Road;
4) the bedrock along Seavers Brook Road; and
5) the weathered bedrock between the site and the Black River.

Waste Area 3 appears to be the most serious source of groundwater contamination, while Waste Areas 2 and 4 also contain significant levels of contamination. The water is contaminated primarily by VOCs.
Waste Areas 2, 3 and 4 receive about 60% of their inflow from precipitation. This means that rainfall and snowmelt are responsible for the majority of the water entering each waste area. Most of the water exiting Waste Area 4 flows down to Waste Area 3. This connection must be taken into account when evaluating alternatives for Waste Areas 3 and 4. The majority of the water leaving Waste Areas 2 and 3 flows out the leachate seeps to the east. The remaining water (15-30%) flows into the deep groundwater. The sand and gravel unit transmits some of this contaminated water to the western leachate seeps along Seavers Brook Road, while the rest flows into the weathered bedrock and migrates toward the Black River.

Recent water level measurements indicate that there may be significant seasonal variation with respect to water flow. During periods of high water levels, horizontal flow may exist in the sand deposit above the till.

Horizontal groundwater flow approaches the site from the south. Once the water reaches the plateau it encounters a groundwater divide which results in some water flowing west towards Seavers Brook and east towards the Black River. There is a large downward component of groundwater flow across most of the site.

The leachate seeps and springs on the outslopes of the site are the major groundwater discharge zones. Approximately 80% of the groundwater entering Waste Areas 2 and 3 flows out the seeps for those waste areas. The eastern leachate seep at Waste Area 3 is the most contaminated.

The 1990 FFS Report also confirmed the presence of contamination along Route 11 in a sand and gravel unit which may be connected with the Black River.

C. Surface Water

Seavers Brook and the Black River are the major surface water bodies which could potentially be affected by the site. The Black River discharges into the Connecticut River a short distance from the site. No significant impacts have been detected in the surface water bodies.

D. Air

The generation of volatile organics either carried on methane generated in the landfill or released from the leachate seeps was evaluated in the field studies and reports. High concentrations of methane gas were noted during the onsite boring, well installation and test pit programs. The release of landfill gas provides a convective force by which contaminants can be released to the air. Air sampling was performed during the Supplemental RI and during the 1990 FFS. Both sets of data were rejected during validation; therefore, no valid chemical specific air monitoring data exists. A three stage exposure model was then used to estimate potential concentrations in the air. The model predicted that hazardous substances would be emitted in the landfill gas. The invalidated air monitoring results also provided a qualitative indication that hazardous substances are being emitted in the landfill gas.

E. Side Slopes

Waste Areas 2 and 3 each have steep outslopes. These outslopes are not stable and could potentially fail. A significant portion of the waste underlies these outslopes.

A complete discussion of site characteristics can be found in the 1988 Supplemental RI Report and a summary can be found in section 1.3 of the 1988 FS and sections 2.1 - 2.5 of the 1990 FFS.

VI. SUMMARY OF SITE RISKS

An Endangerment Assessment (EA) for the site was performed in 1988 to estimate the probability and magnitude of potential adverse human health and environmental effects from exposure to contaminants associated with the site. The assessment of public health risk 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 endangerment assessment for the site are discussed below followed by the conclusions of the environmental risk assessment.

Twenty-four contaminants of concern, listed in Tables 1 through 11 found in Appendix B of this ROD, were selected for evaluation in the 1988 EA. These contaminants constitute a representative subset of the more than 75 contaminants identified at the site during the 1988 Supplemental RI. The 24 contaminants of concern were selected as representative of 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 D of the 1988 EA.

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 Chapter 3 of the 1988 EA.

For inhalation of landfill gas emissions, a three stage exposure model was used. The three stages were: (1) estimate equilibrium vapor density in the soil pore spaces; (2) estimate the flux rate caused by diffusion and convection; and (3) estimate the ambient air concentrations based on the flux rate, the area of the waste disposal, and the local climatic conditions. This model was used to predict ambient air concentrations for on-site and off-site residents and was evaluated for a resident who may spend 24 hr/day for 70 years breathing the predicted air concentrations.

Dermal contact and incidental ingestion of soils was evaluated for an adult who may be exposed 24 times per year under average conditions and 48 times per year under the reasonable maximum scenario, with an ingestion rate of 50 mg/day and 100 mg/day for average and reasonable maximum scenarios, respectively. Each of these exposures was averaged over 70 years.

Dermal contact and incidental ingestion of soils was also evaluated for children ages 6-11 assuming 48 events per year under average conditions and 96 events per year under the reasonable maximum scenario, with an ingestion rate of 50 mg/day and 250 mg/day for the average and reasonable maximum exposures, respectively.

Current ingestion of groundwater was evaluated based on monitoring results from existing off-site wells. Future ingestion of groundwater for the eastern side of the landfill was evaluated assuming steady state conditions would eventually be reached between the bedrock and the waste. Future ingestion of groundwater from the western side of the site was evaluated based upon monitoring wells 9 and 9D. All groundwater exposures assume that the person will ingest 2 liters of water per day for 70 years.

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.

Excess lifetime cancer risks were determined for each exposure pathway by multiplying the exposure level by 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 for 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 index was also calculated for each pathway as EPA's measure of the potential for non-carcinogenic health effects. The hazard index 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 index 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 the given compound). The hazard index is only considered additive for compounds that have the same or similar toxic endpoints (for example: the hazard index for a compound known to produce liver damage should not be added to a second whose toxic endpoint is kidney damage).

Table 1 below depicts the cumulative risk summary for the carcinogenic and non-carcinogenic contaminants of concern for each pathway analyzed. The hazard indices for the individual contaminants of concern and their target endpoints can be found on pages 4-15 thru 4-39 of the 1988 EA. For a more detailed analysis on the risk for each contaminant of concern, see Tables 4-2 though 4-22 in the 1988 EA.

The following is a summary of the major conclusions of the 1988 EA. A more detailed description can be found in Section 1.4 of the 1988 FS.

* Inhalation exposures to current and future site residents due to landfill gas and exposure to nearby residents due to release of volatiles from seeps represent current exposure pathways with the highest risk estimate. Total excess lifetime cancer risks range from $9x10^{-5}$ to $5x10^{-3}$ for average and reasonable maximum cases for exposure to landfill gas. The reasonable maximum exposure does not fall within EPA's risk range of 10^{-4} to 10^{-6} for remedial action. The chemicals contributing most to the carcinogenic risk are benzene, chloroform and trichloroethene. This assessment was based on a contaminant transport model that predicted the movement of contaminants through the soil. Air emissions from the landfill were assumed to remain constant over time so that current and future risks were the same. The cumulative hazard index estimated for inhalation exposure did not exceed one, indicating that adverse health effects from non-carcinogenic compounds are unlikely from this exposure pathway.

* Future consumption of ground water from the bedrock aquifer may exceed EPA's acceptable risk range of 10^{-4} to 10^{-6}. The principal contributors to the carcinogenic risk from the ingestion of groundwater are vinyl chloride, 1,1-dichloroethene and polychlorinated biphenyls(PCBs). Vinyl chloride's maximum concentration of 420 ppb (ug/l) exceeded the Maximum Contaminant Level of 2 ppb established under the Safe Drinking Water Act. The 1,1-dichloroethene at 140 ppb and the polychlorinated biphenyls at 72 ppb also exceeded the Maximum Contaminant Levels established under the Safe Drinking Water Act of 7 ppb and .5 ppb respectively. The hazard index exceeds one. The major contributors to the hazard index are trans-1,2-dichloroethene, 1,1,1-trichloroethane, 1,2-dichlorobenzene and ethylbenzene with a hazard index of 12.

Table I

Cumulative Carcinogenic Risk Estimates and Cumulative Hazard Indices by Exposure Pathway Evaluated for Old Springfield Site

Expoure Pathway	Cancer Risk		Hazard Index	
	Average	Maximum	Average	Maximum
Current-On site				
Dermal contact and ingestion of soil by children	$1x10^{-7}$	$2x10^{-5}$	$6x10^{-5}$	$1x10^{-2}$
Dermal contact and ingestion of soil by adults	$3x10^{-7}$	$2x10^{-5}$	$1x10^{-5}$	$1x10^{-3}$
Inhalation of chemicals from landfill gas	$9x10^{-5}$	$5x10^{-3}$	$2x10^{-4}$	$2x10^{-2}$
Current-Off-site				
Inhalation of chemicals from landfill gas	$9x10^{-5}$	$5x10^{-3}$	$2x10^{-4}$	$2x10^{-2}$
Inhalation of chemicals from Volatilization from leachate seeps	$1x10^{-4}$	$1x10^{-3}$	$2x10^{-3}$	$1x10^{0}$
Future-On site				
Dermal contact and ingestion of soil by children	$1x10^{-7}$	$9x10^{-5}$	$8x10^{-5}$	$3x10^{-2}$
Dermal contact and ingestion of soil by adults	$3x10^{-7}$	$1x10^{-4}$	$2x10^{-5}$	$2x10^{-3}$
Inhalation of chemicals from landfill gas	$9x10^{-5}$	$5x10^{-3}$	$2x10^{-4}$	$2x10^{-2}$
Dermal Contact and ingestion of soil during construction	$2x10^{-7}$	$5x10^{-6}$	$3x10^{-5}$	$7x10^{-4}$
Consumption of ground-water from bedrock, eastern area (based on steady state model)	$1x10^{-3}$	$7x10^{-2}$	$9x10^{-2}$	12
Consumption of ground-water from bedrock, eastern area (based on leaching model)	$4x10^{-2}$	$6x10^{-2}$	11	54
Future-Off site				
Consumption of ground-water, western off-site area	$6x10^{-4}$	$7x10^{-4}$	$1x10^{-1}$	$1x10^{-1}$

* Future consumption of groundwater from the bedrock aquifer based on the leaching model may exceed EPA's risk range of 10^{-4} to 10^{-6}. The principal contributors to the carcinogenic risk are benzene at 550 ppb and tetrachloroethene at 150 ppb which exceed the Maximum Contaminant Levels established under the Safe Drinking Water Act of 5 ppb for benzene and 5 ppb for tetrachloroethene. The hazard index exceeds one. The major contributors to the hazard index are tetrachloroethene, 1,2-dichlorobenzene, chloroform, chlorobenzene, trans-1,2-dichloroethene, 1,1,1 -trichloroethane, and bis(2 ethyl hexyl) pthalate with a hazard index of 50.

* Future consumption of groundwater west of the site may exceed EPA's risk range of 10^{-4} to 10^{-6}. The principal contributor to the carcinogenic risk is vinyl chloride, whose maximum concentration of 7 ppb exceeds the Maximum Contaminant Level established under the Safe Drinking Water Act of 2 ppb. The hazard index does not exceed one.

The excess lifetime carcinogenic risks associated with direct contact with soil by children and by adults and direct contact with soil during construction exceeds EPA's point of departure of 10^{-6}. The chemicals contributiong most to this risk are the polychlorinated biphenyls (PCBs) and the carcinogenic polycyclic aromatic hydrocarbons (PAHs). The hazard index does not exceed one.

An ecological risk assessment was also performed. The main conclusion of the ecological assessment is that adverse effects on wildlife and aquatic life may be expected due to copper, nickel, and PCBs in leachate seeps and sediments; estimated concentrations of these and other chemicals in the Black and Connecticut Rivers are not expected to pose a risk to wildlife.

Actual or threatened releases of hazardous substances from this site, 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.

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 protec-tive of human health and the environment. In addition, Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act (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 to aid in the development and screening of alternatives. These remedial action objectives were developed to mitigate existing and future poten-tial threats to public health and the environment. These response objectives were:

* Prevent the leaching of soil contaminants to the groundwater.
* Prevent the migration of contaminated groundwater to the rest of the aquifer.
* Prevent contact with contaminated soil or leachate that may present a risk.
* Prevent further migration of contaminated groundwater offsite.
* Prevent the uncontrolled emission of landfill gases containing hazardous substances.

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 was developed for the second operable unit.

The 1988 RI/FS developed a range of alternatives in which treatment that reduces the toxicity, mobility, or volume of the hazardous substances is a principal element. This range included an alternative that removes or destroys hazardous substances to the maximum extent feasible, eliminating or minimizing to the degree possible the need for long term management. This range also included alternatives that treat the principal threats posed by the site but vary in the degree of treatment employed and the quantities and characteristics of the treatment residuals and untreated waste that must be managed; alternative(s) that involve little or no treatment but provide protection through engineering or institutional controls; and a no action alternative. The 1990 FFS Report also contains additional alternatives with respect to source control.

As discussed in Chapter 4 of the 1988 FS Report, the RI/FS identified, assessed and screened technologies based on implementability, effectiveness and cost. These technologies were combined into source control (SC) and management of migration (MM) alternatives. Chapter 5 of the 1988 FS Report 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 1988 FS Report. The 1990 FFS Report followed the same procedures in evaluating alternatives.

The 1988 FS evaluated and screened seven source control alternatives. The 1990 FFS screened an additional nine source control alternatives. The 1990 SFS updated source control alternative 2 from the 1988 FS based upon current site information. The presence of three reports which each evaluate remedial alternatives resulted in a larger than usual number of alternatives being retained for final consideration.

In summary, of the sixteen source control remedial alternatives screened in Chapter 6 of the 1988 FS Report and Chapter 4 of the FFS Report, eleven were retained for detailed analysis. In response to deficiencies in the FFS Report, EPA prepared a Detailed Evaluation Memo evaluating the alternatives retained for final consideration in the FFS based upon the nine evaluation criteria set forth in the NCP for review of remedial alternatives. The Detailed Evaluation Memo also contains a comparative analysis of all eleven alternatives retained for final consideration.

VIII. DESCRIPTION OF ALTERNATIVES

This Section provides a narrative summary of each alternative evaluated. Due to the existence of two separate feasibility studies, the numerical designations of the alternatives in the 1990 FFS were changed. Alternatives 1 through 5 in this ROD are numbered as they appear in the 1988 FS Report. Alternatives 6 through 11 in this ROD correspond to alternatives number 2, 3, 5, 6, 7 and 9 of the 1990 FFS Report, respectively. A detailed tabular assessment of alternatives 1-5 can be found in Table 7-28 of the 1988 FS Report and a detailed assessment of alternatives 6 through 11 can be found in the July 1990 Detailed Evaluation Memo.

Alternative 1. No Action. This alternative was evaluated in detail in the 1988 FS Report to serve as a baseline for comparison with the other remedial alternatives under consideration. Under this alternative, no treatment or containment of soil or groundwater contamination would occur and no effort would be made to restrict potential exposure to site contaminants. The only cost associated with this alternative would be the cost of the five year reviews required for an alternative that leaves waste in place.

ESTIMATED TIME FOR DESIGN, CONSTRUCTION: NOT APPLICABLE
ESTIMATED TIME FOR OPERATION: 5 YEAR REVIEWS
ESTIMATED CAPITAL COST: NOT APPLICABLE
OPERATION, AND MAINTENANCE COST (PRESENT WORTH): $23,000.
TOTAL COST (PRESENT WORTH, 10%, 30 YEARS) $23,000

Alternative 2. Capping, French Drain, Active Gas Collection and Passive Gas Venting Systems, Source Control Extraction Wells, and Side Slope Stabilization.
This alternative is described in detail in section X, "The Selected Remedy".

ESTIMATED TIME FOR DESIGN, CONSTRUCTION: 3-3.5 YEARS
ESTIMATED TIME FOR OPERATION: AT LEAST 30 YEARS
ESTIMATED CAPITAL COST: $7,517,000
OPERATION, AND MAINTENANCE COST (PRESENT WORTH): $1,159,500.
TOTAL COST (PRESENT WORTH, 10%, 30 YEARS) $8,692,000

Alternative 3. On-Site Landfill of Contaminated Solids. This alternative would involve excavating waste and placing it in a two to four acre landfill to be constructed in the northern portion of the former mobile home park site. The landfill would be built to specifications outlined in the Resource Conservation and Recovery Act (RCRA) which require a double liner beneath the waste and other precautions to ensure that contaminants do not leach out of the landfill. Once the contaminated waste material has been placed in the landfill, the area would be capped as described in the selected alternative.

ESTIMATED TIME FOR DESIGN, CONSTRUCTION: 3-4 YEARS
ESTIMATED TIME FOR OPERATION: AT LEAST 30 YEARS
ESTIMATED CAPITAL COST: $23,339,000
OPERATION, AND MAINTENANCE COST (PRESENT WORTH): $978,000.
TOTAL COST (PRESENT WORTH, 10%, 30 YEARS) $23,317,000

Alternative 4. On-Site Incineration. This alternative would involve excavating waste and burning it at very high temperatures to destroy contaminants. Air pollution control devices on the incinerator would significantly reduce the risks to public health and the environment from contaminated emissions released during incineration. The contaminated ash produced during the incineration, as well as waste items such as appliances that are too large or that are otherwise unsuitable for incineration, would be placed in an on-site RCRA landfill, as described in alternative 3. A detailed analysis of several cleanup levels is presented in the 1988 FS Report.

ESTIMATED TIME FOR DESIGN, CONSTRUCTION: 7 YEARS
ESTIMATED TIME FOR OPERATION: AT LEAST 30 YEARS
ESTIMATED CAPITAL COST: $197,892,000
OPERATION, AND MAINTENANCE COST (PRESENT WORTH): $945,000
TOTAL COST (PRESENT WORTH, 10%, 30 YEARS) $198,837,000

Alternative 5. In-Situ Vitrification. This alternative would require excavating contaminated waste and soil and placing it in on-site trenches for vitrification treatment. Electrodes would be placed in the waste trenches to melt, or vitrify, the waste. The extremely high temperatures generated would destroy many of the contaminants and solidify any remaining contamination into a glass-like substance. The trenches would be covered with fill and seeded to provide a vegetative covering.

ESTIMATED TIME FOR DESIGN, CONSTRUCTION: 20 YEARS
ESTIMATED TIME FOR OPERATION: AT LEAST 30 YEARS
ESTIMATED CAPITAL COST: $128,280,000
OPERATION, AND MAINTENANCE COST (PRESENT WORTH): $881,000
TOTAL COST (PRESENT WORTH, 10%, 30 YEARS) $129,161,000

Please note that the cost estimates for alternatives 6 through 11 are taken from the 1990 FFS prepared by REMCOR, Inc. The time estimates were adjusted to reflect EPA's judgement concerning construction, operation, and maintenance schedules

Alternative 6. Fencing and Covering of Contaminated Soils. This alternative would involve covering soils that present an unacceptable cancer risk from direct contact or incidental ingestion of contaminated soil. This would require placing a two foot cover of fill over an area of approximately 1.6 acres. A 3500 ft chain link fence would be constructed around Waste Areas 2, 3 and 4 and the eastern seeps to prevent access to the site areas of concern. Nothing would be done to stabilize the side slopes. Surface drainage controls would be used upgradient of Waste Area 4 to protect the integrity of the cover.

ESTIMATED TIME FOR DESIGN, CONSTRUCTION: 1 YEAR
ESTIMATED TIME FOR OPERATION: AT LEAST 30 YEARS
ESTIMATED CAPITAL COST: $378,000
OPERATION, AND MAINTENANCE COST (PRESENT WORTH): $131,000
TOTAL COST (PRESENT WORTH, 10%, 30 YEARS) $509,000

Alternative 7. Fencing; Installation of Source Control Well; and Covering of Contaminated Soils. This alternative would include all of the elements of alternative 6, as well as the installation of a source control well. The source control well would be designed to remove contaminated groundwater from the sand and gravel unit underneath Waste Area 3. This well would pump water into the groundwater treatment system.

ESTIMATED TIME FOR DESIGN, CONSTRUCTION: 2 YEARS
ESTIMATED TIME FOR OPERATION: AT LEAST 30 YEARS
ESTIMATED CAPITAL COST: $495,000
OPERATION, AND MAINTENANCE COST (PRESENT WORTH): $197,000
TOTAL COST (PRESENT WORTH, 10%, 30 YEARS) $692,000

Alternative 8. Fencing; Installation of Source Control Well; Vapor Extraction from Waste Area 3; and Covering of Contaminated Areas Outside Waste Area 3. This alternative would include all of the elements of alternative 7, as well as the implementation of a soil vapor extraction system to remove volatile organic compounds from the unsaturated soil/waste in Waste Area 3. Approximately 20-25 vapor extraction wells would be installed. The deep wells would also remove shallow groundwater. The gases withdrawn by the soil vapor system would be treated to prevent the release of contaminants into the air. It is estimated that 90-95 percent of the waste in Waste Area 3 is unsaturated. Soil vapor extraction would decrease the concentrations of those contaminants still in the waste.

ESTIMATED TIME FOR DESIGN, CONSTRUCTION: 1 YEAR
ESTIMATED TIME FOR OPERATION: AT LEAST 30 YEARS(3-3.5 YEARS FOR VAPOR EXTRACTION SYSTEM)
ESTIMATED CAPITAL COST: $1,638,000
OPERATION, AND MAINTENANCE COST (PRESENT WORTH): $875,000
TOTAL COST (PRESENT WORTH, 10%, 30 YEARS) $2,513,000

Alternative 9. Fencing; Installation of Source Control Well; Capping of Waste Area 3; and Covering of Contaminated Soil Areas Outside Waste Area 3. This alternative would include fencing, a source control well, and a .5 acre cover over contaminated soil outside Waste Area 3, as described in alternative 7. It would also include the installation of a RCRA Cap on the 2.5 acre plateau portion of Waste Area 3. The cap would include a passive soil venting system and treatment of the collected gases.

ESTIMATED TIME FOR DESIGN, CONSTRUCTION: 2-2.5 YEARS
ESTIMATED TIME FOR OPERATION: AT LEAST 30 YEARS
ESTIMATED CAPITAL COST: $1,546,000

OPERATION, AND MAINTENANCE COST (PRESENT WORTH): $342,000
TOTAL COST (PRESENT WORTH, 10%, 30 YEARS) $1,888,000

Alternative 10. Fencing; Installation of Source Control Well; Capping of Waste Areas 3 and 4; and Covering of Contaminated Soil Outside of Waste Area 3. This alternative would include all of the elements of source control alternative 9 as well as the placement of a RCRA Cap on Waste Area 4. An additional 2.2 acres would be capped under this alternative.

ESTIMATED TIME FOR DESIGN, CONSTRUCTION: 2-2.5 YEARS
ESTIMATED TIME FOR OPERATION: AT LEAST 30 YEARS
ESTIMATED CAPITAL COST: $2,367,000.
OPERATION, AND MAINTENANCE COST (PRESENT WORTH): $446,000
TOTAL COST (PRESENT WORTH, 10%, 30 YEARS) $2,813,000

Alternative 11. Fencing; Installation of Source Control Well; Capping of Waste Area 3 with Perimeter Slurry Wall; and Covering Of Contaminated Soils Outside of Waste Area 3. This alternative would include all of the elements of source control alternative 9 as well as the design and construction of a slurry wall around the perimeter of Waste Area 3. The wall would be a 900 ft long, 45 ft deep solid barrier reducing groundwater flow into the waste.

ESTIMATED TIME FOR DESIGN, CONSTRUCTION: 3 YEARS
ESTIMATED TIME FOR OPERATION: AT LEAST 30 YEARS
ESTIMATED CAPITAL COST: $3,198,000
OPERATION, AND MAINTENANCE COST (PRESENT WORTH): $403,000
TOTAL COST (PRESENT WORTH, 10%, 30 YEARS) $3,601,000

IX. SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

Section 121(b)(1) 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 NCP articulates nine evaluation criteria to be used in assessing the individual remedial alternatives.

A detailed analysis was performed on the alternatives using the nine evaluation criteria in order to select a site remedy. 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 theirdefinitions are as follows:

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 and Maintenance (O&M) costs, as well as present-worth costs.

<u>Modifying Criteria</u>

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 public's general response to the alternatives described in the Proposed Plan and RI/FS reports.

A detailed tabular assessment of alternatives 1-5 according to the nine criteria can be found in Table 7-28 of the 1988 FS Report. A descriptive assessment of the remaining alternatives based on the nine criteria can be found in the July 1990 Detailed Evaluation Memo.

Following the detailed analysis of each individual alternative, a comparative analysis, focusing on the relative performance of each alternative against the nine criteria, was conducted. The comparative analysis for the eleven alternatives retained for detailed evaluation is in the Detailed Evaluation Memo.

The discussion below presents the nine criteria and a brief narrative summary of the alternatives and their strengths and weaknesses according to the detailed and comparative analyses.

1. Overall Protection of Human Health and the Environment.

Alternatives 2 through 5 would provide for overall protection of human health and the environment by preventing direct contact with contaminated soils, preventing the inhalation of contaminants in landfill gas, and reducing the infiltration and underground migration of water to prevent the continued leaching of contaminants into the groundwater. Only alternatives 4 and 5 would use treatment which permanently reduces the toxicity, mobility, or volume of the contaminants. Alternatives 2 and 3 would provide for the significant immobilization of contaminants in the unsaturated zone. Of the alternatives which satisfy this criterion and which leave the waste in place, alternative 2 provides for the greatest degree of containment of the wastes. It is also the only one of these alternatives that considers the potential failure of the side slopes and includes measures to prevent such a failure.

Alternative 1, the no action alternative, would not satisfy this criterion, nor would alternatives 6 through 11. The no action alternative does not include measures which provide for protection of human health and the environment. Alternatives 6 and 7 do not address the potential risk associated with the inhalation of landfill gas emissions for the entire site. Alternatives 9 and 11 do not address the potential risk from inhalation of landfill gas emissions from Waste Areas 2 and 4. Alternative 10 does not address the potential risk from inhalation of landfill gases from Waste Area 2. Alternative 6 does not reduce or control the risk posed by ingesting contaminated groundwater or prevent the leaching of soil contaminants into the groundwater. Alternatives 7 and 8 do not prevent the infiltration of water which could contact contaminated waste or soil and carry the contamination into the groundwater. Alternatives 9 and 11 do not prevent the infiltration of water through the unsaturated zone containing contaminated soil/waste. Alternatives 6 through 11 would reduce the direct contact threat. Alternatives 1 and 6 through 11 do not include measures to prevent the failure of the side slopes.

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

Alternatives 2 through 5 would meet all ARARs, with the exception of the Vermont Groundwater Protection Act enforcement standard for tetrachloroethene. This ARAR would be waived. Alternative 1 and alternatives 6 through 11 do not satisfy ARARs. The soil cover contemplated by alternatives 6 through 11 does not satisfy the RCRA requirements for hazardous waste landfill closure and would not encompass all three waste areas. Of all the alternatives which would leave waste in place (alt. 1, 2, 3 and 6 through 11), only alternative 2 would include a cover over all of the area subject to the RCRA closure regulations. Alternative 2 also would involve construction of a cap consistent with RCRA technical guidance for final covers on hazardous waste landfills.

3. Long-term Effectiveness and Permanence.

Alternatives 4 and 5 would have the most long-term effectiveness and permanence because the waste would be treated. Alternative 3 would achieve long-term effectiveness by removal of the waste and placement into an on-site RCRA landfill. Alternative 2 would be effective in reducing the long-term generation of leachate, controlling landfill gas emissions and preventing dermal contact and ingestion of soil provided that the cap is maintained. Alternatives 6 through 11 would be less long-term effective because all of the waste would not be capped. For alternatives 1, 2, 3 and 6 through 11, the waste would remain in place. Alternative 8 would reduce the volume of contamination in the unsaturated zone for Waste Area 3, which would have a significant impact on reducing the level of VOCs in landfill gas.

4. Reduction of Toxicity, Mobility, or Volume through treatment.

Only alternatives 4 and 5 would achieve a significant reduction in volume, mobility, or toxicity through treatment. Alternative 8 would reduce the volume of contamination in the unsaturated zone through vacuum extraction and vapor phase carbon treatment. An active gas collection system, included in alternative 2, would also achieve some reduction in the volume of the VOCs in the unsaturated zone through treatment of the collected gases. Alternatives 7 through 11 and alternative 2 would all reduce the mobility and volume of contaminants in the deep groundwater through the use of source control extraction well(s) to pump contaminated groundwater to the leachate collection and treatment system. Alternatives 1, 3 and 6 would not reduce toxicity, mobility, or volume through treatment.

5. Short-term Effectiveness.

With the exception of alternative 1, all of the alternatives would be effective in the short-term. Because of the potential for release of contaminants during any excavation activities, special engineering precautions would have to be taken to minimize the potential for contaminant emissions to ensure short-term protection of workers and area residents during construction activities. Alternative 2 would be completed in a shorter time frame than alternatives 3 through 5. Except for alternative 1, alternatives 6 and 7 would be constructed in a shorter time frame than any of the other alternatives. None of the alternatives that would leave the waste in place would result in the cleanup of the site in a time frame significantly shorter than any other alternative that leaves waste in place.

6. Implementability.

All of the alternatives evaluated would be implementable. Alternative 2, and alternatives 6 through 11 would be implementable because caps, french drains, and gas collection systems are commonly used engineering practices. Alternative 5 would involve the use of an innovative technology (in-situ vitrification) which would require careful design studies. Alternative 8, soil vapor extraction, would require a pilot study prior to full scale implementation. Alternative 2 includes side slope stabilization which would be difficult to implement in certain areas of the site. The side slope stabilization of Waste Area 3 would involve the use of common construction techniques. The side slope stabilization of Waste Area 2 would require more complex engineering practices. The construction of the french drain to 25 feet would require the use of specialized construction practices.

7. Cost.

Alternatives 3, 4 and 5 are more expensive than alternative 2. The costs for alternatives 6 through 11 may be underestimated due to the lack of adequate controls relating to groundwater flow and side slope stabilization. Alternative 2 is the least costly of the alternatives which are adequately protective and attain ARARs. Alternative 2 is at least an order of magnitude less expensive than the waste treatment alternatives that satisfied the two threshold criteria. Costs for alternatives 2 through 5 are shown in Table II.

Table II
Cost of Alternatives which satisfy the two threshold criteria

(costs in thousands)

Alternative	Capital Cost	O & M Cost	Net Present Value
2	5,568	1,159	8,692
3	22,340	978	23,317
4	197,892	945	198,837
5	128,280	871	129,161

8. **State Acceptance.**

The Vermont Department of Environmental Conservation (VT DEC) has been involved in the site from the time it was operated by the Town of Springfield as summarized in Section II of this document, "Site History and Enforcement Activities". The VT DEC has reviewed this document and concurs with the selected remedy for the source control operable unit remedy as documented in the attached Declaration of Concurrence.

9. **Community Acceptance.**

The comments received in writing during the public comment period and orally at the public hearing held on August 2, 1990 are included in the Responsiveness Summary which is attached to this ROD. Comments from citizens were divided between those who want more permanent remedies and others who called for less costly remedies. The PRPs submitted their own recommendations concerning remediation.

In accordance with requirements of the NCP, EPA may only select a remedy which satisfies the two threshold criteria, overall protectiveness and compliance with ARARs. Following the evaluation of the eleven alternatives retained for detailed evaluation, EPA determined that alternative 1 and alternatives 6 through 11 do not satisfy the two threshold criteria. Consequently, alternative 1 and alternatives 6 through 11 can not be selected as the source control remedy. Alternatives 2 through 5 do satisfy the two threshold criteria and were then further compared using the five balancing criteria. (see July 1990 Detailed Evaluation Memo)

X. THE SELECTED REMEDY

The selected remedy described herein is for the second operable unit for the Old Springfield Landfill site. It involves the source control portion of the cleanup and will be implemented in addition to the first operable unit remedy to provide for the comprehensive cleanup of the site.

A. Cleanup Levels

Cleanup levels have been established for those contaminants that were identified in the 1988 EA which were found to pose an unacceptable risk to either public health or the environment. Cleanup levels have been set based on the identified ARARs (e.g. Safe Drinking Water Act [SWDA] Maximum Contaminant Level Goals [MCLGs] and Maximum Contaminant Levels [MCLs]), if available. The 10^{-6} risk level was used as the point of departure for determining remediation goals for carcinogenic effects when ARARs were not available. A concentration corresponding to a hazard index of one for compounds with non-carcinogenic effects was used as the point of departure when setting cleanup levels. In instances in which the values described above were not feasible to quantify, the practical quantitation level (PQL) was used as the cleanup level.

Periodic assessments of the protection afforded by remedial actions will be made as the remedy is being implemented and at the completion of the remedial action. If the remedial action is not found to be protective, further action will be required.

1. Groundwater

Because the aquifer at and beyond the compliance boundary of the site has a groundwater classification of Class IIB, which is a potential source of drinking water, MCLs and non-zero MCLGs established under the Safe Drinking Water Act are ARARs. The Groundwater Protection Act Standards of the State of Vermont are also ARARs. The compliance boundary was established as the perimeter of the waste management unit.

Cleanup levels for known and probable carcinogenic compounds (Class A & B) have been set at the appropriate MCL. Cleanup levels for the Class C, D and E compounds (possible carcinogens not classified and no evidence of carcinogenicity) have been set at the MCLG, if available. In the absence of a MCLG, a MCL, state standard, or a proposed drinking water standard or other suitable criteria to be considered (i.e. health advisory), a cleanup level was derived for carcinogenic effects using the 10^{-6} excess cancer risk level as the point of departure in considering the potential ingestion of groundwater.

Cleanup levels for compounds in groundwater exhibiting non-carcinogenic effects have been set at the MCLG, if available. In the absence of a MCLG, cleanup levels for non-carcinogenic effects have been set at a level thought to be without appreciable risk of an adverse effect when exposure occurs over a lifetime (hazard index = 1).

Table III summarizes the cleanup levels for a subset of the carcinogenic and non-carcinogenic contaminants of concern identified in groundwater. Groundwater standards were originally established in the 1988 ROD. Since 1988, two standards more stringent than federal MCLs have been promulgated by the State of Vermont. The standards relate to the compounds tetrachloroethene and xylenes. The Vermont primary groundwater enforcement standard for tetrachloroethene is 0.7 ppb. However, in place of the 0.7 ppb standard, the practical quantitation limit (PQL) of 5 ppb, based on SDWA analytical methods, will be used as the performance standard for tetrachloroethene. The Vermont primary groundwater enforcement standard for xylenes (400 ppb) will also be included as a performance standard.

TABLE III: GROUND WATER CLEANUP LEVELS

Carcinogenic Contaminants of Concern	Cleanup Level (ppb)	Basis	Level of Risk
Benzene	5	MCL	$4x10^{-6}$
Trichloroethylene	5	MCL	$2x10^{-6}$
1,1-dichloroethene	7	MCL	$1x10^{-4}$
Vinyl Chloride	2	MCL	$1x10^{-4}$
Tetrachloroethene	5	PQL	$7x10^{-6}$

Non-Carcinogenic Contaminants of Concern	Cleanup Level (ppb)	Basis	Target Endpoint of Toxicity	Hazard Index
Tetrachloroethene	5	PMCL	liver	.01
1,1 Dichloroethene	7	MCL	liver	.02
Xylenes	400	VTstd	CNS effects, reduced body weight	.006

These cleanup levels must be met at the completion of the remedial action at the points of compliance described in the 1988 ROD and at the boundary of the waste management unit as described in section X.A.3. of this ROD.

Also, sampling results from the 1990 FFS indicate the presence of contamination in the groundwater along Route 11. The first operable unit ROD requires that as additional areas of groundwater contamination are identified, the management of migration system will be expanded to include these waters if such actions are determined by EPA to be practical and consistent with the management of migration system. Should EPA make this determination for the area along Route 11 where contamination is present, the management of migration system of the first operable unit shall be extended to include this area as an action covered by the first operable unit.

These cleanup levels are consistent with ARARs for ground water and attain EPA's risk management goal for remedial actions (carcinogenic risk level between 10^{-4} and 10^{-6}), unless the MCL and/or MCLG is outside the risk range due to the PQL for the particular hazardous substance being above the 10^{-4} excess risk level. Vinyl chloride and 1,1 DCE are two substances whose MCL's are set at the PQL and the PQL represents an excess risk level greater than 10^{-4}. The PQL for these compounds has been used to establish the performance standard.

2. Soil Cleanup Levels

Cleanup levels for known and suspected carcinogens have been set to total 10^{-5} excess cancer risk level considering exposures via dermal contact and ingestion of soil contaminated with PCBs and PAHs. Exposure parameters for dermal contact and ingestion of soil have been described in the 1988 FS Report in section 1.4.1. Table IV summarizes the cleanup levels for carcinogenic contaminants of concern in soils.

TABLE IV: SOIL CLEANUP LEVELS

Carcinogenic Contaminants of Concern	Cleanup level (ppb)		Level of Risk
PCBs	6,000		$5x10^{-6}$
cPAHs	3,000		$5x10^{-6}$
		Sum	$1x10^{-5}$

3. Other Cleanup Levels

The area of contamination (AOC) is comprised of the portion of the site on which disposal of industrial waste or co-disposal of municipal and industrial waste occurred. This area covers approximately eight acres. The cap will be placed over those areas in or contiguous with Waste Areas 2, 3 and 4 where waste has been disposed or has come to be located or where the soil cleanup levels are exceeded. This area includes all of Waste Area 4, the plateau portions of Waste Areas 2 and 3, and the contamination adjacent to the western side of Waste Area 3. The cap shall extend to the west beyond the boundary of Waste Area 3 approximately to the location of boring 70. The waste management unit is the area which includes the cap, groundwater extraction wells adjacent to the waste area, side slopes of Waste Areas 2 and 3 and the eastern leachate collectors. The remedy will be implemented and maintained to achieve the specified groundwater and soil cleanup levels at the boundary of the waste management unit.

If Waste Area 2 is completely excavated as part of the remedy, the following performance standards will apply. Waste Area 2 will be excavated until: (1) all of the waste material is removed; (2) only natural soil (no deposited waste) remains; (3) a soil testing program demonstrates that at the vertical and lateral limits of excavation, there are no volatile or semi-volatile contaminants above contract laboratory program detection limits and that all metals are below three times the background level. All of these conditions must be attained to meet the performance standards for complete excavation of Waste Area 2.

The selected remedy does not require that isolated areas of organic contamination (e.g. Waste Area 1) be excavated and placed under the cap because these areas are not of sufficient volume to pose a significant threat to groundwater nor do they pose other unacceptable risks. If, however, during the implementation of the remedy, significant volumes of isolated organic contamination are discovered which would exceed soil cleanup levels or otherwise represent a groundwater, direct contact, or air emission risk, this contamination would be excavated. Such material would be consolidated under the cap unless such action was prohibited by federal land disposal restrictions.

The selected remedy will result in the covering of all areas identified as representing a total direct contact threat of $1x10^{-5}$ or greater. In addition, although the cleanup standards for PCBs and PAHs are 6 and 3 ppm, respectively, the cap will cover all soil which prior sampling has shown to be contaminated with PCBs or PAHs above 1 ppm. The selected remedy will also result in the containment of those areas with sufficient volumes of waste or contaminated soil or both to pose a long-term threat to groundwater.

B. Description of Remedial Components

The selected source control remedial alternative will constitute a containment option with little or no treatment of the waste. It is designed to: (1) prevent dermal contact with and ingestion of contaminated soil; (2) reduce or prevent, to the extent practicable, infiltration of surface and/or groundwater into waste areas and leaching of contaminants from waste areas into the groundwater below and downgradient of the waste; and (3) control the harmful buildup or emission of landfill gases.

The major components of the selected remedy are listed and described in further detail below.

1. Two French drains
2. Source control extraction wells
3. Capping Waste Areas 2, 3 and 4
4. Active gas collection and passive gas venting systems
5. Side slope stabilization
6. Operation and maintenance of the selected remedy
7. Institutional controls to restrict future site use
8. 5 year reviews of the effectiveness of the remedy

The bushes and trees in Waste Areas 2, 3 and 4 will be cleared and grubbed to facilitate side slope stabilization, french drain installations, and construction of a multilayer cap and side slope covers. A chain link fence approximately 8 ft high will be constructed to restrict access to the waste management unit. Warning signs will be posted on the perimeter fence as necessary. The fence and signs will be subject to periodic inspections and maintenance.

Two french drains (see Figure 3, Appendix A) will be constructed at specified locations around the perimeter of the waste areas. Construction of a french drain involves the placement of perforated pipe along the bottom of a trench so that water flowing through or over the soil will drain into the trench and be collected in the pipe. The french drains or some equivalent method of water collection must be designed, constructed, and maintained to achieve the objectives and specifications established in the following paragraphs.

The first french drain will be constructed along the upgradient western and southern perimeters of Waste Area 4 to intercept both overland and shallow subsurface groundwater flows from the surrounding uplands and to prevent this water from entering Waste Area 4. It is anticipated that the french drain will be approximately 650 ft long and up to 25 feet deep. The water collected in the french drain will be analyzed in a representative manner. If the water collected in the french drain exceeds the groundwater cleanup levels, it will be treated in the management of migration treatment system or other equivalent treatment system. The french drain will be operated and maintained until the cleanup levels described in section X.A for groundwater at the boundary of the waste management unit and in the water collected in the french drain are achieved. If the performance standards are exceeded after the use of the french drain is discontinued, the french drain will be brought back into operation.

The second french drain will be constructed in the uncapped area along the northern edge of Waste Area 4 and the western edge of Waste Area 3 in the area of monitoring wells 28, 21 and 38. The purpose of this drain is to prevent shallow subsurface water which may flow horizontally above the till from entering Waste Area 3. It is anticipated that this french drain will be approximately 200 ft long and 25-35 ft deep. The water collected in the french drain will be analyzed in a representative manner. If the water collected in the french drain exceeds the groundwater cleanup levels, it will be treated in the management of migration treatment system or other equivalent treatment system. The french drain will be operated and maintained until the cleanup levels described in section X.A for groundwater at the boundary of the waste management unit and in the water collected in the french drain are achieved. If the performance standards are exceeded after the use of the french drain is discontinued, the french drain will be brought back into operation.

Source control extraction wells will be installed in Waste Area 3. Source control extraction wells will be placed in locations that allow for the capture of water which would otherwise move east towards the Black River. The number of wells will be sufficient to maintain the maximum practical contaminant removal. In evaluating the number and location of source control extraction wells, the impact of stagnant zones, pump rates, and the potential for extracting clean water from beyond the area of contamination will be considered, at a minimum. The water collected in the source control extraction wells will be analyzed in a representative manner. If the water collected in the source control extraction wells exceeds the groundwater cleanup levels, it will be treated in the management of migration treatment system or other equivalent treatment system. The source control extraction wells will be operated and maintained until the cleanup levels described in section X.A for groundwater at the boundary of the waste management unit and in the water collected in the source control extraction wells are achieved. If the performance standards are exceeded after the use of the source control wells is discontinued, the source control extraction wells will be brought back into operation.

The principal component of the selected remedy is placement of a multilayer cap over those areas in or contiguous with Waste Areas 2, 3 and 4 where waste has been disposed or has come to be located or where the soil cleanup levels are exceeded. This area includes all of Waste Area 4, the plateau portions of Waste Areas 2 and 3, and the contamination adjacent to the western side of Waste Area 3. The cap shall extend to the west beyond the boundary of Waste Area 3, approximately to the location of boring 70. (see Figure 4, Appendix A for estimated location and Figure 5, Appendix A for a typical cap cross-section). The plateau portions of Waste Areas 2 and 3 are those locations which have a slope of less than or equal to 3:1. The side slopes (or outslopes) are those areas of Waste Areas 2 and 3 which have a slope of greater than 3:1. The cap will be designed to meet or exceed the performance requirements set forth in 40 CFR 264.111, 40 CFR 264.310 and the guidance document Final Covers on Hazardous Waste Landfills and Surface Impoundments, July 1989 (EPA/530-SW-89-047) (Technical Guidance) or in a manner to achieve performance equivalent to that required by 40 CFR sections 264.111, 264.310 and the Technical Guidance. Site specific conditions will be considered in determining the most effective cap design. A typical RCRA Technical Guidance cap includes a 1 foot gas vent layer over prepared subgrade, followed by a geotextile filter, a 2 foot low permeability soil layer , a geomembrane, a 1 foot drainage layer, a geotextile filter, with a cover of sufficient soil and topsoil to provide for a grass cover and to provide adequate frost protection. The finished surface of a typical cap is seeded with grass.

To expedite the construction of a cap on Waste Area 4, additional measures to dewater the waste area (e.g. pumping) will be considered, and, if found appropriate by EPA during remedial design, implemented. The cap must be maintained for a minimum of thirty years from the date the cap is completed and thereafter until EPA determines that further maintenance is not necessary. This maintenance may include reconstruction, if necessary, of all or a part of the cap, active gas collection and passive gas venting systems, french drains, water treatment systems, and/or stabilized slopes.

Active gas collection and passive gas venting will be used to prevent the harmful buildup or release of landfill gases from the areas beneath the cap or the stabilized slopes. The landfill gases will be treated using vapor phase carbon or an equivalent method of treatment. Waste Areas 2 and 4 will have a passive gas venting system installed as part of the cap. A passive gas venting system (see Figure 5, Appendix A) involves installing gas vents into the cap. A sufficient number of gas vents will be installed: (1) to prevent the harmful buildup of methane and/or carbon dioxide, and (2) to provide for the collection and treatment of landfill gases containing hazardous substances. The passive gas venting systems for Waste Areas 2 and 4 will be operated and maintained as part of the maintenance of the cap. The treatment of landfill gases will continue until a demonstration is made that hazardous substances in the landfill gas do not represent a potential threat to human health or the environment. In making the demonstration and in monitoring gas emissions, the landfill gas will be tested at the source of emission (e.g. at the gas vents).

An active gas collection system (see Figure 6, Appendix A) will be used in Waste Area 3. The active gas collection system will involve the use of vertical wells or equivalent method to increase the flow of landfill gases to the collection system. The system will involve the placement of sufficient vertical gas collection wells and vents to prevent the buildup of methane and to provide for the collection and treatment of landfill gases containing hazardous substances. The active gas collection system will also be designed to prevent or minimize, to the extent practicable, the escape of landfill gases containing hazardous substances from the side slope of Waste Area 3. If the side slopes are covered in a manner which allows for the installation of a passive gas venting system, a passive gas venting system may be considered in place of the active gas collection system provided the same level of performance will be achieved and maintained. If the passive gas venting system for Waste Area 3 fails to achieve the performance of an active gas collection system, then the system will be converted to an active gas collection system. The treatment of landfill gases will continue until a demonstration is made that hazardous substances in the landfill gas do not represent a potential threat to human health or the environment. In making this demonstration and in monitoring gas emissions, the landfill gas will be tested at the source of emission. The active gas collection system will be operated and maintained as part of the cap maintenance.

The eastern slopes of Waste Areas 2 and 3 (see Figure 4, Appendix A for estimated locations) will be stabilized to prevent any slope failure which can damage the cover system or which could allow releases of waste and leachate into surrounding soils and groundwater. Each slope must be designed to withstand the loading and hydraulic conditions to which it will be subject during the cap's construction and post-closure periods. In addition, the slopes of Waste Areas 2 and 3 will be stabilized so that a greater than 1.25 long-term factor of safety is achieved. Each slope will be stabilized to prevent or minimize, to the degree practicable, shifts, cracks or slumpage in the slope in excess of those expected by waste settlement and to prevent a decrease in the integrity, permeability or effectiveness of the cap. The cover used on these eastern slopes will minimize infiltration of water through the cover and will, to the degree possible, attain the performance standards in 40 CFR 264.310. The best method of slope stabilization will be determined during remedial design. The side slope covers and stabilization will be maintained as part of the maintenance of the cap.

The excavation of a portion of the side slope of Waste Areas 2 or 3 to achieve the desired grade is one method of stabilization. Any material removed from Waste Areas 2 or 3 to achieve the slope stabilization standards of this section or removed from elsewhere within the area of contamination to remediate the site can be consolidated in Waste Area 3 beneath its cap. This consolidation of waste material may include a portion or all of Waste Area 2. A design or remedial action decision regarding the appropriate extent of this excavation will be governed by the nine criteria as described in the NCP, focusing on implementability and cost of alternative design approaches to meet the performance standards for the soils and cap. If, after such possible excavation in Waste Area 2 and consolidation in Waste Area 3, it is demonstrated that there is no waste material or contaminated soil in a portion or all of Waste Area 2 (i.e. the performance standards in section X.A are attained), no cap would be required over those portions of Waste Area 2.

In order to monitor the performance of this remedial alternative, sampling/testing of the following will be performed before and during the O & M period: (1) the stability of side slopes; (2) water collected from the french drains and source control wells; (3) landfill gas; and (4) groundwater. Landfill gas monitoring will be used to optimize the gas collection and treatment processes to meet the performance standards and ensure that the concentration of contaminants in air emissions and ambient air on- and off-site are protective of human health and the environment. Monitoring will also be required to ensure compliance with 40 CFR 264, Subparts F, G and N.

In conjunction with this remedial action, a public information program will be used to educate the public about the hazards of the site. Deed restrictions will be imposed to restrict the use of the site within the fenced area. This will include restricting excavation or any activity that might compromise the integrity or performance of the cap, french drains, wells, slopes or other remedial features. Institutional controls restricting groundwater use sitewide and land use beyond the fenced area are contained in the ROD for the first operable unit. This remedy does not limit or modify the institutional controls found in the first operable unit ROD.

Based upon the current delineation of the site resulting from the sampling and analysis of the completed studies, the area outside the waste management unit which is not required for use during implementation of the selected remedy will not be restricted from use after the construction of the remedy. Any excavation activity occuring outside of the waste management unit, but within the boundary of the 27 acre study area or the general area of the landfill and the plateau should include sampling for site related contamination and should proceed with caution. The restrictions on groundwater use established by the first operable unit will remain in place until groundwater cleanup levels in section X.A are achieved.

As required by law, if any hazardous substances, pollutants or contaminants remain at the site, EPA will review the site at least once every five years after the initiation of remedial action 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 Old Springfield Landfill Site is consistent with CERCLA and, to the extent practicable, the NCP. The selected remedy is protective of human health and the environment, attains ARARs, with the exception of one state ARAR which is being waived, and is cost effective. 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 remedy at this site will permanently reduce the risks posed to human health and the environment by eliminating, reducing or controlling exposures to human and environmental receptors through treatment, engineering controls, and institutional controls. More specifically, the cap will reduce the infiltration of water into the waste areas which would otherwise come into contact with contaminated waste material or soil and leach contamination into the groundwater. The cap will also allow for the collection of landfill gases containing VOCs. The selected remedy requires the treatment of these gases. The selected remedy will also prevent direct contact with soils containing PCBs and PAHs. Moreover, the selected remedy will result in human exposure levels that are within the 10^{-4} to 10^{-6} incremental cancer risk range or are consistent with regulatory standards if those standards are outside the risk range and compliance with the risk range is not feasible due to PQLs and that are within the hazard index of one for non-carcinogens. More specifically, all of the identified risks which exceed the point of departure which were not fully addressed by the 1988 ROD will be addressed by the selected remedy. Finally, implementation of the selected remedy will not pose unacceptable short-term risks or cross-media impacts. The possible excavation of material from the waste areas to construct the cap and stabilize the side slopes is the activity with the most significant potential short-term impacts. Careful construction practices and air monitoring will be used to minimize any potential short term impacts which may occur during excavation.

B. The Selected Remedy Attains ARARs

This remedy will attain all applicable or relevant and appropriate federal and state requirements that apply to the site, with the exception of one state ARAR which is being waived pursuant to section 121(d)(4)(C) of CERCLA because it is technically impracticable from an engineering perspective. Environmental laws from which ARARs for the selected remedial action are derived, and the specific

ARARs, include:

Chemical Specific

Safe Drinking Water Act (SDWA)
Vermont AHS Public Water System
Vermont Ground Water Protection Standards
Vermont Water Quality Standards
National Ambient Air Quality Standards
Vermont Air Pollution Control Regulations

Location Specific

Fish and Wildlife Coordination Act
RCRA Location Standards

The site is not located within a wetland, wilderness area, wildlife refuge, or critical habitat, nor will the selected remedy impact wetlands.

Action Specific

Resource Conservation and Recovery Act (RCRA)
Occupational Safety and Health Act (OSHA)
Clean Air Act (CAA)
Clean Water Act (CWA)
National Pollution Discharge Elimination System (NPDES)
Fish and Wildlife Coordination Act

To Be Considered

National Primary and Secondary Drinking Water Regulations; Proposed Rule
Federal Ambient Water Quality Criteria
EPA Risk Reference Doses (RfDs)
EPA Carcinogen Assessment Group Potency Factors
Federal Threshold Limit Values (TLVs)
Executive Order 11988 Protection of Floodplains
EPA Groundwater Protection Strategy
EPA Technical Guidance Document on Final Covers
Closure with Waste In-Place
Interim RCRA/CERCLA Guidance on Non-Continguous Sites
Interim Policy for Planning and Implementing CERCLA Response Actions
Proposed Standards for Control of Emissions of Volatile Organics
Proposed Standard on Gas Collection

Appendix C to this ROD lists all ARARs for the site and whether they are applicable, relevant and appropriate or to be considered. Any changes to applicability or appropriateness or relevance of an ARAR or the waiver of an ARAR are discussed below.

1. Chemical Specific.

The bedrock aquifer at and beyond the compliance boundary of the Landfill is a possible drinking water source. Maximum Contaminant Levels (MCLs) promulgated under the Safe Drinking Water Act which regulate public drinking water supplies, are applicable to drinking water at the tap and are not applicable to groundwater. However, because the groundwater may be used as a potential drinking water source, MCLs are relevant and appropriate.

The Vermont Groundwater Protection Act establishes primary groundwater quality standards and contains enforcement standards. Under the Act, two enforcement standards have been established which are more stringent then MCLs. The standards are for tetracholoroethene and xylenes. EPA has incorporated the enforcement standard for xylenes as the cleanup level for this contaminant of concern. Pursuant to CERCLA section 121(d)(4)(C) and section 300.430(f)(1)(ii)(C)(3) of the NCP, EPA is invoking a waiver of the enforcement standard for tetra-chloroethene. EPA has determined that in this circumstance it is technically impracticable from an engineering perspective to establish a standard below a practical quantitation level (PQL). The PQL is the lowest concentration that "can be reliably measured within specified limits of precision and accuracy during routine laboratory operating conditions." 54 Fed. Reg. 22062, 22100 (May 22, 1989). For evaluating standards set with respect to drinking water, EPA uses the methods determined by the SDWA. Therefore, the PQL determined in accordance with SDWA methods will be the cleanup level for tetrachloroethene. This level is equivalent to the MCL for tetrachloroethene.

2. Action Specific.

RCRA hazardous waste closure requirements, 40 CFR Part 264, Subpart G, and hazardous waste landfill closure requirements, 40 CFR 264.310, Subpart N, are ARARs for a substantial part of the remedial action. Under Part 264, Subpart G, closure of a hazardous waste disposal facility must be done so as to control, minimize, or eliminate "post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere". Section 264.111(b). Section 264.310, Subpart N, provides specific closure requirements for a hazardous waste landfill.

Pursuant to the NCP, EPA has determined that the RCRA hazardous waste closure requirements (40 CFR 264.111, 264.310) are not applicable to the site because the RCRA requirements were promulgated after the Old Springfield Landfill ceased operation. However, EPA has determined that these RCRA hazardous waste closure requirements are relevant and appropriate to the remedial action. The 1988 FS indicates the presence of RCRA-listed hazardous wastes at the site. In addition, other substances disposed of and found at the site are similar to RCRA hazardous wastes. Objectives of the remedial action, such as preventing the leaching of soil contaminants to the groundwater and preventing public contact with contaminated soil or leachate that may present a risk, are similar to the purposes of the RCRA hazardous waste landfill closure requirements. The source control operable unit is itself similar to the closure activities required by RCRA, and the medium to be addressed is similar to the medium regulated by RCRA requirements.

In certain areas of the site, however, the RCRA requirements, while relevant, have been determined not to be appropriate to the remedial action. The side slopes along Waste Areas 2 and 3 are sufficiently steep so that a multi-layer cap would not be suitable. For the limited area of the steep side slopes along Waste Areas 2 and 3, EPA has determined that the RCRA hazardous waste landfill closure requirements are not appropriate.

In addition to considering the RCRA landfill closure requirements relevant and appropriate, EPA also considers the July 1989 Technical Guidance Document, Final Covers on Hazardous Waste Landfills and Surface Impoundments, a To Be Considered (TBC) criterion for help in determining the protectiveness of alternatives. This guidance document provides the technical basis for implementation of the RCRA ARAR and recommends the use of a multi-layer cap with natural and synthetic materials.

RCRA includes specific provisions restricting the placement of hazardous waste into a land-based unit, which includes a landfill. The RCRA Land Disposal Restrictions (LDRs) are not applicable to consolidation of material under the cap which has been taken from any of the three waste areas that have been identified. The movement of waste within a land-disposal unit does not constitute land disposal for purposes of application of RCRA LDRs. The area of contamination (AOC) at the Old Springfield Landfill is comprised of the approximately eight-acre portion of the Landfill on which co-disposal of municipal and industrial waste occurred. References to three "waste areas" in this ROD and the feasibility study reports are used for descriptive purposes to indicate those areas where drilling encountered evidence of high concentrations of contaminants. Historical photographs of the site provide evidence of the random disposal of waste within the AOC. Given the random nature of disposal at the site, the three waste areas are part of one continguous (AOC). Therefore, consolidation of waste under the cap does not qualify as placement into a unit but is merely movement within the unit.

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 ARARs, EPA evaluated the overall effectiveness of each alternative by assessing the relevant three criteria--long term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short term effectiveness, in combination. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs. A detailed description of the costs of this remedial alternative are shown in Figure 7 of Appendix A.

Of all the alternatives which met the two threshold criteria, the selected alternative is the least costly. The selected alternative was at least an order of magnitude less expensive than the other alternatives which satisfied the two threshold criteria. Due to the large volume of waste material, the other alternatives have costs which are substantially greater than the selected alternative.

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) long-term effectiveness and permanence; 2) reduction of toxicity, mobility or volume through treatment; 3) short-term effectiveness; 4)implementability; and 5) cost. The balancing test emphasized long-term effectiveness and permanence and 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. The selected remedy is not permanent and does not involve treatment as a principal element. However, it will be effective in the long-term provided the remedy is maintained. In addition, the selected remedy exceeds all other alternatives for the criteria of short-term effectiveness, implementability and cost effectiveness.

The selected remedy will provide for the shortest period of construction. It will also require lower volumes of excavation than alternatives 3 through 5. This will result in less risk from potential volatilization of organic compounds during the excavation of soil or waste. The selected remedy will also have greater short-term effectiveness by achieving the reduction in risks from direct contact with soils and landfill gas emissions in the shortest time. The selected remedy will be the most implementable and least costly of the alternatives which satisfy the two threshold criteria. It provides the greatest benefit in proportion to cost. The Old Springfield Landfill site is a landfill with approximately 125,000 cubic yards of mixed industrial and municipal waste. All of the alternatives which would treat this volume of waste would be considerably more expensive. On balance, the selected remedy provides adequate protection at the least cost.

E. The Selected Remedy does not Satisfy the Preference for Treatment Which Permanently and Significantly reduces the Toxicity, Mobility or Volume of the Hazardous Substances as a Principal Element

The selected remedy does not satisfy the preference for treatment which permanently and significantly reduces the toxicity, mobility,or volume of the hazardous substances as a principal element due to the large volume of heterogenous material. The selected remedy is consistent with EPA's preference for containment of wastes which it is not practicable to treat. Of the alternatives which satisfied the two threshold criteria, the two alternatives which involved treatment, alternatives 4 and 5, would have each cost more than 100 million dollars.

XII. DOCUMENTATION OF SIGNIFICANT CHANGES

EPA presented a Proposed Plan (preferred alternative) for remediation of the site on July 12, 1990. The preferred alternative included capping of Waste Areas 2, 3 and 4, construction of french drains, active gas collection and passive gas venting systems, side slope stabilization, installation of source control extraction wells, and institutional controls. The selected remedy includes all of the components of the preferred alternative as listed in the Proposed Plan. However, the selected remedy establishes performance standards and objectives for attainment of cleanup levels in lieu of setting construction specifications. This will allow for flexibility in design of the selected remedy and does not require additional public comment.

The ROD contains the addition of the National Primary and Secondary Drinking Water Regulations (NPSDWR), Proposed Rule, as a To Be Considered. The NPSDWR proposed rule provides guidance for the use of practical quantitation levels, which are the lowest concentration levels that can be consistently measured in the laboratory. The Vermont Groundwater Protection Act is an ARAR for the site. The Act establishes enforcement standards for groundwater. A waiver is being invoked for the enforcement standard for tetrachloroethene on the basis of technical impracticability. There are no changes in procedural or process requirements as a result of this waiver, nor does it alter the feasibility of the selected remedy. Invoking this waiver does not require additional public comment.

The preferred alternative also included an option which would involve the complete excavation of Waste Area 2 and the placement of the material in Waste Area 3. The selected alternative is consistent with the Proposed Plan in calling for a multi-layer cap and side slope stabilization. However, the option to excavate Waste Area 2 has been incorporated into the selected remedy as a design consideration. Further geotechnical analysis will allow for a better determination of the cost and design approach for stabilizing the slope along Waste Area 2. Either excavation or capping with slope stabilization of Waste Area 2 meet the two threshold criteria. Therefore, EPA will be guided by the remaining seven criteria in reviewing design approaches for Waste Area 2.

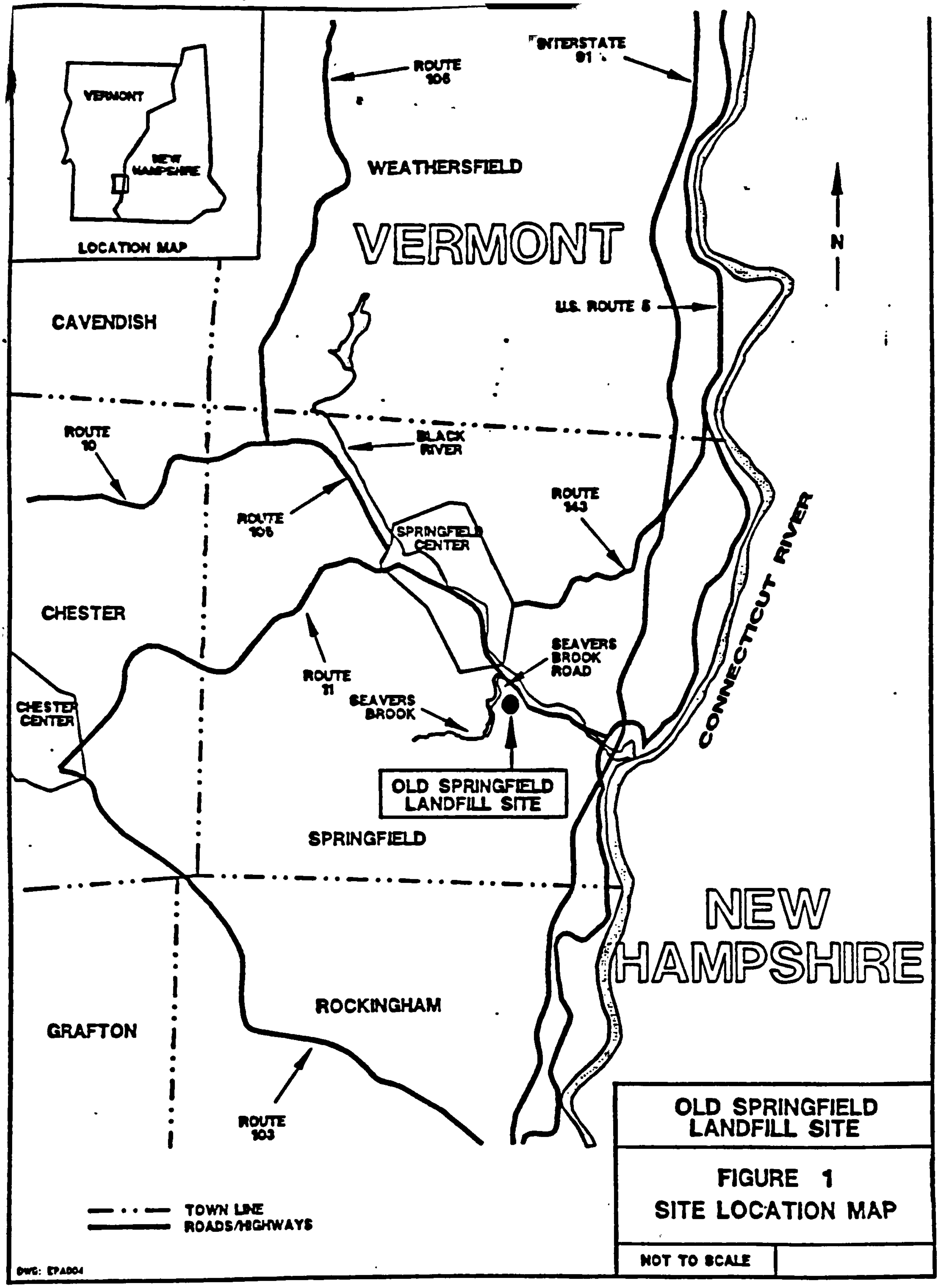
XIII. STATE ROLE

The Vermont Department of Environmental Conservation has reviewed the various alternatives and has indicated its support for the selected remedy. The State has also reviewed the Remedial Investigation, Endangerment Assessment, Feasibility Study, Focussed Feasibility Study, Supplemental Feasibility Study and Detailed Evaluation Memorandum to determine if the selected remedy is in compliance with applicable or relevant and appropriate State Environmental laws and regulations. The State of Vermont concurs with the selected remedy for the Old Springfield Landfill site. A copy of the declaration of concurrence is attached as Appendix D.

APPENDIX A

FIGURES

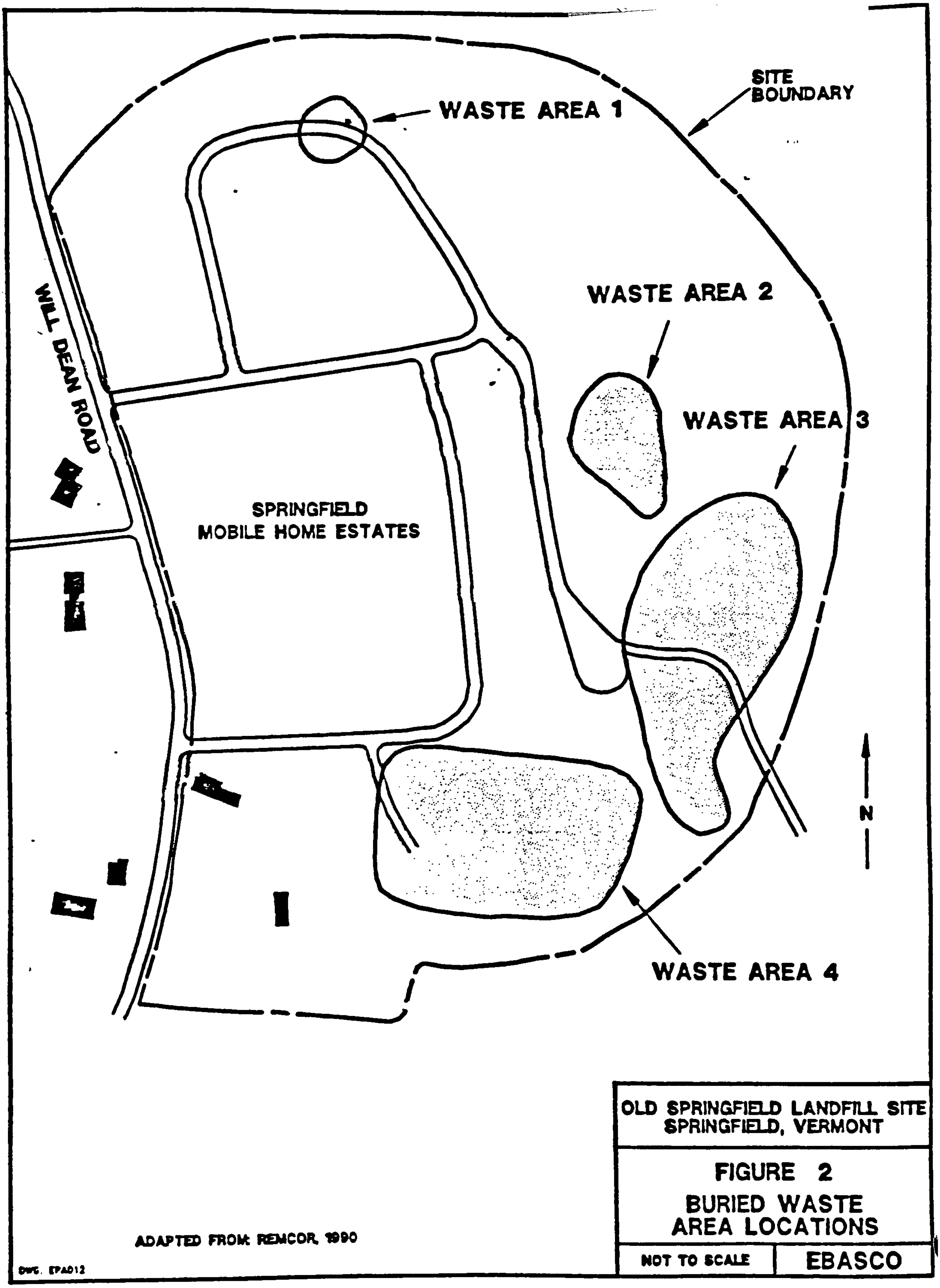
OLD SPRINGFIELD LANDFILL SITE



OLD SPRINGFIELD LANDFILL SITE

FIGURE 1
SITE LOCATION MAP

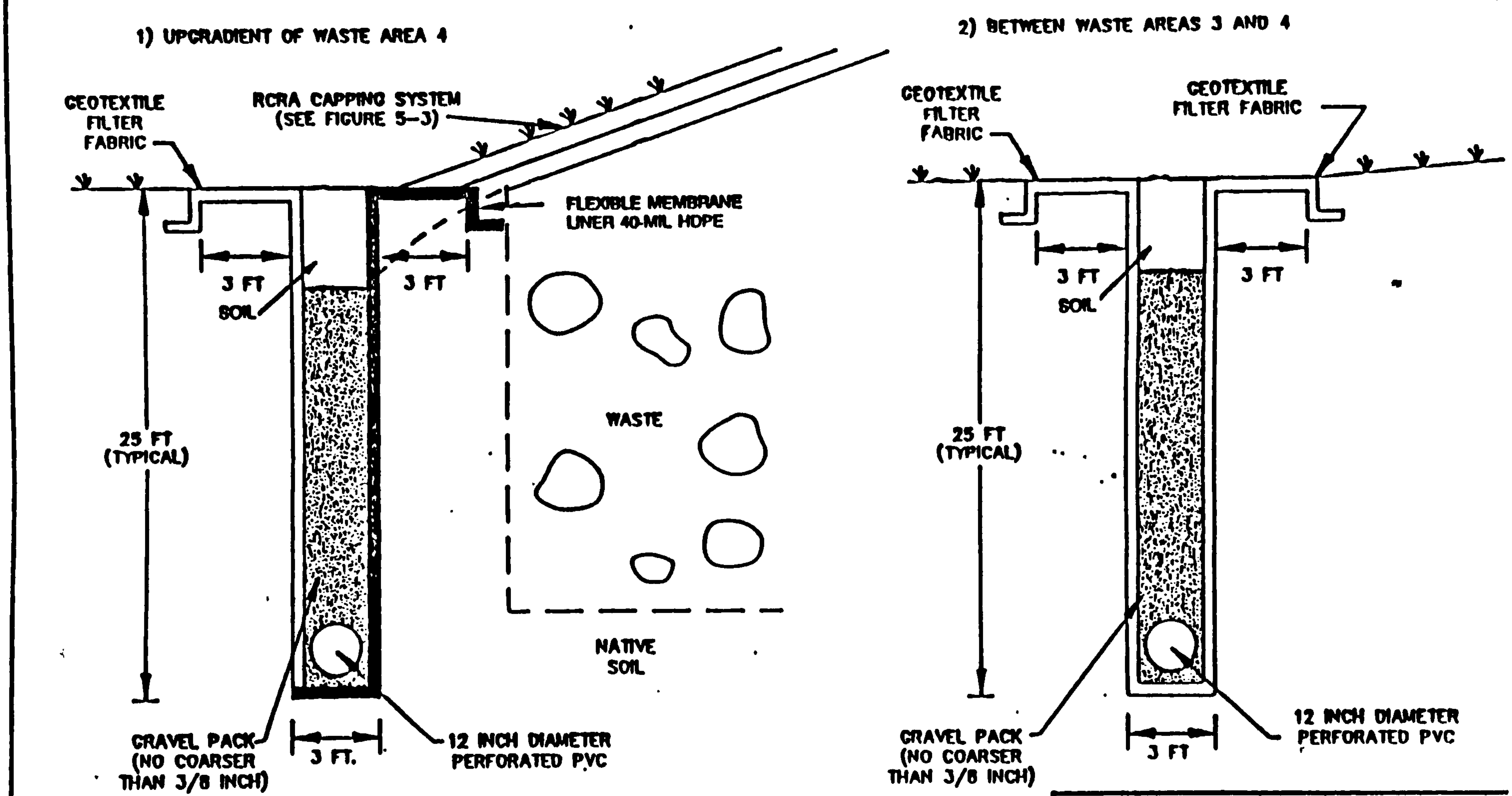
NOT TO SCALE



OLD SPRINGFIELD LANDFILL SITE
SPRINGFIELD, VERMONT

FIGURE 2
BURIED WASTE AREA LOCATIONS

NOT TO SCALE | EBASCO



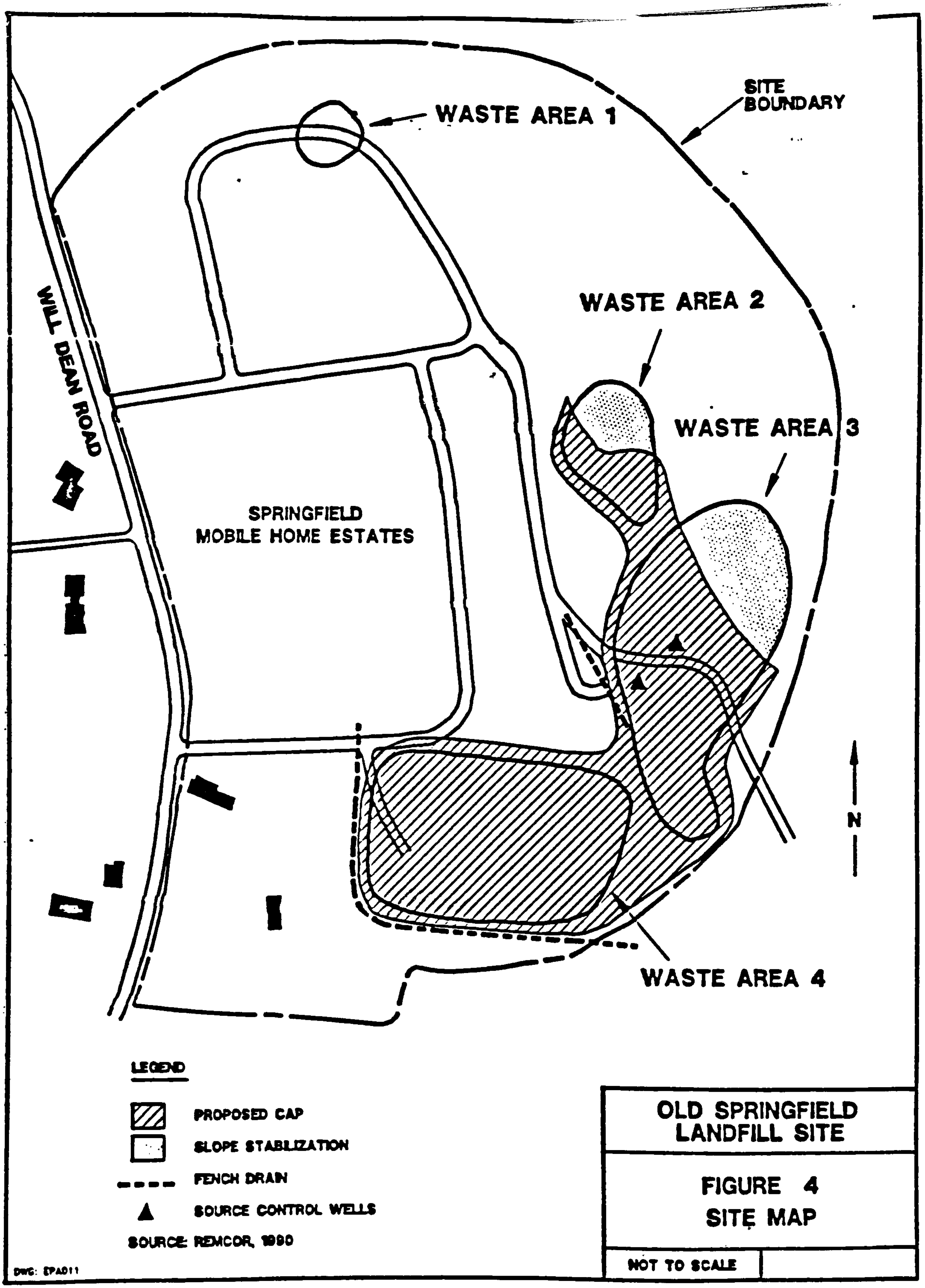
NOT TO SCALE

FIGURE - 3

TYPICAL FRENCH DRAIN CROSS-SECTION

OLD SPRINGFIELD LANDFILL SITE

EBASCO SERVICES INCORPORATED


WASTE AREA 1
SITE BOUNDARY
WILL DEAN ROAD
WASTE AREA 2
WASTE AREA 3
SPRINGFIELD
MOBILE HOME ESTATES
N
WASTE AREA 4
LEGEND
PROPOSED CAP
SLOPE STABLIZATION
FENCH DRAIN
SOURCE CONTROL WELLS
SOURCE: REMCOR, 1990
DWG: EPA011
OLD SPRINGFIELD
LANDFILL SITE
FIGURE 4
SITE MAP
NOT TO SCALE

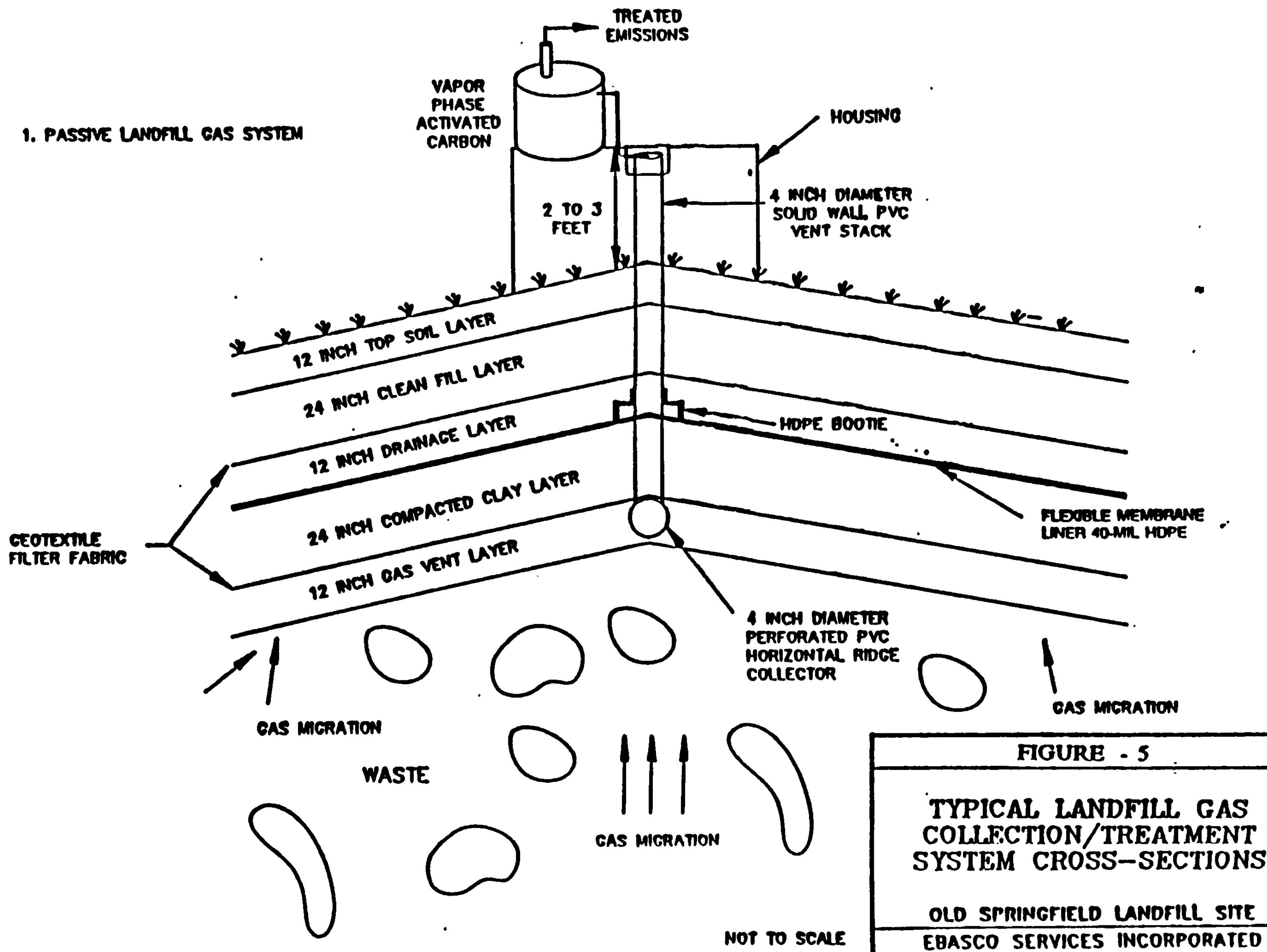


FIGURE - 5

TYPICAL LANDFILL GAS COLLECTION/TREATMENT SYSTEM CROSS-SECTIONS

OLD SPRINGFIELD LANDFILL SITE

EBASCO SERVICES INCORPORATED

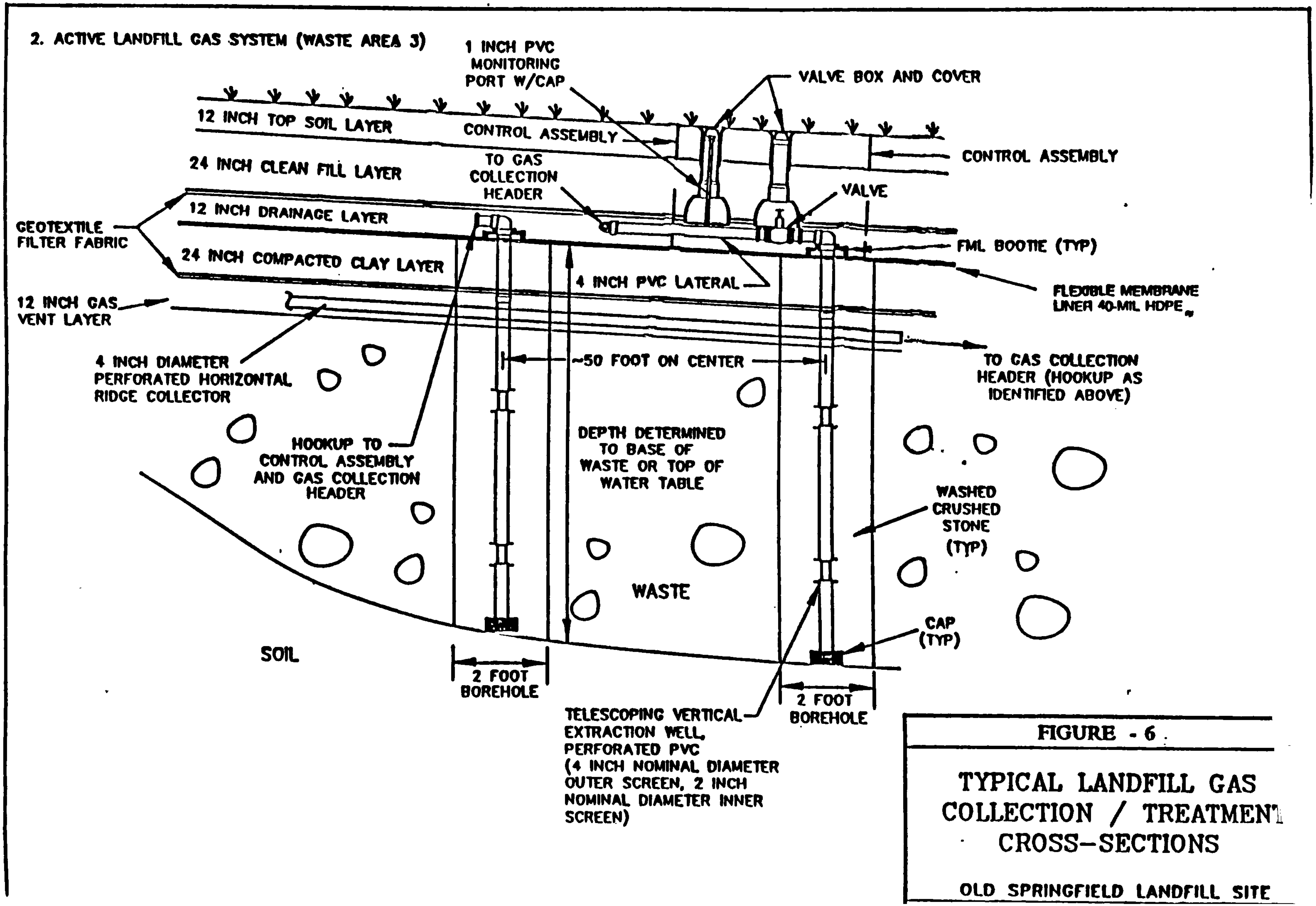


FIGURE - 6

TYPICAL LANDFILL GAS COLLECTION / TREATMENT CROSS-SECTIONS

OLD SPRINGFIELD LANDFILL SITE

FIGURE 7

EPA COST ESTIMATE FOR SELECTED REMEDY

COMPONENT		COST
1. SUPPORT FACILITIES		55,200
2. SECURITY FENCING		92,800
3. FRENCH DRAIN WA#4	1,244,600	
WA#3	332,440	
		1,576,040
4. SOURCE CONTROL WELLS (2)		59,000
5. DECOMISSIONING OLD WELLS		22,300
6. CAP #3 & 4		1,977,200
7. CAP # 2		191,000
8. SIDE SLOPE STABILIZATION & COVER OF SIDE SLOPE;WASTE AREA 3		290,200
9. SIDE SLOPE STABILIZATION & COVER OF SIDE SLOPE; WASTE AREA # 2		1,050,000
10. DEWATERING WASTE AREA 4		43,200
11. SOIL VENTING SYSTEMS		200,300
12. DEED RESTRICTIONS		10,000
13. PUBLIC AWARENESS		10,000
TOTAL CAPITAL COSTS		5,568,800
CONTINGENCY (20%)		1,113,800
ENGINEERING (10%)		556,900
LEGAL AND ADMIN. (5%)		278,400
TOTAL		7,517,900
ANNUAL O & M	123,000	
NPV (10%) O & M		1,159,500
5 YEAR REVIEWS	10,000	
NPV (10%0		15,400
TOTAL NPV OF ALTERNATIVE		8,692,800

APPENDIX B

CONTAMINANTS OF CONCERN

OLD SPRINGFIELD LANDFILL SITE

TABLE 1: SUMMARY OF CONTAMINANTS OF CONCERN IN GROUND WATER EASTERN MONITORING WELLS

Contaminants of Concern	Average Concentration (ug/l)	Maximum Concentration (ug/l)	Frequency of Detection
Vinyl Chloride	11	420	3/13
Methylene Chloride	1500	1500	1/1
1,1-Dichloroethene	6.4	140	2/13
1,1-Dichloroethane	6.6	180	5/13
trans-1,2-Dichloroethene	10.2	4100	5/13
1,1,1-Trichloroethane	8.9	1100	5/13
Trichloroethene	20.9	9100	6/13
Tetrachloroethene	9.6	7200	6/13
Benzene	5.2	710	2/13
Chloroform	4.7	5.3	2/13
Toluene	8	790	4/11
Chlorobenzene	6.7	42	1/11
1,2-Dichlorobenzene	10.3	51	3/12
Ethylbenzene	7.7	140	2/11
Xylenes	12.9	1341.6	3/11
Acetone	11.7	4381.8	1/7
Diethylpthalate	9.3	3	1/11
Bis(2-ethylhexyl)pthalate	15.3	350	4/12
Napthalene	13.9	57	3/12
Di-n-butylpthalate	9	10	3/11
PCB-1254	0.9	72	1/12
PCB-1260	0.6	2.1	1/12
Copper	18.63	112	5/11
Nickel	28.43	332	6/11
Cobalt	14.41	40.3	2/11

TABLE 2: SUMMARY OF CONTAMINANTS OF CONCERN IN GROUND WATER
WESTERN MONITORING WELLS

Contaminants of Concern	Average Concentration (ug/l)	Maximum Concentration (ug/l)	Frequency of Detection
Vinyl Chloride	6.9	110	2/11
1,1-Dichloroethene	2.6	3.7	3/11
1,1-Dichloroethane	2.6	4.4	3/11
trans-1,2-Dichloroethene	5.5	39.8	4/11
1,1,1-Trichloroethane	3.4	24	3/11
Trichloroethene	5.4	150	4/11
Tetrachloroethene	2.1	1	2/11
Benzene	2.5	2.2	1/11
Toluene	2.1	4.4	4/9
Chloroform	2.3	1.1	1/11
Chlorobenzene	2.5	2.9	1/10
Xylenes	2.7	4.2	1/9
Bis(2-ethylhexyl)pthalate	8.5	5.9	2/11
Napthalene	13.9	57	3/12
Copper	13.75	57.3	4/11
Cobalt	18.06	37.8	3/11

TABLE 3: SUMMARY OF CONTAMINANTS OF CONCERN IN EASTERN LEACHATE SEEPS

Contaminants of Concern	Average Concentration (ug/l)	Maximum Concentration (ug/l)	Frequency of Detection
Vinyl Chloride	11.1	395.9	2/6
1,1-Dichloroethene	3.4	16.1	2/6
1,1-Dichloroethane	4.6	49.8	2/6
trans-1,2-Dichloroethene	6.3	344.5	2/6
1,1,1-Trichloroethane	4.8	24.8	2/6
Trichloroethene	5.6	112.5	2/6
Tetrachloroethene	4.1	10.3	1/6
1,2-Dichlorobenzene	10.9	16.7	1/6
Xylenes	2.9	5.3	1/5
Acetone	4.3	10	1/5
Bis(2-ethylhexyl)pthalate	10.3	12	1/6
Napthalene	16.5	10.9	1/6
Copper	17.85	68	2/6
Nickel	25.4	45	4/6
Cobalt	12.16	13	1/6

TABLE 4: SUMMARY OF CONTAMINANTS OF CONCERN IN WESTERN LEACHATE SEEPS

Contaminants of Concern	Average Concentration (ug/l)	Maximum Concentration (ug/l)	Frequency of Detection
Vinyl Chloride	9.2	78.2	2/3
1,1-Dichloroethene	4.1	10.7	2/3
1,1-Dichloroethane	3.4	6.3	2/3
trans-1,2-Dichloroethene	12.1	89.3	2/3
1,1,1-Trichloroethane	9.5	48.8	2/3
Trichloroethene	28.1	223.1	2/3
Tetrachloroethene	3.1	4.7	1/3
Benzene	nc	2.3	1/3
Toluene	nc	1.6	1/2
Chlorobenzene	nc	2.4	1/3
Ethylbenzene	nc	2.4	1/3
Xylenes	nc	2.4	1/3

TABLE 5: SUMMARY OF CONTAMINANTS OF CONCERN IN SOIL (0.5-2.5 ft.)

Contaminants of Concern	Average Concentration (ug/l)	Maximum Concentration (ug/l)	Frequency of Detection
Methylen chloride	4.1	7,500	1/16
trans-1,2-Dichloroethene	4.1	140	1/39
1,1,1-Trichloroethane	4.5	1,800	1/32
Trichloroethene	6.3	5,600	7/31
Tetrachloroethene	5.0	51	2/31
Benzene	5.2	5,600	5/31
Toluene	12.2	3,300	14/29
Chloroform	5.3	380	6/30
Chlorobenzene	nd	nd	nd
1,2-Dichlorobenzene	nd	nd	nd
Xylenes	5.4	4,200	3/31
Bis(2-ethylhexyl)pthalate	332.9	11,000	3/22
Napthalene	221.8	4,600	1/39
Benzo(a)anthracene	122.5	12,000	4/39
Benzo(a)pyrene	262.4	10,000	5/29
Benzo(b)fluoranthene	264.8	11,000	6/31
Benzo(k)fluoranthene	229.8	8,200	2/39
Chrysene	230.8	12,000	5/39
Indeno(1,2,3-cd)pyrene	221.5	4,400	1/39
PCB-1254	14.5	12,000	5/39
PCB-1260	29.3	5,286	3/38
Cadmium	170	4,900	12/42
Mercury	21	190	10/42

TABLE 6: SUMMARY OF CONTAMINANTS OF CONCERN IN SOIL (5-7 ft.)

ontaminants f Concern	Average Concentration (ug/l)	Maximum Concentration (ug/l)	Frequency of Detection
richloroethene	nc	13	1/10
oluene	45	2,600	3/7
hlorobenzene	50	1,700	1/10
,2-Dichlorobenzene	596	17,000	1/10
ylenes	68	21,354	2/9
is(2-ethylhexyl)pthalate	1,895	23,000	3/7
apthalene	418	5,600	3/10
enzo(a)anthracene	675	970	1/10
enzo(a)pyrene	800	1,100	1/9
enzo(b)fluoranthene	845	1,80	1/9
hrysene	813	1,000	2/9
CB-1254	712	19,000	6/10
CB-1260	539	720	1/10
admium	600	2,400	2/42
ercury	100	110	2/17

TABLE 7: SUMMARY OF CONTAMINANTS OF CONCERN IN SOIL (7-9 ft.)

ontaminants f Concern	Average Concentration (ug/l)	Maximum Concentration (ug/l)	Frequency of Detection
etrachloroethene	171	16,000	2/3
ylenes	333	5,900	1/3
is(2-ethylhexyl)pthalate	16,000	16,000	1/1
CB-1254	981	42,000	2/3
ercury	100	110	1/3

TABLE 8: SUMMARY OF CONTAMINANTS OF CONCERN IN SOIL (9-12 ft.)

Contaminants of Concern	Average Concentration (ug/l)	Maximum Concentration (ug/l)	Frequency of Detection
trans-1,2-Dichloroethene	nc	15	2/6
Trichloroethene	20	26	2/6
Tetrachloroethene	17	530	2/6
Toluene	38	88	1/3
Napthalene	296	5,500	1/6
Benzo(a)anthracene	429	51,000	2/6
Benzo(a)pyrene	495	40,000	1/5
Benzo(b)fluoranthene	473	32,000	1/5
Benzo(k)fluoranthene	467	30,000	1/5
Chrysene	507	45,000	1/5
Indeno(1,2,3-cd)pyrene	443	23,000	1/5
Dibenzo(a,h)anthracene	431	20,000	1/5
PCB-1254	516	6,500	1/4
Cadmium	900	7,600	1/5
Mercury	100	190	1/5

TABLE 9: SUMMARY OF CONTAMINANTS OF CONCERN IN SOIL (12-17 ft.)

Contaminants of Concern	Average Concentration (ug/l)	Maximum Concentration (ug/l)	Frequency of Detection
Trichloroethene	53	18,000	2/5
Tetrachloroethene	59	15,000	3/5
Toluene	304	35,000	4/4
Xylenes	171	110,000	1/4
Bis(2-ethylhexyl)pthalate	2,111	27,000	1/2
PCB-1254	1004	49,000	3/5
Mercury	100	170	1/5

TABLE 10: SUMMARY OF CONTAMINANTS OF CONCERN IN SOIL (19-22 ft.)

ontaminants f Concern	Average Concentration (ug/l)	Maximum Concentration (ug/l)	Frequency of Detection
rans-1,2-Dichloroethene	nc	9	1/3
,1,1-Trichloroethane	nc	1	1/2
oluene	nc	7	1/3
hloroform	3	4	1/2

TABLE 11: SUMMARY OF CONTAMINANTS OF CONCERN IN SOIL (25-43 ft.)

ontaminants f Concern	Average Concentration (ug/l)	Maximum Concentration (ug/l)	Frequency of Detection
,2-Dichlorobenzene	nc	76	1/3
CB-1254	816	1,100	3/3
admium	800	3,000	1/3
ercury	100	230	1/3

APPENDIX C

ARARs, CRITERIA, ADVISORIES AND GUIDANCE

OLD SPRINGFIELD LANDFILL SITE

TABLE C-1
CHEMICAL-SPECIFIC ARARS AND CRITERIA, ADVISORIES, AND GUIDANCE
OLD SPRINGFIELD LANDFILL SITE
FEASIBILITY STUDY REPORT

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CONSIDERATION IN THE RI/FS
<u>Ground Water</u>				
Federal Regulatory Requirements	SDWA	Relevant and Appropriate	MCLS have been promulgated for a number of common organic and inorganic contaminants. These levels regulate the concentration of contaminants in public drinking water supplies, but may also be considered relevant and appropriate for groundwater aquifers potentially used for drinking water.	When the risks to human health due to consumption of groundwater were assessed, concentrations of contaminants of concern in the RI/FS, including vinyl chloride, 1,1-dichloroethene, 1,1,1-trichloroethane, benzene, and 1,2-dichlorobenzene were compared to their MCLs. MCLs were used to set cleanup levels for these contaminants.
State Regulatory Requirements Standards	ANS-Public Water System	Relevant and Appropriate	Vermont adopts Federal MCLs or ambient water quality criteria, whichever is more stringent as concentration of contaminants its drinking water standard. Like MCLs, these levels regulate the concentration of contaminants in public drinking water standards.	Since ANS drinking water standards are the same as MCLs, promulgated MCLs were used to set cleanup levels for contaminants of concern including vinyl chloride, 1,1-dichloroethene, 1,1,1-trichloroethane, trichloroethene, benzene; and 1,2-dichlorobenzene.
	10 V.S.A. Chapter 48 VT Groundwater Protection Act	Relevant and Appropriate	Contains a groundwater classification scheme and groundwater quality standards.	Contains groundwater quality standards for a variety of compounds detected in site groundwaters.
Federal Criteria and Advisories	EPA Risk Reference Doses (RfDs)	To be Considered	RfDs are dose levels developed by the EPA for noncarcinogenic effects.	EPA RfDs were used to characterize risks due to exposure to contaminants in groundwater, as well as other media. They were considered for methylene chloride and tetrachloroethlene.
	Federal Ambient Water Quality Criteria	To be Considered	Federal AWQC are health-based criteria which have been developed for 95 carcinogenic and noncarcinogenic compounds.	AWQC were used to characterize health risks due to contaminant concentrations in drinking water. They were considered for chloroform, toluene, chlorobenzene, ethylbenzene, bis(2-ethylhexyl)phthalate, di-n-butyl phthalate, methylene chloride, copper and nickel.

	EPA Carcinogen Assessment Group Potency Factors	To be Considered	Potency Factors are developed by the EPA from Health Effects Assessments or evaluation by the Carcinogenic Assessment Group.	EPA Carcinogenic Potency Factors were used to compute the individual incremental cancer risk resulting from exposure to site contaminants, including benzene, bis(2-ethylhexyl)phthalate, methylene chloride, tetrachloroethane, and trichloroethene.
	National Primary and Secondary Drinking Water Regulations; Proposed Rule 54 Fed. Reg. 22062 (May 22, 1989)	To be Considered	This proposed rule contains the practical quantitation level for tetrachloroethene.	This was considered in determining cleanup levels in the ROD.
Vermont Criteria, Advisories, and Guidance	Vermont Drinking Water Health Advisories	To be Considered	ANS Health Advisories are guidance criteria for drinking water.	ANS Health Advisories were considered when developing cleanup levels for groundwater.
<u>Discharge to Surface Water</u>				
State Regulatory Requirements	WRB-Vermont Water Quality Standards	Applicable	WRB Water Quality Standards are given for dissolved oxygen, temperature increase, pH, and total Coliform.	Requirements for dissolved oxygen, temperature increase, pH and total Coliform will be attained; however, limits are set on a case-by-case basis for contaminants found in the Old Springfield groundwater which would be discharged to surface water, based on AWQC and bioassay results.
Federal Criteria, Advisories, and Guidance	Federal Ambient Water Quality Criteria (AWQC)	To be Considered	Federal AWQC are health-based criteria which have been developed for 95 carcinogenic and noncarcinogenic compounds.	AWQC were considered in characterizing human health risks to aquatic organisms due to contaminant concentrations in surface water. Because this water is not used as a drinking water source, the criteria is developed for aquatic organism protection and ingestion of contaminant aquatic organisms were considered. AWQC will be used for evaluating limits on all chemicals discharged to surface water.
<u>Air</u>				
Federal Regulatory Requirements	CAA-National Air Quality Standards (NAQS)-40 CFR 40.	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 emission controls for soil treatments.
State Regulatory Requirements	VTAEC-Air Pollution Control Regulations (EPR Chapter 5)	Relevant and Appropriate	These standards were primarily developed to regulate stack and automobile emissions.	Alternatives involving excavation and emission controls for soil treatments, incineration and air stripping.

Federal Criteria, Advisories, and Guidance	Threshold Limit Values (TLVs)	To be Considered	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 soil removal operations.

TABLE C-2
LOCATION-SPECIFIC ARARS AND CRITERIA, ADVISORIES, AND GUIDANCE
OLD SPRINGFIELD LANDFILL SITE
FEASIBILITY STUDY REPORT

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CONSIDERATION IN THE RI/FS

At the current time, no potential location-specific ARARs have been identified. The site is not:

- A wetland
- Within a floodplain
- Within 100 year floodplain
- In a wilderness area
- A wildlife refuge
- Within an area affecting a national wild, scenic, or recreation river
- A critical habitat upon which endangered or threatened species depends

However, remedial actions may potentially include activities involving the following location-specific ARARs:

Floodplains

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CONSIDERATION IN THE RI/FS
Federal Regulatory Requirements	Fish and Wildlife Coordination Act (16 U.S.C. 661)	Applicable	This regulation requires that any Federal Agency that proposes to modify a body of water or potentially affect fish and wildlife services. This requirement is addressed under CWA Section 404 requirements.	During the identification, screening, and evaluation of alternatives, the effects on streams and wetlands are evaluated. If an alternative modifies a body of water or potentially affects fish or wildlife, EPA must consult the U.S. Fish and Wildlife Service.
	RCRA Location Standards (40 CFR 264.18)	Applicable	This regulation outlines the requirements for constructing a RCRA facility on a 100-year floodplain.	A facility located on a 100-year floodplain must be designed, constructed, operated, and maintained to prevent washout or any hazardous waste by a 100-year flood, unless waste may be removed safely before floodwater can reach the facility or no adverse effects on human health and the environment would result if washout occurred.
Federal Nonregulatory Requirements to be Considered	Executive Order 11988 Protection of Floodplains (40 CFR6, Appendix A)	To be Considered	Under this regulation, Federal agencies are required to avoid adverse effects, minimize potential harm, restore and preserve the natural and beneficial values of floodplains.	Remedial alternatives that involve construction in floodplain areas must include all practicable means of minimizing harm. Floodplain protection considerations must be incorporated into the planning and decision-making about remedial alternatives.

TABLE C-3
POTENTIAL ACTION-SPECIFIC ARARS
OLD SPRINGFIELD LANDFILL SITE
FEASIBILITY STUDY REPORT

ACTION(S)	ARARs	STATUS	REQUIREMENT SYNOPSIS
Federal			
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 specifies the type of safety equipment and procedures to be followed during site remediation.
All	Resource Conservation and Recovery Act (RCRA), RCRA Subtitle C, 40 CFR 260	Applicable	RCRA regulates the generation, transport, storage, treatment, and disposal of hazardous waste. CERCLA specifically requires (in Section 104(c)(3)(B)) that hazardous substances from removal actions be disposed of at facilities in compliance with Subtitle C of RCRA.
All	OSHA - Recordkeeping, Reporting, and Related Regulations (29 CFR 1904)	Applicable	This regulation outlines the recordkeeping and reporting requirements for an employer under OSHA.
All	USEPA Groundwater Protection Strategy - USEPA Policy Statement, August 1984	To be Considered	Identifies groundwater quality to be achieved during remedial actions based on the aquifer characteristics and use.
All	RCRA - Standards for Owners Operators of Permitted Hazardous Waste Facilities (40 CFR 264.10-264.8)	Relevant and Appropriate	General facility requirements outline general waste analysis, security measures, inspections, and training requirements.
All	RCRA - Preparedness and Prevention (40 CFR 264.30-264.31)	Relevant and Appropriate	This regulation outlines requirements for safety equipment and spill control.
All	RCRA - Contingency Plan and Emergency Procedures (40 CFR 264.50-264.56)	Relevant and Appropriate	This regulation outlines the requirements for emergency procedures to be used following explosions, fires, etc.
All	RCRA - Groundwater Protection (40 CFR 264.90-264.109)	Relevant and Appropriate	This regulation details requirements for a groundwater monitoring program to be installed at the site.

All	RCRA - Closure and Post-Closure (40 CFR 264.110-264.120)	Relevant and Appropriate	This regulation details specific requirements for closure and post-closure of hazardous waste facilities.
Capping-Waste in Place	RCRA - Landfills (40 CFR 264.310(a))	Relevant and Appropriate	Placement of a cap over waste requires a cover designed and constructed to: • Provide long-term minimization of migration of liquids through the capped area; • Function with minimum maintenance; • Promote drainage and minimize erosion or abrasion of the cover; • Accommodate settling and subsidence so that the cover's integrity is maintained; • Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.
	RCRA - Landfills (40 CFR 264.310(a))	Relevant and Appropriate	Prevent run-on and run-off from damaging cover.
	RCRA - General Standards (40 CFR 264.117(c))	Relevant and Appropriate	Restrict post-closure use of property as necessary to prevent damage to the cover.
	EPA Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments (EPA-530-SW-89-047)	To be Considered	This document includes EPA technical guidance for landfill covers and presents recommended technical specifications for multilayer landfill cover design.
Clean Closure (Removal)	RCRA - General Standards (40 CFR 264.111)	Relevant and Appropriate	General performance standard requires minimization of need for further maintenance and control; minimization or elimination of post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products. Also requires disposal or decontamination of equipment, structures, and soils.
	RCRA - Manifesting, Recordkeeping and Reporting	Applicable	This regulation specifies the recordkeeping and reporting requirements for RCRA facilities.
Closure with Waste In-Place (Hybrid Closure)	Proposed Rule 52 FR 8712 (not enacted)	To be Considered	Requires removal of majority of contaminated materials. Also requires application of cover and post-closure monitoring based on exposure pathway(s) of concern.
	RCRA - Manifesting, Recordkeeping and Reporting (40 CFR 264.70-264.77)	Applicable	This regulation specifies the recordkeeping and reporting requirements for RCRA facilities.
Groundwater and Surface Water Monitoring	RCRA - Groundwater Protection (40 CFR 264.97)	For Groundwater: Relevant and Appropriate for Surface Water: To be Considered	General requirements for groundwater monitoring.

Construction and Operation of Onsite Landfill	RCRA - Landfills (40 CFR 264, Subpart N)	Relevant and Appropriate	Regulates the design, construction, operation and closure of a hazardous waste landfill.
	RCRA Land Ban (40 CFR 268, Subpart D)	Applicable	After 11/8/88, placement on or in land outside unit boundary or area of contamination will trigger land disposal requirements and restrictions. Also requires treatment by Best Demonstrated Available Technology (BDAT) before placement.
	Hazardous and Solid Waste Amendments of 1984 (1984 Amendments to RCRA) PL 98-616, Federal Law 71:3101	Relevant and Appropriate	Specific wastes are prohibited from land disposal under the 1984 RCRA Amendments. This includes a ban on the placement of wastes containing free liquids. Also, solvent-containing wastes are prohibited from land disposal, effective November 1986. EPA is also required to set treatment levels or methods, exempting treated hazardous wastes from the land disposal ban. To date, these treatment standards have not been promulgated. The RCRA amendments will also restrict the landfilling of most RCRA-listed wastes by 1991 unless treatment standards are specified.
Construction and Operation of Onsite Incinerator	RCRA - Incinerators (40 CFR 264, Subpart O)	Relevant and Appropriate	Regulates the design, construction, operation and closure of hazardous waste incinerators.
	RCRA - (40 CFR 761.70)	Relevant and Appropriate	Lists special performance standards for incineration of PCBs.
	Clean Air Act (CAA) - National Air Quality Standards (NAQS) (440 CFR 1 to 99)	Relevant and Appropriate	Applies to major stationary sources such as treatment units that have the potential to emit significant amounts of pollutants such as NO_x, SO_2, CO, lead, mercury and particulates (more than 250 tons/year). Regulations under CAA do not specifically regulate emissions from hazardous waste incinerators, but it is likely that Prevention of Significant Deterioration (PSD) provisions would apply to an onsite treatment facility.
	Interim RCRA/CERCLA Guidance on Non-Contiguous Sites and Onsite Management of Waste and Treated Residue (USEPA Policy Statement March 27, 1986)	To be Considered	If a treatment or storage unit is to be constructed for onsite remedial action, there should be a clear intent to dismantle, remove, or close the unit after the CERCLA action is completed. Should there be plans to accept commercial waste at the facility after the CERCLA waste has been processed, it is EPA policy that a RCRA permit be obtained before the unit is constructed.
Offsite Disposal of Solid Wastes	Standards Applicable to Transporters of Hazardous Waste - RCRA Section 3003, 40 CFR 262 and 263, 40 CFR 170 to 179	Applicable	Establishes the responsibility of offsite transporters of hazardous waste in the handling, transportation, and management of the waste. Requires a manifest, recordkeeping, and immediate action in the event of a discharge of hazardous waste.

	EPA Administered Permit Program: The Hazardous Waste Permit Program RCRA Section 3005, 40 CFR 270, 124	Relevant and Appropriate	Covers the basic permitting, application, monitoring and reporting requirements for offsite hazardous waste management facilities.
	EPA Interim Policy for Planning and Implementing CERCLA Response Actions. Proposed Rule, 50 FR 45933 (November 5, 1985)	To be Considered	Discusses the need to consider treatment, recycling, and reuse before offsite land disposal is used. Prohibits use of a RCRA facility for offsite management of Superfund hazardous substances if it has significant RCRA violations.
Onsite Water Treatment and Discharge	National Pollution Discharge Elimination System (NPDES) (40 CFR 122)	Relevant and Appropriate	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 may be determined on a case-by-case basis. • Applicable Federally approved State water quality standards must be complied with. These standards may be in addition to or more stringent than other Federal standards under the CWA. • The discharge must conform to applicable water quality requirements when the discharge affects a state other than the 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. - 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. • 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 of 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 treatments 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 units such as air strippers.
	Toxic Pollutant Effluent Standards (40 CFR 129)	Relevant and Appropriate	Regulates the discharge of the following pollutants: aldrin/dieldrin, DDT, endrin, toxaphene, benzidine, and PCBs.
	Fish and Wildlife Coordination Act 16 USC661 <u>et. seq.</u>	Applicable	This act requires that before undertaking any Federal action that causes the modification of any body of water or affects fish and wildlife, the following agencies must be consulted: the appropriate State agency exercising jurisdiction over Wildlife Resources and the U.S. Fish and Wildlife Service.
Offsite Discharge to POTW	Clean Water Act (CWA) (40 CFR 403)	Applicable	These regulations control the discharge of contaminated water to POTW. The same regulations apply regardless of whether remedial action discharges into the sewer of trucks waste to POTW. Point of reference is entry of pollutants into treatment system as the POTW. Some of the major requirements of these regulations are: • Pollutants that pass through the POTW without treatment, interfere with POTW operation, or contaminate POTW sludge are prohibited. • Specific prohibitions preclude the discharge of pollutants to POTWs that: - Create a fire or explosion hazard in the POTW; - Are corrosive (pH<5.0); - Are discharged at a flow rate and/or concentration that will result in interference; - Increase the temperature of wastewater entering the treatment plant that would result in interference, but in no case raise the POTW influent temperature above 104 degrees F (40 degrees C). • If a leachate collection system is installed and the discharge is sent to a POTW, the POTW must have an approved pretreatment program. The collected leachate runoff must be in compliance with the approved program. Prior to discharging, a report must be submitted containing identifying information, list of approved permits, description of operations, flow measurements, measurement of pollutants, certification by a qualified professional, and a compliance schedule.
	RCRA - General Standards (40 CFR 264.71 and 264.72)	Relevant and Appropriate	RCRA permit-by-rule requirements must be complied with for discharges of RCRA hazardous wastes to POTWs by truck, rail, or dedicated pipe.
Excavation	CAA - NAQA for Total Suspended Particulates (40 CFR 129.105, 750)	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 260 μ/m^3 (primary standard).
	Land Ban (40 CFR 268 - Subpart D)	Applicable	After November 8, 1988, movement of excavated materials to new location and placement in or on land will trigger land disposal restrictions.
Gas Collection	Proposed Standard - 52 FR 3748 (2/5/87)	To be Considered	Identifies proposed standards for control of VOC emissions.

APPENDIX D

LETTER OF CONCURRENCE
FROM STATE OF VERMONT

OLD SPRINGFIELD LANDFILL SITE

State of Vermont

Department of Fish and Wildlife
Department of Forests, Parks and Recreation
Department of Environmental Conservation
State Geologist
Natural Resources Conservation Council

AGENCY OF NATURAL RESOURCES
103 South Main Street
Waterbury, Vermont 05676

Department of Environmental Conservation

Mr. Merrill Hohman
U.S. Environmental Protection Agency
Region I
Waste Management Division
J.F. Kennedy Federal Building
Boston, MA 02203

September 27, 1990

Dear Mr. Hohman:

I am writing to advise you of Vermont's concurrence with the proposed source control remedy for Old Springfield Landfill as detailed in the draft Record of Decision.

Through the Focused Feasibility Study effort the State and EPA have been able to gain a more thorough understanding of site conditions. The remedy as proposed reflects this understanding and presents a solution that is at once flexible and protective of public health and the environment.

We appreciate the cooperative effort that we have experienced with EPA in reaching this agreement, and look forward to working with you and your staff in future Superfund efforts.

Sincerely,

Reginald A. LaRosa

Reginald A. LaRosa, Acting Commissioner,
Vermont Department of Environmental Conservation

RAL:dc rod2 concur

APPENDIX E

RESPONSIVENESS SUMMARY

OLD SPRINGFIELD LANDFILL SITE

TABLE OF CONTENTS

PAGE

Preface 1

I. OVERVIEW OF REMEDIAL ALTERNATIVES CONSIDERED IN THE FEASIBILITY STUDY AND PROPOSED PLAN 2

II. SITE HISTORY AND BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS 4

III. SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES TO THESE COMMENTS 6

A. Summary of Resident and Citizen Comments 6
1. 1990 Comments 6
2. 1988 Comments (Deferred from 1988 ROD) 9

B. Summary of Potentially Responsible Parties' Comments 13
1. 1990 Comments 13
2. 1988 Comments (Deferred from 1988 ROD) 37

C. Summary of State of Vermont Comments 46
1. 1990 Comments 46
2. 1988 Comments (Deferred from 1988 ROD) 46

IV. REMAINING CONCERNS 47

ATTACHMENT A - COMMUNITY RELATIONS ACTIVITIES CONDUCTED AT THE OLD SPRINGFIELD LANDFILL SUPERFUND SITE IN SPRINGFIELD, VERMONT

ATTACHMENT B - DETAILED SUMMARY OF POTENTIALLY RESPONSIBLE PARTY COMMENTS

ATTACHMENT C - TRANSCRIPT OF THE AUGUST 2, 1990 INFORMAL PUBLIC HEARING

ATTACHMENT D - EPA RESPONSE TO CONTAMINANT DESORPTION MODEL

OLD SPRINGFIELD LANDFILL RESPONSIVENESS SUMMARY

Preface

The U.S. Environmental Protection Agency (EPA) held a 60 day public comment period from July 13, 1990 to September 10, 1990 to provide an opportunity for interested parties to comment on the Remedial Investigation (RI) reports, 1988 Feasibility Study (FS), 1990 Supplemental Feasibility Study (SFS), 1990 Detailed Evaluation Memorandum (Detailed Evaluation Memo), 1990 draft Focused Feasibility Study (FFS) reports, and the 1990 Proposed Plan for second operable unit at the Old Springfield Landfill Superfund site (the site) in Springfield, Vermont. The second operable unit or source control portion of the site cleanup addresses controlling the sources of contamination at the site that present a hazard or contribute to the spread of contamination. EPA made a preliminary recommendation of its preferred alternative for source control in the Proposed Plan issued on July 6, 1990, before the start of the public comment period. Remediation for the first operable unit, addressing contaminated water flowing from the site, was addressed in the first Record of Decision for the site signed in September 1988 (the 1988 ROD).

The purpose of this Responsiveness Summary is to document EPA responses to the comments and questions raised during the 1990 public comment period as well as any comments pertaining to source control from the 1988 ROD comment period. EPA considered all of the comments summarized in this document before selecting a final remedial alternative to address the source of contamination at the site.

This Responsiveness Summary is organized into the following sections:

I. <u>Overview of Remedial Alternatives Considered in the Feasibility Studies and Proposed Plan</u> - This section briefly outlines the remedial alternatives evaluated in the FS, FFS, SFS and Proposed Plan, including EPA's preliminary recommendation of a preferred alternative.

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

III. <u>Summary of Comments Received During the Public Comment Period and EPA Responses to These Comments</u> - This section summarizes and provides EPA's responses to the comments received from residents, other interested parties and Potentially Responsible Parties (PRPs) on both the source control action that was part of the 1988 Proposed Plan and this June 1990 Proposed Plan.

IV. Remaining Concerns - This section summarizes comments raised during the public comment period that cannot be fully addressed at this stage of the Superfund process and which thus will need to be evaluated during the design and implementation of EPA's selected remedy for the site. EPA provides responses to these comments and will further address these concerns during the remedial design and Remedial Action (RD/RA) phase of the cleanup.

Attachment A - This attachment provides a list of community relations activities that EPA has conducted to date at the site.

Attachment B - This section contains a detailed summary of Potentially Responsible Parties' comments.

Attachment C - This attachment provides a transcript of the August 2, 1990 informal hearing on the site, held in Springfield, Vermont.

Attachment D - This attachment contains EPA's comments on the contaminant desorption model.

I. OVERVIEW OF REMEDIAL ALTERNATIVES CONSIDERED IN THE FEASIBILITY STUDIES AND PROPOSED PLAN

Using information gathered during the RI (an investigation of the nature and extent of contamination at the site), and the Endangerment Assessment (EA) (an assessment of the potential risks to human health and the environment associated with the site contamination), EPA identified several cleanup objectives for the site. The primary cleanup objective is to reduce the risks to public health and the environment posed by exposure to the site source areas or to contamination that has migrated, or may potentially migrate, off the site.

After identifying the cleanup objectives, EPA evaluated potential cleanup alternatives, called remedial alternatives. The FS, FFS and SFS reports and the Detailed Evaluation Memo describe the remedial alternatives considered for addressing contaminated soil, groundwater and leachate, as well as the criteria EPA used to narrow the list to eleven potential source control remedial alternatives.

As indicated in the Proposed Plan, EPA's preliminary recommendation of a source control preferred alternative involved the following: capping identified waste areas, installing french drains, gas collection and venting systems, source control extraction wells,and stabilizing the waste area side slopes.

REMEDIAL ALTERNATIVES EVALUATED IN THE FS, FFS AND SFS

The eleven source control remedial alternatives considered by EPA are listed below. The July 1990 Proposed Plan should be consulted for a detailed explanation of these remedial alternatives as well as EPA's preferred alternative.

ALTERNATIVES TO ADDRESS SOURCE CONTROL

Alternative 1:	No Action
Alternative 2: (Preferred Alternative)	Capping, French Drains, Gas Collection and Venting, Source Control Extraction Wells and Side Slope Stabilization.
Alternative 3:	On-Site Landfill of Contaminated Solids
Alternative 4:	On-Site Incineration
Alternative 5:	In-Situ Vitrification
Alternative 6:	Fencing and Covering of Contaminated Soils
Alternative 7:	Fencing, Installation of a Source Control Well and Covering of Contaminated Soils
Alternative 8:	Fencing, Installation of a Source Control Well, Vapor Extraction from Waste Area 3, and Covering of Contaminated Areas Outside Waste Area 3
Alternative 9:	Fencing, Installation of a Source Control Well, Capping of Waste Area 3, and Covering of Contaminated Soil Areas Outside Waste Area 3
Alternative 10:	Fencing, Installation of a Source Control Well, Capping of Waste Areas 3 and 4, and Covering of Contaminated Soil Outside of Waste Areas 3 and 4
Alternative 11:	Fencing, Installation of a Source Control Well, Capping of Waste Area 3 with a Perimeter Slurry Wall, and Covering of Contaminated Soil Outside of Waste Area 3

II. SITE HISTORY AND BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

The Old Springfield Landfill site is located in Springfield, Windsor County, Vermont, approximately one mile southeast of the commercial and residential center of the town. The site is a 27-acre parcel of land on the former Old Will Dean Farm property. The site study area is approximately bounded by Will Dean Road to the west, a housing development to the north, Route 11 to the east, and residential property to the south.

From 1947 through 1968, the Town of Springfield operated a landfill at the site that accepted both municipal and industrial wastes. Industrial wastes are believed to have been disposed of on approximately eight acres at the site and included oil, solvents, and other industrial wastes.

In 1970, an area resident noticed an odor in his well water and notified the Vermont Department of Environmental Conservation. Complaints by other nearby residents prompted the state to begin area drinking water studies. In 1982, EPA added the site to the Superfund National Priorities List, making it eligible to receive Federal funds for investigation and cleanup.

In 1985, EPA began the field investigations of the Old Springfield Landfill site. An initial Remedial Investigation (RI) report was prepared for EPA in 1985. Further investigations were necessary in order to answer questions raised by the initial study. These investigations resulted in the development, in 1988, of a supplemental RI, EA, and an FS.

Results of site investigations have identified that the soils in Waste Areas 2, 3 and 4 are contaminated with volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). The groundwater is contaminated primarily with VOCs.

The EA identified exposure pathways through which the public could potentially be exposed to the contaminants of concern at the Old Springfield Landfill site. Current exposure pathways include inhaling VOCs released to the air from leachate seeps or landfill gas emissions and direct contact with contaminated soil. If the site contamination is left untreated, there could be potential future adverse human health effects from long-term exposure to site contaminants. Potential future risks from site contaminants include:

- o ingestion of contaminated groundwater,
- o long term exposure to PCB and PAH contamination in the soil from handling or ingestion of the soil, and
- o inhalation of contaminants in landfill gas.

EPA issued the first proposed cleanup plan for public comment in July 1988. Based upon comments received from the public and the State of Vermont, EPA revised the preferred alternative and separated the cleanup into two operable units. The Record of Decision (ROD) for the first operable unit, signed by EPA in September 1988, addresses the migration of contamination from the site. The remedy selected in the 1988 involves collection and treatment of contaminated leachate. The remedial design for this remedy is currently being completed by four of the Potentially Responsible Parties (PRPs) with EPA's oversight.

The September 1988 ROD also required an FFS be conducted to collect additional data related to the second operable unit, or source control portion, of the remedy. Source control studies were necessary to better define the extent of deep groundwater contamination, the feasibility of isolating the waste from surface and groundwater, and the nature of sub-surface water flow. The draft FFS Report was submitted to EPA in April, 1990 and a revised draft was submitted in June 1990.

Prior to 1989 much of the public concern regarding the site centered on the citizens living in the mobile home park. The mobile home park residents were concerned about potential health threats and being forced to move out of their homes. These concerns ended by 1990 when the last of mobile home park residents moved from the site. Citizens continue to be concerned about the possible adverse economic effect that the site could have on the town. Concerns range from the potential for raising town taxes, due to the town's involvement with the site, to property value decreases for residences in close proximity to the site. Citizens have also expressed some doubt about the actual health risks from exposure to the contaminants at the site. People want EPA to clarify what the risks are and how and when people are at risk. People are also concerned about the present and future site aesthetics. They feel EPA should give some consideration to the visual impacts of the site activities on nearby residences.

A complete list of community relations activities conducted at the site is included in Attachment A at the end of this document.

III. SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES TO THESE COMMENTS

This Responsiveness Summary summarizes the comments received during the public comment period held from July 13, 1990 to September 10, 1990 and also those comments deferred from the first ROD comment period ("1988 comments"). EPA deferred responding to 1988 ROD comments that pertained to the source control portion of the remedy until the comment period for the second ROD.

The comments are categorized into three sections: Resident and Citizen, PRP, and State. Each of these sections contains separate subsections for comments received during the public comment period for the current ROD ("1990 comments") and deferred comments from the 1988 ROD ("1988 comments"). All of these comments are summarized below. A detailed summary of PRP 1990 comments is included as Attachment B. A copy of the transcript from the August, 1990 informal public hearing is included as Attachment C of this document and is available in the Administrative Record located at the site information repositories at the Springfield Public Library, Main Street, Springfield, Vermont and at the EPA Records Center, 90 Canal Street, Boston, Massachusetts. A detailed summary of the PRP's 1988 comments and the transcript from the 1988 informal public hearing are also available in the Administrative Record.

A. Summary of Resident and Citizen Comments

Comments from residents and concerned citizens are summarized below. The comments are organized into the following categories:

1. 1990 Comments
2. 1988 Comments (Deferred from 1988 ROD)

1. 1990 Comments.

a. Comment: One person wanted to know if something would be done with the town water line that runs through the site.

EPA Response:

EPA believes that the Town of Springfield is planning to install a new section of water line which would allow for the disconnection of the line running through the Old Springfield Landfill. EPA would not require action regarding the water line unless such action was necessary as part of the remedial action. A further evaluation of the water line will be made during remedial design.

b. Comment: One person asked if REMCOR was going to relocate the existing command post and decontamination facility.

EPA Response:

EPA will do what it can to ensure that the command post and decontamination facilities are relocated, but the citizen must understand that EPA's Superfund authority only extends to actions which directly relate to protecting human health and the environment from a release or threats of a release of hazardous substances. If the site owner requires the location of equipment and facilities in a certain location as part of the access agreement and that location does not affect the remedial action or create a threat to human health or the environment, then EPA cannot prohibit or relocate such facilities.

c. Comment: One person requested information about the enforcement of the Town of Springfield Article 88-2. It appears that the article is not being enforced and, therefore, there is a potential for people to be digging on the site. This individual also wanted to know if digging in Waste Area 1 would be safe, since this area has been referred to as a low hazard area.

EPA Response:

The first ROD called for the implementation of institutional controls and referenced Article 88-2 in particular. At the informational meeting on July 12, 1990, the Town indicated that Article 88-2 was not in effect. EPA intends to ensure that institutional controls are implemented.

Waste Area 1 does not contain sufficient hazardous substances to represent a threat to human health. However, EPA suggests that samples be taken if any excavation is to occur to ensure that unidentified contamination is not present.

Based upon the current delineation of the site resulting from the sampling and analysis of the completed studies, the area outside the waste management unit and which is not required for use during implementation of the selected remedy will not be restricted from use after the construction of the remedy. Any excavation of the area within the boundary of the 27 acre study area (with the exception of the waste management unit), should include sampling for site related contamination and should proceed with caution. The restrictions on groundwater use established by the first operable unit will remain in place until groundwater cleanup levels in section X.A are achieved.

d. Comment: One person asked if the State had approved the use of the Town's sewage treatment plant for treating leachate from the site.

EPA Response:

The State of Vermont is currently reviewing the application for discharge to the POTW submitted by the PRPs. This application was filed as part of the activities required under the first operable unit.

e. Comment: A Town Representative expressed concern for the town's financial condition and made suggestions for reducing the costs of the preferred alternative. The representative also stated that he supported the incorporation of the option to the Preferred Alternative (excavation of waste from Waste Area 2 and placing it under the Waste Area 3 cap), since it would reduce the engineering costs by $700,000. The representative also suggested that the use of qualified volunteer workers at the site be considered as another means of lowering the cost of construction.

EPA Response:

The selected remedy allows for the consideration and possible implementation of the excavation option as more information is evaluated during design. The use of qualified volunteers would be a decision for the company performing the work. EPA cannot assume the use of volunteers in a cost estimate. Typically, only individuals who have passed the applicable OSHA health and safety training will be allowed to work on a Superfund site.

f. Comment: One citizen suggested that the in-situ vitrification alternative be modified to include power generated from the Black River. The commenter stated that this modified remedial alternative could be completed for the same cost as the preferred alternative and would prevent potential future needs for remediation.

EPA Response:

In-situ vitrification was evaluated in the 1988 FS as a potential technology for the site. EPA relied upon already existing power supplies for its cost evaluation. EPA did not select in-situ vitrification for the source control remedy because EPA determined that the selected remedy represents the best balance of the nine selection criteria. Among these, the short-term risks and potential implementability problems associated with the in-situ vitrification alternative were greater than those associated with the selected remedy. EPA agrees that permanent remedies should be considered to the extent practicable and EPA has a preference for treatment. Section XI of the ROD provides more detail relating to the rationale for selecting the remedy.

g. <u>Comment:</u> One citizen commented that the cost of EPA's preferred alternative could be reduced substantially by having the PRPs (excluding the Town of Springfield) hire management personnel and purchase necessary material, and the Town pay for equipment and fuel costs.

<u>EPA Response:</u>

EPA intends to give the PRPs an opportunity to perform the work described in the ROD. It is up to the PRPs to allocate costs among themselves. EPA encourages the PRPs to develop approaches to implementing the remedy that are efficient as long as the work is performed in accordance with the 1990 ROD.

2. 1988 Comments (Deferred from 1988 ROD)

a. <u>Comment</u>: A resident asked if continued horizontal or vertical migration of contaminants could occur if the proposed alternative (capping) is implemented.

<u>EPA Response</u>:

EPA has considered the potential for the horizontal and vertical migration of contaminants. The selected remedy was designed to reduce any future migration of contaminants to the extent practicable. Unfortunately, there will be some movement of contaminants due to the time which has expired since disposal. The management of migration system will target contaminants which have crossed or will cross the boundary of the waste management unit.

b. <u>Comment</u>: A group of residents expressed their preference for a permanent cleanup remedy rather than containment, collection of leachate and monitoring.

<u>EPA Response</u>:

EPA considered several alternatives which would have resulted in a more permanent clean-up. EPA determined that the selected remedy represents the best balance of the nine selection criteria. All of the more permanent waste treatment alternatives were orders of magnitude more costly than the selected alternative. The remedy selected by EPA provides greater short-term effectiveness, implementability, and cost-effectiveness than the more permanent remedies.

c. Comment: A group of residents asked EPA to consider planting trees and other vegetation around the cap to provide aesthetic and air quality improvements to the proposed cap design.

EPA Response:

EPA's authority for cleaning up a site is restricted to those actions necessary to protect human health and the environment. Certain restrictions will exist for the type of vegetation that may be placed over the cap. However, the site owner and other responsible parties will not be restricted by EPA from any attempts to improve the aesthetic nature of the site provided such activity does not interfere with the cleanup.

d. Comment: Residents requested that EPA design the cap to maintain the current ground level rather than creating a higher elevation at the site. The residents also asked that well-heads be capped at ground-level to reduce maintenance and risk of injuries.

EPA Response:

The thickness of the cap and the elevation of well-heads will be determined during design. The cap must meet the requirements established in the guidance so that its effectiveness will not be compromised. The ROD allows for site specific factors to be considered as part of the design. Please see comment A.2.c regarding EPA's authority to spend money for aesthetic issues.

e. Comment: Residents asked that the proposed fence around the site enclose the capped area only and not excavated areas north of the cap. Residents also requested that warning signs be posted along the fence at access points only.

EPA Response:

EPA has included a fence around only the capped area, as requested in the comment. Warning signs will posted be as necessary to prevent unauthorized entry. Since the fence no longer extends to Will Dean Road, the warning signs should not be visible from the road.

f. Comment: A resident suggested that excavation of outlying areas and capping of the site be deferred until EPA can evaluate the effectiveness of the leachate collection and treatment system alone. The commenter suggested that EPA should allow rainfall to flow through the site to "flush" contaminants into the leachate collection system for a more cost-effective remedy than constructing a cap.

EPA Response:

EPA considered natural flushing during the alternative evaluation process. Natural flushing has several problems. First, it allows for the continued migration of contamination from the waste into the water table. Second, it assumes that there is complete knowledge as to where all of the contamination is migrating and that there will be methods of collecting all of the contaminated water. Third, it does not consider the RCRA closure requirements. Fourth, it would not provide for protection from the inhalation of landfill gases containing hazardous substances. Finally, the flushing system would place the burden of the cleanup on the management of migration system which requires a great deal of operation and maintenance. EPA prefers to use management of migration to supplement source control, not to replace it.

g. Comment: A resident asked when the cap construction would begin if EPA selects a cap as part of the site remedy.

EPA Response:

EPA estimates that construction of the cap should begin within two years of the selection of the remedy. The standard EPA process following the signing of a ROD involves the following: (1) EPA will prepare for and enter into negotiations with the PRPs; (2) at the conclusion of negotiations either EPA or the settling parties will initiate remedial design; and (3) once the design has been accepted, the construction of the cap will begin.

h. Comment: Residents were concerned about the aesthetic impact of the cap, i.e., what kind of fence and vegetation would be used and whether trees could be planted on or around the cap.

EPA Response:

The 1990 SFS and ROD describe the basic components of the selected remedy. The final cap design may be somewhat different. Trees cannot be planted on top of a cap. Only vegetation with a shallow root structure (grass) will be planted on top of the cap. Vegetation with a deep root structure could damage the low permeability layer of the cap. As explained previously, (see EPA Response to comment A.2.c) EPA cannot spend money for activities that do not relate to protecting human health and the environment, but other parties would not be restricted from improving the aesthetic nature of the site provided such activities do not compromise the integrity of the remedy.

i. Comment: Residents asked whether EPA could implement cleanup innovations perfected in the future, if a cap is used as the current remedy for the Old Springfield Landfill site.

EPA Response:

As described in the ROD, the site will be reviewed every five years after the initiation of remedial action. Under existing Agency procedures, new information submitted to or generated by EPA is analyzed to determine if a change in the remedy or a component of the remedy is warranted.

B. Summary of Potentially Responsible Parties' Comments

This section contains comments submitted by the PRPs. There are two sets of comments. Comments were submitted by attorneys representing Emhart Industries, Inc. and Textron Inc. (Emhart and Textron) and by the Town of Springfield on the 1990 Proposed Plan (the 1990 Comments). Emhart and Textron and the Town of Springfield also submitted comments on the 1988 Proposed Plan. Following issuance of that Proposed Plan, EPA divided the remedial action into two operable units. Comments on the first operable unit (management of migration) were answered in the 1988 Responsiveness Summary. Responses to comments relating to the second operable unit (source control) were deferred until issuance of this source control ROD (the 1988 Comments). The comments are organized into the following categories:

1. 1990 Comments
2. 1988 Comments (Deferred from 1988 ROD)

1. 1990 Comments

a. Comment: The PRPs contend that the risk of ingestion of bedrock groundwater is non-existent. They refer to the lack of an exposure endpoint due to the undevelopable nature of the topography between the site and the Black River, the presence of institutional controls and the discharge of bedrock groundwater to the Black River as reasons why there is no potential for exposure.

EPA Response:

EPA disagrees with the PRPs' contention that the risk of ingestion of bedrock is non-existent. In the 1988 Comments, the PRPs denied the potential for the existence of groundwater contamination in the bedrock east of the site. Results of the 1990 FFS have shown that there is indeed bedrock contamination east of the site. The land along Route 11 is capable of being developed. In addition, EPA considers the institutional controls described in the first ROD less reliable and less preferable to active measures. For example, according to the Town, the Town of Springfield Article 88-2, has not been implemented. Institutional controls may not replace active measures. Ingestion of groundwater must be considered a potential risk at the site and any alternative selected must address such risk.

b. Comment: The PRPs allege that Waste Area 4 is not a source of contaminants of concern (i.e., chlorinated ethenes) in groundwater because those contaminants are not found in Waste Area 4 and water within Waste Area 4, itself, does not exceed any Safe Drinking Water Act maximum contaminated levels (MCLs) for contaminants of concern identified in the EA.

EPA Response:

EPA does not agree that chlorinated ethenes are the only contaminants of concern for groundwater. The 1988 EA and Tables 1 and 2 in Appendix A of the ROD list the contaminants of concern for groundwater. Groundwater in Waste Area 4 exceeds the Vermont Groundwater Protection Act enforcement standard for xylenes, which is a contaminant of concern in groundwater. Benzene, another contaminant of concern, has also been detected within Waste Area 4 and in the groundwater below Waste Area 4. The presence of these compounds above standards indicates that Waste Area 4 does represent a potential threat to groundwater. Also, due to the uncertainties associated with contaminant distribution in landfills, which have both municipal and industrial waste co-disposed, it is possible that additional contamination exists which has not been detected. The selected remedy considered the uncertainty associated with co-disposed landfills.

c. Comment: The PRPs argue that Waste Area 2 does not contribute contamination to, or require source control action to mitigate contamination of, bedrock groundwater because the majority of infiltrating surface water and groundwater flowing through Waste Area 2 discharges at an eastern seep (LSE04) which will be collected and treated in operable unit 1, and groundwater beneath and in the vicinity of Waste Area 2 does not exceed MCLs (as evidenced by monitoring wells MW-46S, 48T, 48B, 42S, and 42T).

EPA Response:

Uncertainties in determining the characteristics of any mixed stream of municipal and industrial waste require that care be taken when evaluating data from randomly collected samples. It is highly likely that concentrations greater than the those detected during the investigation of the site are present in Waste Area 2. REMCOR, the consultant for Emhart and Textron, and the PRPs recognize this problem when they claim that there would be enormous environmental consequences resulting from the excavation of Waste Area 2. There is a contradiction in the comments being made by the PRPs. REMCOR alleges that Waste Area 2 is cleaning itself rapidly and, therefore, does not represent a threat to groundwater. However, REMCOR also maintains that the degree of uncertainty in characterization of the waste in Waste

Area 2 leaves the possibility that significant contamination may be undiscovered. EPA also is not completely satisfied with the delineation of the groundwater exiting Waste Area 2. There is still the potential that the downgradient flow of water from Waste Area 2 has not been intercepted. See Attachment D for comments regarding the contaminant desorption model.

d. Comment: The PRPs commented that risk of inhalation of contaminants from landfill gases is non-existent.

EPA Response:

It is unfortunate that both EPA and REMCOR were not able to obtain valid air monitoring samples to use as indicators of the potential air emission risk. EPA used a model with conservative, yet acceptable, assumptions to determine the potential risk from the inhalation of landfill gas. The result of this assessment showed a potential carcinogenic risk greater than the 10^{-6} point of departure. EPA has also considered other factors to evaluate its concern regarding landfill gas emissions. The well installation program encountered concentrations of landfill gases at location 39 sufficient to stop the progress of drilling. The REMCOR recalculation of the model shows a risk greater than the point of departure under the maximum concentrations detected. Further, the heterogeneous nature of mixed municipal and industrial waste makes it impossible to be certain of the exact waste composition. Even REMCOR and the PRPs acknowledge the potential for significant air impacts from the waste in their comments concerning excavation. The air monitoring data collected during the FFS was invalidated and may not be used for risk assessment purposes, but the data is a qualitative indicator that hazardous substances are being emitted in the landfill gas. EPA is concerned about the protection of human health. At this site, residential development could re-occur in the area around the remedy. EPA must ensure that any future residents are protected from exposure to hazardous substances from the inhalation of landfill gases. EPA believes that there is a potential risk greater than the point of departure and that EPA's risk calculations are appropriate. Therefore, the risk from inhalation of landfill gas must be addressed for any remedial action to be protective.

e. Comment: The PRPs allege that EPA has not demonstrated any site risks beyond dermal contact risks and, thus, proposed source control actions aimed at mitigating landfill gas inhalation risks and bedrock groundwater ingestion risks are arbitrary and capricious.

EPA Response:

Selection of the source control actions in the ROD is not arbitrary and capricious. EPA has identified the presence of several potential risks at the Old Springfield Landfill in addition to the risk from dermal contact and ingestion of contaminated soil. Table 1 of the ROD presents those risks identified by EPA which exceed the 10^{-6} point of departure. Table I from the ROD shows that risks were identified from the inhalation of landfill gas and volatilized gases from leachate seeps, and from the ingestion of groundwater from both the eastern and western sides of the site. EPA has responded to the PRPs contentions regarding the inhalation risk in the comment B.1.d. Regarding potential groundwater ingestion, there is potential for the development of the areas under which the contaminated groundwater is found on both the eastern and western sides of the sites. Data collected during the RI/FS and FFS confirm the presence of contaminants above maximum contaminants levels in the groundwater off-site. EPA believes that there are risks other than dermal contact and that the source control remedy was required to consider such risks. In addition, EPA is required to consider ARARs in developing the appropriate remedy for the site.

f. Comment: The PRPs commented that EPA may not rely on the 1988 EA to support source control actions aimed at mitigating alleged inhalation and ingestion risks. They cite procedural flaws resulting from EPA's failure to respond to the 1988 comments regarding the 1988 EA. The PRPs also claim that the 1988 EA does not demonstrate any unacceptable risks associated with inhalation of landfill gases or ingestion of bedrock groundwater. In addition, they reference their 1988 comments which claimed that the 1988 EA was based upon erroneous assumptions, incorrect calculations, and highly unrealistic exposure scenarios.

EPA Response:

As discussed in the responses B.1.a and B.1.d and in many of the other responses, EPA believes that there are demonstrated risks associated with inhalation of landfill gases and ingestion of bedrock. EPA has relied upon and considers it appropriate to continue to rely upon the 1988 EA. The 1988 EA was developed according to acceptable Region I practices. EPA is not aware of any data, nor has it been presented with any rationale, which justifies the development of a new endangerment assessment. Responses to the allegation that the EA contained erroneous assumptions, incorrect calculations, and highly unrealistic exposure scenarios may be found in comments B.2.b and B.2.c.

g. Comment: The PRP's contend that REMCOR's revised risk assessment shows the absence of ingestion and inhalation risks and was improperly rejected by EPA.

EPA Response:

The Detailed Evaluation Memo provides EPA's review of the risk assessment contained in the 1990 FFS. EPA does not agree with all of the conclusions referenced on pages 21 and 23 of the comments. In particular, EPA disagrees with the following conclusions: (2) the inference that the water in Waste Area 4 does not exceed enforcement standards, when in fact the water exceeds the Vermont standard for xylene; (3) that the wells identified absolutely intercept the contamination exiting Waste Area 2; (10) that groundwater to the east of the site is not capable of development; and (11) the inference that all of the water moving east is discharging to the Black River.

h. Comment: There is no public health risk rationale for placement of a low permeability cap on Waste Areas 2, 3 and 4 or for gas collection systems or covering of the outslopes.

EPA Response:

EPA reiterates its determination that the risks identified in Table I of the ROD are appropriate. The selection of a low permeability cap was based upon an interpretation of the RCRA closure ARAR and the need to reduce the infiltration of water into the waste so that the contamination in the unsaturated waste will no longer contaminate the groundwater. In addition, a low permeability cap offers the ability to control the emission of landfill gases. EPA believes that the outslopes, as they exist today, are unstable. This belief was also expressed by REMCOR in their 1988 comments.

i. Comment: The management of migration remedy selected in first operable unit ROD has been determined to protect public health and the environment. RCRA capping of Waste Areas 2, 3 and 4 is not required to achieve any chemical-specific ARAR.

EPA Response:

Implementation of the first operable unit remedy will protect public health and the environment with respect to the risks addressed in that operable unit. The first operable remedy only partially addresses the risks associated with the ingestion of groundwater and will not address the risks associated with the inhalation of landfill gases or the risk associated with the dermal contact with and ingestion of contaminated soil. The management of migration remedy was not intended to, nor could it, address all of the risks posed by the source of contamination. The ARARs for this operable unit promotes the protectiveness of the remedy.

j. Comment: EPA has misinterpreted the CERCLA statute, regulations and Agency guidance by requiring a RCRA-compliant cap. RCRA is an action-specific ARAR and such ARARs do not apply unless they are necessary to protect public health or the environment or to achieve a chemical-specific ARAR. In the absence of risk, the construction of a multi-layer RCRA-compliant cap cannot be justified as an "applicable or relevant and appropriate requirement" under CERCLA.

EPA Response:

EPA's determination of ARARs for the site is in accordance with CERCLA, the NCP and the EPA guidance "CERCLA Compliance With Other Laws Manual" (August 8, 1988). Moreover, as pointed out in this responsiveness summary, EPA disagrees with the PRPs' contention regarding site risks. Also, the PRPs mischaracterize EPA's differentiation of ARARs into chemical-specific, location-specific and action-specific. EPA has divided ARARS into these categories to facilitate their identification. Each ARAR need not necessarily achieve all location, chemical or action specific ARAR. The capping ARAR is required because it is relevant and appropriate to the remedial action.

k. Comment: The PRPs comment that even if action-specific ARARs apply at the site, a RCRA cap is not appropriate under the circumstances of the release of hazardous substances at the site.

EPA Response:

EPA is required to evaluate site-specific conditions in determining if an ARAR is relevant at a site and appropriate in the particular circumstances. EPA engaged in exactly this analysis in determining that a RCRA-compliant cap was relevant and appropriate for Waste Areas 2, 3 and 4, but that such a cap was not appropriate for the side slopes of Waste Areas 2 and 3. Among the reasons that the Agency determined that RCRA was relevant and appropriate is not just the fact substances similar to RCRA wastes were found at the site, but that RCRA listed wastes were found at the site. The RCRA ARAR is discussed in Section XI of the ROD.

1. Comment: To the extent that RCRA requirements are considered ARARs, soil covers on Waste Areas 2 and 4 would be consistent with "Hybrid Closure" under RCRA.

EPA Response:

Based on the circumstances at the site, EPA has determined that RCRA hazardous waste closure requirements, including landfill closure, are relevant and appropriate, and the circumstances under which hybrid closure would be appropriate are not present at the site. EPA does not find "Hybrid Closure" to be appropriate for Waste Areas 2, 3 or 4. The CERCLA Compliance with Other Laws Manual: EPA/540/G-89/006 (the manual) explains the concept of Hybrid Closure. In the manual, two scenarios are presented to describe the situations under which Hybrid Closure would be acceptable. The two scenarios are:

> (1) Although residual contamination is above health-based levels (i.e., clean closure levels) contamination does not pose a direct contact threat or impact groundwater. Residual leachate levels exceed health-based levels. A type of alternate closure, which may be termed "alternate-clean closure" could be used. No covers or long-term management would be required. However, fate and transport modeling and model verification is necessary to ensure that the groundwater is usable. In this situation, a notice in the property deed may be necessary indicating the presence of hazardous substances.
>
> (2) Removal of waste material results in residuals that potentially pose a direct contact threat but do not pose a threat to groundwater. Residual leachate contamination does not exceed health-based levels. This type of alternate closure, which may be termed "alternate-landfill" closure, consists of a cover to address the direct contact threat. The cover, however, may be permeable. Limited long-term management would include site and cover maintenance and minimal ground-water monitoring. For this scenario, institutional controls, including land-use restrictions, would be necessary, based on site-specific considerations. Id. at 2-20 - 2-21.

The first scenario under which Hybrid Closure may be used is clearly not appropriate for the Old Springfield Landfill site due to the presence of contamination in the soils which represent a potential direct contact threat. In addition, the contaminated groundwater at the Old Springfield Landfill is not usable.

The second scenario under which Hybrid Closure may be used is also not appropriate because the leachate of all of the identified waste areas does exceed health-based levels. In addition, there would be no initial waste removal activity as described in the second scenario nor will the site be subject to only limited long-term management. The management of migration system operable unit will ensure that the site is subject to a great deal of long-term management. Neither of the scenarios described in the manual occur at the Old Springfield site.

m. Comment: The PRPs asked that the following material be included in the Administrative Record: (i) the comments that they submitted to EPA on August 23, 1988, (ii) the comments submitted on the July 9, 1990 Proposed Plan, (iii) the draft Final Focused Feasibility Study Report (FFS) prepared in June 1990, (iv) the "Petition for Reconsideration of ROD Issued 9/22/88 and for Supplementation of Administrative Record" (Petition for Reconsideration), (v) all previous correspondence regarding the Site, and (vi) transcripts and videos of all public hearings and meetings.

EPA Response:

Pursuant to the National Contingency Plan (NCP), EPA must establish an administrative record "that contains the documents that form the basis for the selection of a response action." 40 CFR 300.800(a). In accordance with the NCP, the Administrative Record for the site includes those documents that form the basis for the selection of the remedy for both operable units. The 1988 comments which pertain to the second operable unit, the 1990 comments, transcripts of public hearings, videotapes of public hearings or meetings which were made by EPA personnel and correspondence that was part of the Agency's decision-making in selection of the remedy will be included in the Administrative Record. The Petition for Reconsideration will not be included in the Administrative Record. This document does not pertain to the second operable unit and the materials contained therein were not part of the basis for selection of either of the operable unit remedies. Moreover, the Petition for Reconsideration does not contain new information and so does not rise to the level of information to which the Agency is required to give consideration under Section 117 of CERCLA or EPA policy and procedures. EPA notes that many of the arguments and statements made in the Petition for Reconsideration are also comments that the PRPs have submitted on the 1990 Proposed Plan. To the extent that is the case, those comments are being addressed in this Responsiveness Summary and so will be included in the Administrative Record.

n. Comment: EPA refused to respond to comments on risks associated with inhalation of landfill gases and ingestion of bedrock groundwater that the PRPs submitted for the 1988 ROD and took the position that responses were not warranted.

EPA Response:

In reviewing the comments received in response to the 1988 Proposed Plan, the Agency decided to divide the remedial action into two operable units. The ROD issued in 1988 is for the first operable unit, which is a management of migration remedy. Source control action was deferred to the second operable unit. All comments pertaining to issues that would be addressed by source control are now being responded to in this second operable unit ROD.

o. Comment: EPA violated CERCLA sections 113(k) and 117(b) by not responding to the PRPs' comments on risk assessments in the responsiveness summary to the first operable unit ROD.

EPA Response:

In 1988, EPA responded to those comments submitted by the PRPs which related to the remedy being selected for the first operable unit. Neither section 113(k) nor section 117(b) requires the Agency to incorporate into the Administrative Record materials which it has not relied on in selecting the remedy.

p. Comment: CERCLA public participation requirements impose greater obligations on EPA than those imposed by rulemaking procedures in section 553 of the Administrative Procedure Act (APA), 5 U.S.C. section 553.

EPA Response:

EPA followed the public participation requirements set forth in CERCLA in issuance of the 1988 ROD and in issuance of this ROD. The NCP requires that the public, which includes PRPs, be given the opportunity to comment on the proposed remedy. 40 CFR 300.430(f)(3). In accordance with the NCP requirements on public participation, the Agency responded in the 1988 Responsiveness Summary to all significant comments that were received which pertained to the remedy being selected pursuant to that ROD. This Responsiveness Summary responds to significant comments which were received in both 1988 and presently which pertain to the source control operable unit.

q. Comment: EPA's use of the 1988 risk assessment without responding to PRPs' comments violates their procedural rights.

EPA Response:

The comments that PRPs submitted in 1988 which pertain to EPA's risk assessments and the consequences of those assessments on the source control action are being responded to in this Responsiveness Summary. Those comments did not pertain to the first operable unit ROD and so were not appropriate for response at that time.

r. Comment: EPA has not supplemented the Administrative Record to include all of the documents requested by PRPs and has thus deprived them of the opportunity to participate in development of the Administrative Record.

EPA Response:

The Administrative Record is the Agency's compilation of documents that it relied on in selecting a remedy. Materials are included in the record, from any source, to the extent that such materials are pertinent to the Agency's decision-making. The PRPs had the opportunity to participate in development of the Administrative Record through submission of oral comments at the Agency's public hearings on the Proposed Plan for both operable unit RODs as well as in the submission of written comments. All of the comments and criticisms of the PRPs are included in the Administrative Record to the extent that they were submitted pursuant to the public comment period or otherwise relied on by the Agency.

s. Comment: EPA officials met with persons interested in the Proposed Plan and gave them copies of it before the public meeting, but did not advise the PRPs of such a meeting. There are no minutes of the meeting and PRPs do not know what was discussed. EPA also met with officials of the Town of Springfield and the Proposed Plan was discussed at that meeting. EPA declined to meet with the PRPs.

EPA Response:

The first meeting referenced above was held on June 28, 1990 in a resident's home near the site. In attendance were the EPA project manager, EPA community relations coordinator, twelve residents from the site area, and a town selectman. EPA had met with this group in the past and had promised to meet periodically to discuss citizens concerns related to their proximity to the site (e.g. field work, residential well sampling results). EPA representatives distributed a copy of the June 28, 1990 press release announcing the July 12, 1990 public information meeting and briefly describing the preferred alternative. This same release was mailed to the entire site mailing list on June 28, 1990. EPA did not distribute copies of the 1990 Proposed Plan at this meeting or at any other meeting prior to July 12, 1990 as alleged by the PRPs.

The second meeting referenced by the PRPs was held on July 12, 1990 at 4:00 PM with representatives from the Town of Springfield, EPA, VTDEC, the Vermont Attorney General's Office, and the Vermont congressional delegation. The meeting was requested by the Vermont congressional delegation to discuss communication between EPA and the Town of Springfield. The meeting was hosted by the Town of Springfield, and EPA had no rôle in determining who could or could not attend. Discussion focussed on how to promote better communication between the Town of Springfield, VTDEC and EPA. It is not EPA policy to notify PRPs of meetings with citizen groups or meetings called by a third party or to keep minutes of such meetings.

EPA did afford the PRPs, however, with the opportunity for public participation required by CERCLA, including participation at an informal public meeting on July 12, 1990 and at an August 2, 1990 public hearing in Springfield. In addition, pursuant to the request of PRPs, the public comment period was extended from 30 to 60 days.

t. Comment: The PRPs advised EPA that they would be submitting a revised risk assessment in the FFS and the only issue of contention was whether the risk assessment should be a separate document.

EPA Response: This is incorrect. EPA continuously maintained that a revised risk assessment was not required or requested. When EPA became aware of the PRPs intentions to submit a revised risk assessment along with the FFS Report, EPA advised the PRPs that Region I required all risk assessments to be performed according to the Region I Supplemental Risk Assessment Guidance. A copy of the guidance was sent to the PRPs.

u. Comment: The PRPs commented that the reasons EPA put forth in the Detailed Evaluation Memo for rejection of the risk assessment in the FFS are arbitrary and capricious.

EPA Response:

The PRPs comments assume that any party has the ability to formulate a risk assessment based on factors of their own choosing. EPA has been delegated the authority and the responsibility for ensuring that the statutory mandates of CERCLA are met. It is EPA's responsibility to ensure that remedial actions are protective of human health, welfare and the environment. It is EPA's responsibility to define the risk factors, in accordance with regulatory requirements. In addition, the EPA Office of Solid Waste and Emergency Response Directive No.9835.15 states that PRPs will no longer be allowed to perform risk assessments for Superfund sites.

v. Comment: The PRPs state that they included a revised risk assessment in the FFS because EPA refused to consider their comments on the 1988 EA and EPA has issued new risk assessment guidance documents which undermine reliance on the EA.

EPA Response:

The PRPs' comments on the EA which related to the source control action are responded to in this Responsiveness Summary. Neither the Region I risk assessment guidance issued in 1989 nor EPA Headquarters guidance undermine the 1988 EA.

w. Comment: EPA's source control actions attempt to mitigate risks that do not exist, are inconsistent with the NCP and are arbitrary and capricious.

EPA Response:

EPA has responded to the PRPs' comments on the risks identified at the site in numerous other responses in this Responsiveness Summary. See, e.g., responses to comments B.1.a and B.1.d. EPA's actions are not inconsistent with the NCP. EPA has engaged in remedial investigation of the site, has conducted appropriate feasibility studies and has developed and analyzed remedial alternatives in accordance with the nine criteria set forth in the NCP. See 300.430(e)(9)(iii). EPA has not been arbitrary and capricious in selection of the remedy.

x. Comment: The PRPs have stated that the impermeable cap described in EPA's preferred alternative is excessive in both cost and complexity; is likely to be ineffective; and does not take into account site specific conditions. The PRPs have stated that: 1) because native clay potentially may not be available for the 24-inch compacted clay layer, alternative materials should be evaluated; 2) due to the existing sandy soil cover in Waste Areas 2 and 3, the 12-inch gravel gas venting layer is unnecessary; 3) based on the potential for significant differential settlement, a flexible membrane layer (FML) is inappropriate for Waste Area 4; and 4) where an FML is used, the clean fill layer may be reduced.

EPA Response:

EPA has included flexibility in the ROD to enable additional site specific factors in the cap design. The ROD requires the cap to be designed to meet or exceed the performance requirements set forth in 40 CFR 264.310, 40 CFR 264.110 and the Technical Guidance Document Final Covers on Hazardous Waste Landfills and Surface Impoundments, July 1989 (EPA/530-SW-89-047) (Technical Guidance) or in a manner to achieve performance equivalent to the requirements of 40 CFR 264.111, 264.310 and the Technical Guidance.

With respect to REMCOR's criticism of the proposed design, it should be recognized that the configurations and cap dimensions indicated in the SFS and in the 1990 Proposed Plan are based upon specifications presented in the Technical Guidance. It should also be noted that the cap dimensions contained therein are considered to be minimum requirements and that actual dimensions may be greater where appropriate to take into account site specific conditions (frost protection, settlement, gas venting, etc.). The cap described in the 1990 SFS report used the minimum cap dimensions to fulfill all recommendations proposed in the guidance document except for the thickness of the flexible membrane liner (FML).

During the remedial design, EPA anticipates reviewing the feasibility of substituting low permeability naturally occurring soil or alternative soil and clay mineral mixes that meet or surpass the intended functions of the 24-inch low permeability soil layer (1×10^{-7} cm/sec or less) recommended in the Technical Guidance. However, EPA remains concerned that potential alternative cap designs may ultimately prove to be less reliable than those which adhere to its current guidance. In this regard, the Agency is concerned that a reduction in the overall cap thickness (e.g., replacement of the 2-foot compacted low permeability soil with bentonite panels, reduction of 2-foot of clean fill to 1-foot, elimination of the FML etc.) would reduce the frost protection given to the low permeability compacted soil layer and to the gas vent layer. Since landfill gases contain relatively high moisture contents (up to 80% on a wet weight basis) and since water is typically used to compact the low permeability soil layer (e.g., water added to clay after emplacement to aid in compactability and obtaining desired hydraulic conductivity), protection from frost must be given key consideration. Successive freeze/thaw cycles may cause damage to the low permeability soil layer, thereby voiding its integrity.

With respect to the cap gas vent layer, the cap design presented in the 1990 SFS was again based on the Technical Guidance. This document indicates that the gas vent layer should have specifications similar to the granular material indicated for use for the drainage layer (Section 5.1.2).

The Technical Guidance specifically indicates that the drainage layer design should have a hydraulic conductivity of at least 1×10^{-2} cm/sec (or hydraulic transmissivity of at least 3×10^{-5} m^2/sec), should consist of granular material no coarser than 3/8-inch which is classified as "SP" (more than fifty percent smaller than No. 4 sieve (4.76 mm), poorly graded sand, gravel, with little or no fines), the material selected should be smooth and rounded, and should not contain fines that might lessen the permeability (Section 3.1). In addition, the Agency is currently considering the appropriateness of increasing the hydraulic conductivity requirement for the drainage layer from 1×10^{-2} cm/sec to 1 cm/sec (two order of magnitude increase) (EPA 625-4-89-022). This change essentially eliminates the use of sand and necessitates the use of gravel. Gravel size should be between ¼ to ½-inch with no fines to comply with the new proposed guidance.

Remcor's comment that the existing sandy soils meet the USEPA requirements for hydraulic conductivity cannot be evaluated by EPA without additional data. The Remcor boring log information from MW-39S (0 to 4 foot interval) indicates the presence of "brown coarse sand, little silt, some peat, trace gravel". The presence of the silt and peat would reduce the hydraulic conductivity of the predominant coarse sand. No data is presented to confirm that these soils meet the current USEPA minimum technology guidance (MTG) requirement of 1×10^{-2} cm/sec or other MTG requirements. Literature information would tend towards suggesting a hydraulic conductivity of 10-4 cm/sec to 10-3 cm/sec for the upper four feet, which is one to two orders of magnitude less than the MTGs, and three to four orders of magnitude less than the proposed MTGs.

With respect to gas vent layers in Waste Areas 2 and 3, EPA would consider reviewing alternative approaches to the gas vent layer during remedial design that provide equivalent performance. However, the Agency anticipates that any such consideration of alternative approaches may include requirements that technical studies gradation testing be performed to ensure that header and collection piping would not be plugged from siltation effects (i.e., soil particles smaller than the pipe openings reduce the effectiveness of the collection system by entering into/plugging the pipe). The need for filter materials (fabric, geonet, or intermediate sized soils) may also have to be addressed.

With respect to Waste Area 4, EPA acknowledges the fact that there is likely to be some settlement due to the presence of municipal waste. The Technical Guidance points out that the compacted soil (which is in contact with the FML) should have a minimum slope of 3 percent after allowance for settlement. The Technical Guidance also points out that where there is a concern about subsidence and settlement, the design and construction of the cap should take measures to minimize the settlement and its effect on the cap. It also points out some of the preventative measures which may be taken, including consolidation and compaction of the waste, adjusting the initial slope of the caps, use of a thicker FML layer and performance of special construction procedures to compact the cap layers. Overall, while the Agency will further evaluate the potential impact of differential settling on the FML layer during remedial design, it currently believes that appropriate engineering approaches can be utilized in Waste Area 4 to overcome this concern.

EPA also points out that, as discussed in its Technical Guidance, the FML and the low permeability clay or soil layer together are intended to form the low permeability cap layer and they are considered to function as one system. In addition, these layers tend to back each other up in the event of a failure of either component.

The EPA Technical Guidance also indicates the low permeability layer should be constructed so that it will be entirely below the maximum depth of frost penetration upon completion of the cover system. In northern areas of the United States, such as the Old Springfield Landfill site, this recommendation would necessitate a top layer thicker than the 24-inch minimum (the top layer includes all successive layers above the drainage layer). As previously indicated, protection from frost needs to be given close consideration in the capping system design as successive freeze/thaw cycles may cause damage to the low permeability soil layer, thereby voiding its integrity.

In summary, EPA has incorporated flexibility into the ROD to allow for an evaluation of designs other than those presented in the Proposed Plan, but any alternate design must achieve equivalent performance to the standards listed in 40 CFR 264.110, 40 CFR 264.310, and the Technical Guidance.

y. <u>Comment</u>: The PRPs have suggested that the proposed french drain design can be modified. Remcor has proposed a design (refer to Attachment B) that provides a separate shallow surface water drain along the western and southern sides of

Waste Area 4 which does not include a hydraulic barrier on the downgradient face of the french drain; eliminates the combining of surface and groundwater flow and reduces the hydraulic system size. The PRPs have also proposed elimination of wells for dewatering Waste Area 4.

EPA Response:

EPA has provided flexibility with respect to the methods of intercepting groundwater entering Waste Areas 3 and 4. The ROD requires that the french drains or some equivalent method of water collection be designed, constructed, and maintained to achieve the objectives and specifications established in the ROD.

EPA initially proposed a single french drain capture system incorporating both surface water flow and groundwater interception in the belief that this system offers certain advantages of simplicity in design and engineering. While EPA does not necessarily concur with all of the technical data furnished in the PRPs' comments (such as the peak flow estimates), the Agency acknowledges the potential viability of the PRPs' conceptual design for separate surface water drainage ditch and groundwater french drain systems as depicted in Figure 2, Alternate Design Illustrations (PRP Comments; September 10, 1990) under certain conditions. EPA is in agreement with the PRPs that surface water intercepted upgradient of Waste Areas 3 and 4 could possibly be diverted away from the waste areas and discharged without further treatment assuming this water has not passed through potentially contaminated areas. The Agency has also reviewed Detail C, french drain in Figure 4, Alternative Design Details (PRP Comments; September 10, 1990) relating to the removal of the flexible membrane liner (FML). The Agency points out that the FML was included in its proposed french drain system, in part, to prevent possible seepage into Waste Area 4 from the drain should high flow levels in the drain result in temporary flow back-ups in the system. However, EPA would consider a separate drainage system concept which did not include an FML during remedial design. In evaluating the removal of the FML EPA would consider if the proposed separate system:

1) allows the surface runoff from the cap to be diverted towards the surface water drainage ditch and this runoff will not infiltrate into the waste areas;

2) insures that the cap runoff will not be introduced to the french drain system as a means to dilute groundwater collected by the french drain; and

3) insures that the water collected from the french drain system (groundwater intercepted from upgradient of the drain as well as backflow from the waste area) will be treated to the appropriate levels and standards.

If these design objectives are maintained, EPA recognizes that a downsizing of the overall hydraulic system size may be appropriate. System sizing will be determined during the remedial design.

With respect to dewatering Waste Area 4, additional measures to dewater the waste area (e.g. pumping) will be considered, and, if found appropriate by EPA during remedial design, implemented. EPA feels that inclusion of the use of pumping as proposed in the SFS is an appropriate component in the dewatering of the waste area. The use of wellpoints or borings with appropriately sized sand packs or screens and pumps is anticipated to provide a shorter timeframe for dewatering than sole reliance on the passive collection of backflow into the french drain system, as proposed by the PRPs, because of the measured contrasts in hydraulic conductivity between the till and the waste. The injection test in Waste Area 4 at MW-32S yielded a hydraulic conductivity of 9.4×10^{-3} cm/s and slug tests in waste area borings RTB-19 and RTB-20 yielded hydraulic conductivities of 2.50×10^{-5} cm/s and 1.55×10^{-5} cm/s, respectively (FFS; April 1990). Measured hydraulic conductivities in the till ranged from 1.3×10^{-5} cm/s to 5.8×10^{-7} cm/s (FFS; April 1990). Thus, values of hydraulic conductivity in the waste area are equal to or greater by almost four orders of magnitude than the values in the till through which the backflow from the waste area must flow to be intercepted by the french drains. In addition, some degree of interconnection observed between the trenches themselves in Waste Area 4 has been observed (FFS; April 1990, p. 2-56). Such interconnection could reduce the number of wellpoint placements or borings in the early stages of dewatering.

z. Comment: The PRPs have stated that if slope stabilization is required in Waste Areas 2 and 3 then methods other than those proposed by EPA should be considered on the basis of effectiveness, implementability and cost. Remcor has specifically proposed a "buttress/fill" stabilization approach to both Waste Areas 2 and 3.

EPA Response:

EPA agrees the the best method of slope stabilization should be determined during design. The ROD requires that the slopes be stabilized to prevent any slope failure which can seriously damage the cover system, which could allow releases of waste and leachate into surrounding soils and groundwater. Each slope must be designed to withstand the loading and hydraulic conditions to which it will be subject during the cap's construction and post-closure periods. In addition, the slopes of Waste Areas 2 and 3 will be stabilized so that a greater than 1.25 long-term factor of safety is achieved. Each slope will be stabilized to prevent or minimize, to the degree practicable, shifts, cracks or slumpage in the slope in excess of those expected by waste settlement and to prevent a decrease in the integrity, permeability or effectiveness of the cap. The cover used on these eastern slopes will minimize infiltration of water through the cover and will, to the degree possible, attain the performance standards in 40 CFR 264.310.

EPA indicated in the 1990 Proposed Plan and in the SFS that the extent of slope stabilization necessary for Waste Areas 2 and 3 requires further investigations which will be conducted during the remedial design. EPA also recognizes and has indicated that multiple approaches to slope stabilization for Waste Areas 2 and 3 may exist and that these approaches may also differ for each waste area.

EPA acknowledges that Waste Area 3 might ultimately represent less of a problem with respect to slope stabilization than Waste Area 2. However, EPA believes that the PRPs' assertion that slope stabilization is not needed in Waste Area 3 is premature and inaccurate. As noted in Appendix F of the 1990 SFS (page F-1), limited available information indicates that the SPT blow counts are very low for the waste material. Since the existing outslopes of Waste Area 3 are steeper than 1 vertical to 2 horizontal, the additional weight of the cap quite possibly may cause instability on the side slopes.

EPA also disagrees with certain input data assumptions made by the PRPs in their computer assessment of slope stability. In particular, an internal friction angle of 35° corresponds to a blow count of 25 (according to Peck, Hanson and Thornburn's Foundation Engineering, page 310). This is a high number for the existing waste. According to borings MW40S (Waste Area 3), MW48S and MW49P (Waste Area 2), the blow counts in the waste material are around 10, some are even as low as 2 or 3. Moreover, at the hypothetical internal friction angle of 35°, the factor of safety obtained by Remcor is marginal, at approximately 1.2 to 1.3. Also, the short term stability of the slopes should be determined. Judging from the low blow counts of the existing fill, the cohesion or undrained shear strength is likely be low.

Finally, EPA notes that Remcor's comment on the need for slope stabilization appears to directly contradict earlier comments made by Remcor on the 1988 FS. At that time, Remcor indicated that it considered the outslope areas to be prone to instability due to the past methods of waste placement.

EPA has conducted a preliminary review of the alternative slope stabilization approaches for Waste Areas 2 and 3 and considers them to be potentially feasible. Additional detailed evaluation would be required during remedial design prior to a determination of the acceptability of the approach by the Agency. In addition, the Agency maintains that any proposed approach should have a factor of safety of a minimum 1.25 for the long term, and 1.2 for the short term (construction stage) against shallow and deep seated failures. In addition, the Agency notes that the existing heavy vegetation on the slopes, which presently serves as a stabilizing measure, would probably have to be removed to accommodate the backfill. This may create stability problems during construction.

In summary, the Agency believes that slope stabilization measures will ultimately be required in Waste Areas 2 and 3. During the remedial design, following pre-design investigations of slope stability EPA will consider alternative approaches to slope stabilization for Waste Areas 2 and 3 such as the "buttress/fill" approach suggested by Remcor.

aa. Comment: The PRPs requested that EPA not implement the option to excavate Waste Area 2 and place the excavated material under the Waste Area 3 cap. They stated that EPA underestimated the excavation risk, did not fully address regulatory issues (LDRs), and overestimated technical difficulties and costs associated with side slope stabilization in Waste Area 2.

EPA Response:

EPA believes that it is advantageous to retain the option for excavation in the selected remedy. Once more details about the other components of the remedy are finalized, a better determination of the feasibility of the complete excavation can be performed. EPA has established cleanup goals for the complete excavation of Waste Area 2 in section X.A.3 of the ROD.

In its detailed evaluation of the feasibility of excavating waste material from Waste Area 2, EPA has indicated in its evaluation that during actual excavation environmental and health impacts are a possible concern. The Agency recognizes that such impacts could include possible on-site worker exposure to contaminants in the waste material through dermal contact and/or inhalation. It is also recognized that some off-site migration of contaminants might conceivably occur or that some previously undetected contaminants might be identified. The Agency does not, however, agree with the PRPs' comment that the environmental and health risks associated with excavation of waste from Waste Area 2 were "enormous". On this issue, the Agency notes that this comment appears to contradict the FFS prepared by the PRPs wherein it is asserted that under a no action alternative, "maximum risks would, however, be within the acceptable risk range even assuming the breakdown of institutional controls and residential development of the site". FFS at 4-10. The Agency disagrees that excavation of waste material in Waste Area 2 by qualified and trained personnel represents a far greater risk than is posed by unsupervised residential development at the site.

In evaluating the feasibility of excavation, the Agency has reviewed available information contained in the 1988 RI/FS and 1990 FFS concerning specific contaminants identified to date in Waste Area 2 and routes of exposure to workers during excavation of Waste Area 2. In addition, the Agency recognizes that certain of the contaminants which have been identified in Waste Area 2 (including PCBs) do pose a concern to on-site workers with respect to dermal exposure during excavation. However, excavation is a remediation method which has been widely used in remediation of soils containing PCBs and other contaminants identified in Waste Area 2.

Overall, the Agency believes that any potential on- or off-site risks associated with excavation can be effectively minimized through the implementation of appropriate health and safety practices and associated monitoring programs.

With respect to the cost of excavation of Waste Area 2, EPA acknowledges that if the cost of slope stabilization in Waste Area 2 is substantially less than initial projections, then excavation of Waste Area 2 could ultimately prove to be more expensive than capping the waste area. However, in the absence of any supporting cost documentation, the Agency is not prepared to accept the PRPs' estimate that excavation would be "at least $600,000 more expensive" than capping. As previously indicated, the actual difference in cost between capping and excavation will depend, in part, on the actual method of slope stabilization which is chosen.

The excavation of material from within the area of contamination and subsequent consolidation of such material under the cap would not trigger the RCRA land disposal restrictions.

bb. <u>Comment:</u> The PRPs stated that an active gas collection system in Waste Area 3 is not necessary because there is no unacceptable risk from gas inhalation and the low rate of landfill gas emissions does not warrant an active system.

<u>EPA Response:</u>

As described in previous comments, EPA has determined that there is an unacceptable risk from inhalation of landfill gas emissions in Waste Area 3. EPA believes that active gas collection offers an effective means of addressing the problem of landfill gas emissions while simultaneously offering a potentially valuable means of significantly reducing the total concentration of volatile organics in Waste Area 3, thereby reducing the time required for remediation of groundwater from this waste area. EPA believes that for these combined objectives, active gas collection is likely to be significantly more effective than passive gas collection.

Waste Area 3 is believed to contain significantly more waste (estimated by Remcor to be 72,000 cubic yards) than either Waste Areas 4 and 2 (estimated by Remcor to be 42,500 and 6400 cubic yards, respectively). Therefore, the volumes of landfill gas generated in Waste Area 3 may be significantly greater than in either of the other waste areas. In addition, the total masses and concentrations of volatile and potentially hazardous organic contaminants, particularly chlorinated ethenes in Waste Area 3, are greater than in either of the other two waste areas. Some chlorinated ethenes which have been detected are potential health hazards if inhaled. EPA notes that Remcor was required to temporarily suspend field operations during drilling in Waste Area 3 due to high gaseous vinyl chloride concentrations. Finally, based upon the results of the FFS, EPA believes that the total mass of chlorinated ethenes currently remaining within Waste Area 3 and the underlying till is large and will continue to contaminate groundwater passing through the waste area for many years. As previously indicated, EPA believes that active gas collection is a technology which offers a potentially effective means of addressing all three concerns: landfill gas pressure buildup, hazardous gas release and accelerated groundwater remediation.

In the active gas collection system as identified in the SFS, Waste Area 3 is considered to be a significant source of VOC groundwater contamination at the site. In conjunction with this, the location of the proposed telescoping landfill gas extraction wells have been placed within areas of highest VOC contamination (up to >100 mg/kg total VOCs) in the unsaturated zone which extends to depths of over 40 feet below grade. Since the VOC compounds detected have Henry's Law constants which are amenable to compound removal via stripping (vapor extraction), active gas extraction in this area is seen as a beneficial means to reduce the levels of VOCs remaining in the unsaturated soil after emplacement of the capping system, thereby combining source control as a portion of the gas collection system. Additional VOCs may be removed from the upper water bearing zone beneath Waste Area 3 if the zone of influence exerted by the extraction well intercepts the water table and if the vacuum head is high enough to remove VOCs.

As previously indicated, the active gas system should also:

- Reduce the theoretical timeframe required for groundwater and leachate collection and treatment by reducing and treating the source area.

- Ensure the effective treatment of potentially high levels of VOCs in the landfill gas, which might be released from Waste Area 3 should passive activated carbon treatment systems break through. (Alternatively, flaring of the off-gas may be proposed, but supplemental energy costs might make this very expensive).

EPA has reviewed the calculations presented by Remcor, and while it does not necessarily agree with the quantitative assumptions and results presented therein, the Agency does acknowledge that a passive gas collection may be capable of preventing excessive gas pressure buildup. The Agency does, however, remain concerned that landfill gas generation usually occurs over a 70 to 90 year period, but may not be seen for up to 40 years after a capping system is in place at hazardous waste landfills. In addition, the long-term logistics and effects of gas generation/release are not known for hazardous waste landfills, and as such, conservative approaches to gas collection are potentially appropriate.

With respect to the PRPs' gas flux calculations, the Agency notes that while a geometric mean landfill gas velocity of 1×10^{-10} cm/sec was used to estimate the gas flux, velocities up to almost two orders of magnitude greater than this value were estimated in the upper soil zones. Paired with the uncertainties in landfill gas generation at hazardous waste landfills after capping, the significant variations in gas velocities introduce some uncertainties with respect to the pressure buildup estimation approach presented.

In summary, EPA points out that the proposed use of active gas collection is not solely for the purpose of preventing excessive gas pressure buildup. The Agency also notes that, with respect to long-term operation, the proposed active system could be easily converted to a passive system, if data indicate that active extraction is no longer removing large quantities of VOCs from the soils. This would reduce operation and maintenance costs for the active system. Finally, EPA points out that the ROD incorporates language which allows for the use of a passive venting system if it can be shown to achieve a level of performance equivalent with the active gas collection system.

cc. Comment: The PRPs stated that a single source control well is sufficient to intercept the groundwater discharging from the till beneath Waste Area 3.

EPA Response:

EPA acknowledges that pumping from a single extraction well might be feasible for source control efforts. Nonetheless, the Agency maintains its original position that a remediation approach, including more than one extraction well in Waste Area 3, should be more efficient and flexible in capturing contaminated groundwater than a system including only one well. Similarly, the Agency believes that multiple extraction wells are likely to prove more effective than a system relying only on extraction wells utilized in the management of migration (Operable Unit 1) system. Installation of a multiple well system offers the flexibility through variable and pulsed pumping rates to maximize and optimize the groundwater capture zone in response to changing hydraulic conditions arising from both source control and management of migration efforts. Such flexibility is often unavailable in a single well system that is limited, by definition, to just one location. Furthermore, should a single well extraction system be selected and then found to be deficient for the intended purpose after installation, subsequent well installations may be difficult to implement due to issues relating to: potential compromise of an already emplaced cap; the additional costs of a second well installation mobilization; lost remediation time; and either the associated costs of treating excess clean water pumped by or the loss of contaminant mass missed by the inefficient single well system.

EPA acknowledges that specific extraction well locations and configurations are being deferred to the remedial design phase and that additional hydrogeologic information obtained during the intervening time period can be used to refine the configuration. The Agency believes that a decision regarding the adoption of the concept of multiple extraction wells need not conflict with ongoing management of migration remedies. Multiple source control extraction well placements offer the flexibility to enhance selected management of migration groundwater extraction design approaches and should accelerate remediation times.

dd. Comment: The PRPs stated that the remedial activity schedules for the source control and management of migration remedial components should be integrated so that inconsistencies can be avoided.

EPA Response:

EPA is aware that there are some components of the two operable units which overlap. In particular, the eastern leachate collection system cannot be installed until the side slope stabilization system is designed. EPA intends to phase the first operable unit so that the groundwater extraction wells and western leachate collection systems can be designed and constructed without further delay.

ee. Comment: The Town of Springfield requested that Alternative 7 be chosen as the selected alternative as it was an order of magnitude less expensive than the selected alternative. They supported this statement with a claim that there appears to be no evidence of any health risk such as inhalation of landfill gases or ingestion of bedrock groundwater.

EPA Response:

EPA has responded to the questions pertaining to risk in the previous comments. Alternative 7 was not selected and was not eligible for selection because it did not satisfy either of the two threshold criteria. EPA cannot select remedies which are not protective of human health and the environment nor can it select remedies which would not comply with ARARs. The selected remedy was the most cost efficient of the alternatives which satisfied the two threshold criteria. The selected remedy contains sufficient flexibility to allow for more cost effective components if they achieve equivalent performance to the components described in the remedy.

ff. Comment: The Town of Springfield commented on the design of the cap, gas collection system, french drains, source control extraction wells, side slope stabilization, and the integration of operable units one and two. The Town also adopts the comments submitted by the Companies.

EPA Response:

The selected remedy includes flexibility to allow for additional site specific factors to be considered during design. The multi-layer cap must meet the performance standards established in RCRA and the RCRA Technical Guidance. Other concerns listed in the above comment are addressed in response to comments submitted by the Companies.

2. 1988 Comments (Deferred from 1988 ROD)

a. Comment: The selection of the 10^{-7} incremental cancer risk as the target risk level does not appropriately reflect site characteristics and is not consistent with recent EPA Region I policy at other sites.

EPA Response:

EPA points out that the 10^{-7} incremental cancer risk was not selected as the target risk level for site cleanup. The 10^{-7} incremental cancer risk due to direct contact hazards and ground water ingestion were only two of the six scenarios developed and evaluated (FS, 3-46 and 3-52).

b. Comment: The RI does not support the need for the capping of the landfilled wastes to protect against future ingestion of bedrock groundwater to the east of the former landfill. EPA's calculations regarding contaminant migration into the bedrock aquifer are erroneous. EPA's calculations concerning exposure to contaminants through consumption of fish from the Black River are erroneous.

EPA Response:

In response to this comment, EPA emphasizes that the results of the FFS clearly demonstrate that groundwater contamination from the site has, in fact, migrated an extensive distance off-site to the east. Several chlorinated ethene contaminants including vinyl chloride have been detected in monitoring wells in both bedrock and till formations to the east of the site. Vinyl chloride has been detected in both till and bedrock formations at MW-45 at concentrations significantly in excess of the MCL.

The Agency believes that the field data collected by Remcor adequately refutes the PRPs' original 1988 objection to the hydrologic model presented in the RI which postulated the off-site migration of contaminated groundwater through bedrock to the east of the site.

The Agency acknowledges that the results of the FFS do not demonstrate observable contamination in the Black River. However, EPA is concerned that there is limited evidence to indicate that all of the contaminated groundwater to the east of the site discharges to the Black River. The Agency does not believe that sufficient evidence exists to determine the ultimate fate of all of the contaminated groundwater in bedrock or till to the east of the site.

c. Comment: The RI does not support the need for capping landfilled wastes to protect against off-site exposure to contaminants via inhalation of chemicals in landfill gas.

EPA Response:

Remcor stated that the second driving force in originally proposing cap installation in 1988 was reduction of risks associated with inhalation of landfill gases. They further stated that the EPA model of gas emissions from the landfilled waste is in error. They based their comment on the following conclusions:

- o Inaccuracy of EPA model of gas emissions (Mass Balance Model).
- o Unrealistic assumptions relative to soil VOC levels.
- o Area of emission source and frequency of exposure.
- o Inappropriate fraction organic carbon value used in mass balance model.

Each of these conclusions has been addressed separately below.

Validity of EPA's Mass Balance Model: Remcor suggests that EPA's model of air emissions from the landfill is not appropriate based on a mass balance analysis. However, Remcor's mass balance, as presented in 1988, was considered erroneous on several accounts. First, it looked only at surface soils (0 - 2.5 feet), whereas waste materials were detected as deep as 43 feet. Further, it ignored the mass of contaminants in the vapor phase in the fill. This resulted in an underestimation of the mass of contaminants potentially present by at least five orders of magnitude (a factor of 100,000). Thus, there was in fact considered to be adequate material to be released over a long exposure period.

Use of Maximum Soil VOC Levels as Representative of Site Conditions: Remcor further objected to the use of maximum soil concentrations as representative of the site. However, this was a standard risk assessment practice that has been used by EPA at many other sites. The maximum represented a plausible upper-bound case. It was noted in the EA that this maximum case probably overestimated actual risk and for that reason an average case was presented as well.

Use of 70-Year Lifetime Exposure: Remcor noted that the assumption of a 70 year lifetime exposure also overestimated risk. However, this was again a standard EPA assumption used for most risk assessments. In addition, use of a 40 or 50 year lifetime exposure would not significantly reduce the total risk estimates. Remcor appeared to erroneously assume that residents must remain outside to be exposed; however, indoor air concentrations would be expected to reach equilibrium with outdoor concentrations over time. Relocation of current residents would not affect the risk assessment since the future use scenario, in keeping with EPA risk assessment practice, assumed no remediation or other corrective actions and allowed for unlimited redevelopment of the site.

Use of Inappropriate Fraction of Organic Carbon (foc) Value: The commenters suggested that a value of 5% for the fraction of organic carbon (foc) would be more realistic than the 0.0023% used by EPA in its model to predict potential future leaching of contaminants from the waste. In general, EPA prefers to use site-specific data where available, rather than relying on literature values. For this reason, the value developed from on-site data was used. During the waste delineation investigation, five soil samples were collected for total organic carbon analysis. Sample numbers, depth sampled, material sampled, and the TOC results are summarized in Table 1. Locations for test borings and monitoring well borings from which these samples were obtained are shown in the RI Report, Figure 3-3. Samples were selected to represent a range of depths from 0.5 to 2.5 and 27 to 29 feet below the ground surface. EPA Method 9060 was used for the analysis.

Samples MW-28-001, MW-25-003 and MW-27-007 are from the deltaic sands and their results were considered indicative of the TOC content encountered by landfill gas as it moved through soil cover, or by leachate as

TABLE 1
TOTAL ORGANIC CARBON RESULTS

Sample No.	Depth Interval (ft.)	Material Sampled	TOC (mg/kg)
MW-28-001	0.5 - 2.5	Medium Sand	82
MW-25-003	4.5 - 6.5	Coarse-Medium Sand	14
MW-27-007	13 - 15	Fine Sand	5
72-010	25 - 27	Clay	16
78-009	27 - 29	Fill Material	69

it moved laterally through the sand unit. Sample 72-010 was considered representative of the clayey till found beneath Waste Area 3. Sample 78-009 was considered representative of mixed waste and soil fill found in Waste Area 3.

It was noted in the EA that this procedure probably overestimated leaching since additional organic carbon may be present in the waste to further retard leaching. However, using a 5% foc as the commentors suggest would not significantly affect the results of the risk assessment or the need for a cap to prevent infiltration. Using Remcor's estimates of retardation factors with 5% organic carbon still resulted in calculated excess lifetime cancer risks from ingestion and inhalation greater than 10^{-4} for plausible maximum concentrations of benzene and methylene chloride, and greater than 10^{-5} for chloroform, tetrachloroethylene, and trichloroethylene. The total risk would therefore not be significantly changed. The Remcor comments also ignored the levels of contamination in shallow groundwater which represented risks ranging from 1 x 10^{-3} to 7 x 10^{-2}.

<u>Summary:</u> Remcor concluded that EPA used "...erroneous assumptions and unrealistic exposure scenarios..." based on the above comments. The Agency believes that the assumptions that were made and the exposure scenarios that were developed were basically valid and in accordance with standard practices used by those in the field of risk assessment. Therefore, the Agency disagrees with Remcor's conclusion.

d. <u>Comment</u>: The outslopes of the former landfill should not be capped.

EPA Response:

The PRPs' presented the above conclusion relating to the 1988 FS based on the following concerns:

- o Lack of empirical data to characterize contamination.
- o Limited benefit due to reduction of infiltration on outslopes.
- o Questionable stability of cap on slopes due to internal friction between layers.
- o Difficulty in handling of heterogeneous materials.
- o Current problems with slope instability.

Lack of Empirical Data to Characterize Outslope Contamination: The outslopes of the former landfill area were (and are) believed to be underlain by waste materials that, in all likelihood, contain contaminants similar to those found in the rest of the landfill. Although no empirical data was obtained because of difficulties in performing subsurface explorations on the steep slopes, EPA considered it reasonable to assume that contaminants of concern are present below the outslopes in potentially significant quantities.

Limited Benefit Due to Reduction of Infiltration: Remcor calculated the proportion of inflow through the slopes as a percentage of total bedrock ground water flow, and also as a percentage of bedrock ground water flow towards the east. They concluded, at that time, that as the proportion of slope infiltration was very small (0.024 percent and 3 percent for total and eastern bedrock flows, respectively), only a very limited benefit could be obtained by capping the outslopes and thereby eliminating infiltration in those areas. They were also of the opinion that the steep slopes possessed higher runoff potential, and would cause infiltration to emerge quickly as seep flow.

EPA considers this viewpoint to be misleading. The outslopes (2 acres) represent approximately 25 percent of the total surface area of the 8 acre landfill. As such, the outslopes could be expected to contribute 15 to 25 percent of the total contaminant loading caused by infiltration. Furthermore, the heavy vegetative cove present on the outslopes retains precipitation and promotes infiltration into the outslopes and retards runoff. Installation of the cap was anticipated to decrease infiltration over the outslopes, reducing contaminant migration to the seeps.

Questionable Stability of Cap on Outslopes: Remcor indicated that the factor of safety for the cap (sliding of sand on HDPE liner) was less than 1.0 for a 3:1 slope. They further indicated that the slope would have to be regraded to a 4:1 slope to provide an adequate factor of safety against sliding.

Remcor assumed that the drainage layer of the cap would consist of sand, which would be placed on the HDPE liner, and therefore appeared to analyze a condition that would not occur. A typical cap section was shown on Figure 4-1 in the Feasibility Study report. The frictional resistance of soil materials overlying the synthetic membrane was not evaluated, as the material directly over the membrane consisted of a synthetic drainage net similar to Gundle Gundnet. Overlying the Gundnet would be a geotextile covered by 2 feet of earthen dover (final cover).

Where soil material was to be placed on the geotextile, an angle of frictional resistance of 26 degrees was conservatively selected for analytical purposes. When evaluated with an overall slope of 3 horizontal:1 vertical (18 degrees), a factor of safety of 1.5 was estimated for resistance to sliding.

EPA points out that the selected remedy does not include a RCRA cap on the outslopes.

Difficulty in Handling Heterogeneous Waste: The handling of the heterogeneous materials encountered below the outslopes, and the compaction of such materials could be satisfactorily performed using available equipment and technology. In the FS, it was anticipated that municipal solid waste would be compacted by repeated passes with an appropriate piece of compaction equipment prior to cap placement. Any bulk debris encountered during excavation activities would likely be contaminated, and was not expected to be removed from the site.

The potential for encountering infectious wastes during Municipal Solid Waste (MSW) handling was to be addressed by the Health and Safety Plan developed to cover construction operations. It was not considered necessary to address this issue during the FS process.

Current Problems with Slope Instability: Remcor indicated that the current outslope areas were prone to instability problems due to the method of waste placement, and that "disturbing the outslopes would be likely to exacerbate this unstable condition". In order to construct the cap on the outslopes, it was estimated that a reduction in slope to 3H:1 would be necessary. This slope reduction could only serve to increase the stability of the outslopes due to a reduction in the forces driving the slope downhill.

In summary, EPA agrees with the PRPs that the outslopes are too unstable to support a cap designed according to the Technical Guidance. EPA also agrees with the PRPs that the outslopes are unstable as they exists. The selected remedy will address the instability of the outslopes.

e. Comment: The potential risk associated with contact with contaminated surface soils suggests covering and fencing approximately 1.5 acres of the former landfill to address a target risk level of 10^{-6}, rather than constructing the eight-acre cap described in EPA's 1988 Proposed Plan.

EPA Response:

The estimated areas that exhibited a direct contact risk in excess of 10^{-6} due to contaminated soils are shown on FS Figure 3-2. Although these areas do not total 8 acres, there were other reasons for proposing an 8 acre cap included in the FS and other comment responses.

EPA also notes that resident relocation or other institutional controls would not affect the risk assessment for the future use scenario. In accordance with EPA risk assessment practice, the future use scenario assumed no remediation or other corrective action, and allowed for unlimited redevelopment of the site.

f. Comment: The data does not support the need for the cap proposed by EPA. The ROD should specify performance objectives rather than a detailed cap configuration.

EPA Response:

Remcor appeared to object to the fact that the original FS and Proposed Plan proposed a specific multi-layer cap design, including a soil liner and synthetic membrane. They appeared to take exception to the following issues:

o Differential settlement was potentially ongoing at the site, and may adversely affect a synthetic membrane.

o Cap design in FS was supposedly taken from EPA guidance documents for new hazardous waste landfills, rather than guidance for site remediations.

o Inappropriate specification of a particular cap design in ROD.

Specific responses to these opinions are as follows:

Cap Resistance to Differential Settlement: High Density Polyethylene (HPDE) membranes are capable of elongating up to 700 percent before tearing (Gundle Lining Systems Inc. product specifications). It was and is considered highly unlikely that differential settlements caused by the degradation of MSW could result in such large elongations in the membrane liner. Therefore, settlement of the MSW should not affect the liner to the extent that Remcor feels may occur.

Furthermore, specific steps may be taken during design and construction to minimize the tensile forces exerted on the liner by differential settlement of the MSW. They would include preloading of the MSW to reduce the total amount of settlement that could occur, and a liner design that would allow some "slack" in the liner which could then be taken up to accommodate some of the elongation caused by differential settlement.

Guidance Documents for Cap Design: The use of a synthetic membrane as a component of a multi-layer cap was and is consistent with EPA guidance. Various EPA guidance documents recommend the use of a synthetic membrane to minimize the volume of liquid infiltrating the cap. Two of the utilized references were:

1. RCRA Guidance Document - Surface Impoundments, Liner Systems, Final Cover and Freeboard Control, July, 1982.

2. EPA Handbook - Remedial Action at Waste Disposal Sites. EPA 625/6-85/006, October 1985.

3. EPA Handbook - Covers for Uncontrolled Hazardous Waste Sites. EPA/540/2-85/002, September 1985.

4. Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments. EPA/530-SW-89-047, July 1989.

These documents recommend the use of a multi-layer cap, including a synthetic membrane underlain by 2 feet of clayey soil (K $<10^{-7}$ cm/sec.) to reduce infiltration into contaminated material.

Remcor appeared to recognize the need for a cap to "provide long-term minimization of liquids through the closed landfill" (Remcor, Page 25) by citing RCRA performance standards for landfill closure, 40 CFR 264.310. That argument may also be used to support the inclusion of a membrane liner. It cannot be argued that a soil liner alone can be equal in effectiveness to a soil liner/membrane liner combination in minimizing infiltration through a closed landfill.

Specification of Cap Design in ROD: The Agency disagrees with Remcor's conclusion and feels that it is appropriate to specify a cap design in the ROD. A cap constructed of multiple layers, incorporating both a synthetic membrane and natural soils of low permeability, was an integral part of the originally proposed remedy. Furthermore, the proposed cap would satisfy appropriate regulations and performance standards more satisfactorily than a single layer cap constructed only of soil. However, the exact configuration of the constructed cap could differ somewhat from that shown in the 1988 FS (FS, Figure 4-1). The new configuration should be equivalent to that specified in the ROD, and developed during the remedial design.

Summary: The Agency disagrees with Remcor's conclusion and feels that it was and is appropriate to specify a multi-layer cap.

g. Comment: The data developed in the RI does not support the need for excavation of areas beyond the limits of the former landfill and consolidation of these materials under the proposed cap.

EPA Response:

Based in part on the results of the 1990 FFS, which was performed following receipt of this comment, EPA's current Proposed Plan does not call for excavation of Waste Area 1 or other satellite waste areas or placement of materials from these areas under the cap.

h. Comment: The slurry wall proposed by EPA as an option within the preferred alternative would have limited effectiveness.

EPA Response:

EPA has not included a slurry wall in its current Proposed Plan.

C. Summary of State of Vermont Comments

This set of comments was generated by the State of Vermont. They are organized into the following categories:

1. 1990 Comments
2. 1988 Comments (Deferred from 1988 ROD)

1. 1990 Comments

a. Comment: The State commented that they agreed with the EPA's preferred clean-up alternative and that they were currently considering the proposed option to consolidate the waste from Waste Area 2 under the Waste Area 3 cap.

EPA Response:

EPA is pleased that the State of Vermont concurs with the selected remedy. EPA has incorporated the excavation option as a design consideration.

2. 1988 Comments (Deferred from 1988 ROD)

a. Comment: EPA should provide a clearer explanation of how it determined the depths to which EPA would excavate contaminated soil from outlying areas of the site. EPA also should specify the depths to which contaminants from sloped sections of Waste Areas 2 and 3 would be excavated, and how EPA would resolve the potential problem of continued leaching from contaminants left beneath the excavated areas.

EPA Response:

The selected remedy does not include the excavation of outlying areas as described in the 1988 Proposed Plan. The slope stabilization method will be determined during remedial design. There will be continued leaching from those contaminants which have already migrated below the waste. The management of migration system and source control extraction wells will target the contamination that will continue to migrate beyond the waste management unit.

b. Comment: The proposed remedy relies heavily on future operation and maintenance activities that could place a large burden on the resources of the State of Vermont and the Town of Springfield. Because operation and maintenance activities may have to be continued indefinitely into the future, the proposed remedy may not meet the requirement for a permanent remedy.

EPA Response:

EPA has performed an evaluation of the selected remedy and several other alternatives based upon the nine criteria listed in the NCP. The ROD provided the rationale for selection of the remedy. EPA realizes that the selected remedy is not as permanent as other alternatives nor does it involve treatment as a principle element, but the selected remedy did provide for the best balance among the five balancing criteria. The selected remedy was designed to avoid reliance on long-term management to the extent practicable.

IV. REMAINING CONCERNS

Issues raised during the public comment period that will continue to be of concern as the site moves into the remedial design and remedial action phase are described briefly below. EPA will continue to address these issues as more information becomes available during the RD/RA.

1. Cost of the remedy and its potential financial impact on the Town of Springfield

2. Site appearance

3. Future potential use of the site

4. Timing of the start of remediation

ATTACHMENT A

COMMUNITY RELATIONS ACTIVITIES CONDUCTED AT THE OLD SPRINGFIELD LANDFILL SITE SPRINGFIELD, VERMONT

EPA conducted the following community relations activities at the Old Springfield Landfill site.

August 1983 - EPA conducted a public meeting to describe the remedial studies and procedures that would be conducted at the site.

July 1984 - EPA conducted interviews with local residents to prepare a Community Relations Plan (CRP).

February 1985 - EPA released the CRP.

September 1985 - EPA conducted a public meeting to present the RI results.

October 1986 - EPA held a public meeting to present the results of the Supplemental RI and discuss future site activities. EPA also released a fact sheet on the Supplemental RI.

June 1987 - EPA met with the residents of the Springfield Mobile Home Estates to discuss plans to temporarily relocate residents during remedial investigations. EPA conducted a public meeting, held a press conference, and mailed a brief update to the people in attendance and those on the site mailing list.

July 1987 - A representative from Federal Emergency Management Assistance (FEMA) was available during the 12-day temporary relocation of site residents. EPA officials met with residents during the temporary relocation to answer questions.

July 1987 - EPA established an information hot line for residents to call for updates and leave messages. EPA officials periodically check and respond to any messages that are left on the hot line.

March 1988 - EPA released a fact sheet to explain the results of the Supplemental RI.

June 1988 - Prior to the public announcement, EPA officials hand-delivered announcements to and met with the individual mobile home residents to discuss EPA's recommendation for permanent relocation as part of the Proposed Plan for site cleanup. EPA also held a press conference to announce its recommendation.

June 1988 - EPA published the Proposed Plan which includes an announcement of EPA's public comment period on the Proposed Plan and RI/FS.

July 1988 - EPA held a public meeting to present the Proposed Plan and describe the public comment period.

July 1988 - EPA conducted a public hearing to summarize the Proposed Plan and accept public comment on it. In conjunction with the public hearing, EPA released a fact sheet and held a public meeting to discuss the results of the EA. Approximately 40 people attended the hearing.

August 1988 - EPA conducted an informal meeting with concerned citizens and area residents to discuss their comments and future site activity.

September 1988 - EPA completed a Responsiveness Summary of the public's comments and EPA's responses to them.

October 1988 - EPA published a fact sheet that included an announcement of the ROD and described the method for controlling the spread of contamination from the site.

November 1988 - EPA held a public meeting to explain the ROD.

August 1989 - EPA held a formal public meeting to describe the FFS work plan.

December 1989 - EPA conducted interviews with local residents and town officials to prepare a revised CRP.

May 1990 - EPA completed the revised CRP.

May 1990 - EPA released an Old Springfield Landfill Superfund site activity update fact sheet.

July 1990 - EPA released the Proposed Plan for Source Control.

July 1990 - A public informational meeting was held and a 30-day public comment period began.

July 1990 - PRPs requested and EPA extended the public comment period from 30 days to 60 days.

August 1990 - An informal public hearing was held to accept public comments on the Proposed Plan that EPA released in July, 1990. Approximately 35 people attended.

September 1990 - The public comment period on the Proposed Plan was closed.

ATTACHMENT B

DETAILED SUMMARY OF POTENTIALLY RESPONSIBLE PARTY COMMENTS

Office of the Manager

TOWN OF SPRINGFIELD
SPRINGFIELD, VERMONT 05156 / (802) 885-2104

SEP 17 REC'D

September 10, 1990

Mr. Edward Hathaway (HPS-CAN1)
Remedial Project Manager
United States Environmental
Protection Agency
Hazardous Waste Division
Region I
John F. Kennedy Federal Building
Boston, Massachusetts 02203-2211

<u>Re: Old Springfield Landfill Site</u>

Dear Mr. Hathaway:

On behalf of the Town of Springfield, I would ask that the administrative record show the following comments in relation to the proposed Source Control Clean-Up Plan for the Old Springfield Landfill Site in Springfield, Vermont which has been proposed by the Environmental Protection Agency. I submit the following:

1. Based upon the studies referred to by E.P.A. in it's July 19, 1990 proposal, there appears to be no evidence of any health risk such as inhalation of landfill gases or ingestion of bedrock ground water at the site, and because of the fact that ambiguity exists as to whether or not there is any danger at all, it would seem that reconsideration should be given to the proposed clean-up Alternative. None of the alternatives presented by E.P.A. are 100% guaranteed to accomplish any purposes of clean-up or health protection. Given the health risk assessment ambiguity, the public health protection that will result from Operable Unit No. 1 and the order of magnitude of cost of the Preferred Alternative as compared to Alternative #7 (Focused Feasibility Study Alternative #3), it would make sense to implement Alternative #7. This Alternative includes fencing, installation of a source control well and covering contaminated soils. The remedial remedies under Operable Unit No. 1 should be given consideration and the Alternative would be subject to five year review as well as constant monitoring which would provide a level of assurance to the public that potential health concerns were being addressed and remedied. In any

case, if because of monitoring or if information obtained during five year reviews should show that there was inadequacy in the remedy, additional remedial action could be required.

It is inconceivable that absent the specific health risks and ambiguity as to certain health risks that it would be economically appropriate to select a remedy at ten times the cost of the remedy proposed in Alternative #7.

2. The proposed cap design of the Preferred Alternative is based upon an ultra-conservative assumption and is very costly. If E.P.A. insists on capping an effective and less costly design would be appropriate. Six inches of top soil is acceptable in Vermont for root zones and grass mixes, therefore, six inches rather than twelve inches is suggested. Twelve inches of clean fill rather than twenty-four inches is adequate and the twenty-four inch compacted clay layer could be eliminated by using local material which meets the permeability criteria.

3. Remcor points out the ambiguities of the risks associated with gas released and in the absence of any risk it would make sense to require a passive gas collection system, rather than a significantly more costly active gas collection system. If, during the process of ongoing monitoring and evaluation it should be determined that an active gas collection system is necessary, then it would be appropriate to do that at that time.

4. The effectiveness of deep french drains as proposed in the Preferred Alternative is questionable. These are very costly and their long-term effectiveness is uncertain. It would be more prudent to install shallow french drains and a swale upgraded to divert surface water. This alternative will be equally as effective and reduce surface water from entering the french drain.

5. Having in mind the ongoing ground water monitoring and the five year reviews, it would be practical to require only one source control well which would be more cost effective then that which is proposed presently by E.P.A.

6. The Town of Springfield believes that there should be a reevaluation of the side slope stabilization proposals.

7. The Town of Springfield adopts by reference those comments which will be filed simultaneously by Emhart and Textron. In adopting these comments by reference, the Town

desires to not only include the substantive matters contained therein but also the legal and due process arguments.

8. There is considerable amount of concern about the integration of Operable Unit No. 1 with the implementation of the proposed source control remedy. The areas of overlap should be very clearly defined before E.P.A. makes a final decision on its Preferred Alternative.

I appreciate your giving the comments of the Town of Springfield attention and would ask that if there is any question, that you contact me immediately.

Very truly yours,

William R. Steele

William Steele
Town Manager

pc: John Parker, Esq.
Barry Malter, Esq.
Daniel Squire, Esq.
Tim Conway
Conrad Smith

COMMENTS OF EMHART INDUSTRIES, INC., AND TEXTRON INC. ON EPA'S PROPOSED SOURCE CONTROL PLAN FOR THE OLD SPRINGFIELD LANDFILL SITE, SPRINGFIELD, VERMONT

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September 10, 1990

COMMENTS OF EMHART INDUSTRIES, INC., AND TEXTRON INC.
ON EPA'S PROPOSED SOURCE CONTROL PLAN FOR THE OLD
SPRINGFIELD LANDFILL SITE, SPRINGFIELD, VERMONT

This document, prepared with the assistance of Remcor, Inc. ("Remcor"), constitutes the comments of Emhart Industries, Inc. and Textron Inc. (the "Companies") on the Proposed Source Control Cleanup Plan ("Proposed Plan") for the Old Springfield Landfill Site (the "Site"), issued by the Environmental Protection Agency ("EPA") on July 9, 1990.[1/] This document also constitutes the comments of Emhart and Textron on the EPA and Agency contractor documents supporting the Proposed Plan.[2/] Incorporated by reference as part of the Companies' comments are the draft Final Focused Feasibility Study Report ("FFS") prepared by Remcor (June 7, 1990), the comments submitted to EPA by Emhart, Textron, and Remcor on August 23, 1988, and the "Petition for Reconsideration of ROD Issued 9/22/88 and for Supplementation of Administrative Record," filed by the Companies on May 19, 1989. We ask that these comments, together with our prior submissions referenced herein, all of our previous correspondence

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1/ The resumes of the Remcor scientists and engineers who assisted in preparing these comments are attached hereto as Exhibit I.

2/ These documents include: Hathaway, Edward M., July, 1990, "Memorandum to Site File re: Detailed Evaluation and Comparative Analysis of Alternatives" ("Detailed Evaluation Memo"), EPA Region I, Boston, Massachusetts; and Ebasco Services, Inc., July, 1990, "Draft Final Supplemental FS Evaluation, Old Springfield Landfill, Operable Unit No. 2" ("SFS"), prepared for EPA Region I under contract No. 68-W9-004, Boston, Massachusetts.

regarding the Site, and transcripts and videotapes of all public hearings and meetings be included in the Administrative Record.

I. BACKGROUND

After studying the Old Springfield Landfill Site for a period of more than four years at a cost approaching $3 million, on June 23, 1988, EPA proposed a preferred remedial alternative for the Site, pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"). This preferred alternative would have required, inter alia, the installation of a low permeability cap, compliant with the Resource Conservation and Recovery Act ("RCRA"), over approximately eight acres of the Site, the excavation of approximately 25,000 cubic yards of materials from elsewhere on the Site for placement under the cap, the collection and treatment of contaminated seeps emanating on the eastern and western outslopes of the Site, and the extraction of groundwater from a sand and gravel aquifer underlying the Site for treatment with the collected contaminated seeps. The stated rationale for that preferred alternative, allegedly supported by a draft final endangerment assessment ("EA") (ICF, June 1988a), a draft final supplemental remedial investigation report ("RI") (ICF, June 1988c), and a draft final feasibility study report ("FS") (ICF, June 1988b), was that Site conditions presented unacceptable risks to public health through dermal contact with and/or incidental ingestion of surficial soils, inhalation of volatile organic compounds ("VOCs") emanating from the seeps, inhalation of landfill gases (VOCs) from the entire Site, ingestion of bedrock groundwater, and consumption of fish in the Black River.

On August 23, 1988, the Companies filed extensive comments on the Agency's June 23, 1988 preferred alternative, which comments included a thorough scientific evaluation of the RI, FS, and EA. The Companies were assisted in the preparation of those comments by Remcor, an experienced hazardous waste consulting and remediation firm. In those comments, Emhart and Textron agreed with the necessity of collecting and treating contaminated seeps and also agreed with the necessity to cover areas of the Site that presented an unacceptable risk of dermal contact. However, the Companies vigorously contested EPA's proposal to construct an eight-acre RCRA cap and to excavate materials for emplacement under the cap. The Companies argued in their August 23, 1988 comments that the capping and associated excavation, allegedly intended to protect against risks of ingestion of bedrock groundwater, consumption of fish from the Black River, and inhalation of landfill gases, were unwarranted because the risks identified by EPA were, in fact, non-existent. The Companies pointed out that the risk assessments in the Agency's EA were based on erroneous assumptions, incorrect calculations, and highly unrealistic exposure scenarios.

On September 22, 1988, EPA Region I issued a Record of Decision ("ROD I") for the Site. The 1988 ROD divided the remedial actions at the Site into two "operable units" ("management of migration" and "source control"), and specified a management of migration (operable unit 1) remedy. That remedy consisted of collection and treatment of contaminated leachate seeps, extraction and treatment of contaminated groundwater from the sand and gravel aquifer above bedrock, monitoring, and establishment of institutional controls in the form of implementation and enforcement of Town of Springfield Ordinance 88-2 to prohibit groundwater use at, and restrict access to, the Site. The Agency declared that the remedy selected in ROD I was "protective of human health and the environment [and] attains Federal and State requirements that are applicable or relevant and appropriate . . .."

EPA explained in ROD I that it had refrained from specifying source control action (i.e., the capping proposed earlier) because the State of Vermont had expressed concern that the proposed cap did not adequately address lateral groundwater flow through buried waste or the potential for bedrock groundwater contamination. ROD I at 11. EPA and the State agreed, therefore, that source control action would be deferred pending additional studies of the feasibility of isolating waste materials from groundwater "in order to determine if such diversion would decrease the time needed to attain groundwater cleanup levels and eliminate the risks associated with the contamination of bedrock." ROD I at 25.

In the responsiveness summary accompanying the 1988 ROD, EPA refused to respond to the Companies' comments challenging the alleged risks of inhalation of landfill gases and ingestion of bedrock groundwater. The Agency took the position that those comments were aimed at the necessity for source control action and, thus, responses were not warranted. Nonetheless, the 1988 ROD incorporated as official Agency findings the existence of the inhalation and ingestion risks which the Companies had challenged.[3/]

[3/] On May 19, 1989, Emhart and Textron filed a Petition for Reconsideration of the 1988 ROD, asking <u>inter alia</u>, that the Agency delete from the ROD references to the inhalation and ingestion risks and respond to the comments concerning those risks. Approximately eight months following the filing of the 25-page Petition for Reconsideration, EPA responded with a one-
(continued...)

Pursuant to an Administrative Consent Order ("ACO") executed by the Regional Administrator on March 10, 1989, Emhart and Textron retained Remcor to perform the studies required by the 1988 ROD. Those studies, which cost approximately $2 million, culminated in the submission of a draft final Focused Feasibility Study Report ("FFS") on June 7, 1990. That report described the site as consisting of three areas of major waste disposal activity that had occurred during the 1947-1968 time frame: an area in the southwest portion of the site, referred to as Waste Area 4, in which solid waste and oily wastes had apparently been disposed in trenches dug into native till soil; an area known as Waste Area 3, consisting of approximately 3.0 acres on the eastern side of the Site, in which approximately 72,000 cubic yards of solid and oily wastes had been disposed of in a former ravine; and an area further to the north on the eastern side of the Site, known as Waste Area 2, in which wastes had also apparently been disposed in a former ravine.

Based on its evaluation of the contaminants found in each of these areas and other Site conditions, Remcor confirmed its earlier conclusion that the Site does not pose an

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[3](...continued)
page letter stating that it was not obligated to respond to a petition for reconsideration of a ROD.

unacceptable risk of inhalation of landfill gases or an unacceptable risk of ingestion of bedrock groundwater. With respect to inhalation risks, Remcor determined that the plausible maximum inhalation risk (95th percentile) is within EPA's acceptable risk range and, in fact, below the point of departure specified in the National Contingency Plan ("NCP"). With respect to alleged bedrock groundwater ingestion risks, Remcor concluded that: (1) Waste Area 4 is not a source of contaminants of concern (i.e., chlorinated ethenes) in bedrock groundwater because those contaminants are not found in Waste Area 4 and water within Waste Area 4, itself, does not exceed any Safe Drinking Water Act maximum contaminant levels ("MCLs") for contaminants of concern identified in the EA; (2) Waste Area 2 does not contribute contamination to, or require source control action to mitigate contamination of, bedrock groundwater because the majority of infiltrating surface water and groundwater flowing through Waste Area 2 discharges at an eastern leachate seep (LSE04) which will be collected and treated in Operable Unit 1, and groundwater beneath and in the vicinity of Waste Area 2 does not exceed MCLs (as evidenced by monitoring wells MW-46S, 48T, 48B, 42S, and 42T); and (3) Waste Area 3, which is a source of chlorinated ethenes, does not represent a risk of ingestion of bedrock groundwater because (i) the majority of water flowing through and from Waste Area 3 is either discharging at an eastern leachate seep (LSE03) (78 percent) or into till that flows into a sand and gravel unit (six percent) which discharges to western leachate seeps that will be collected and treated during Operable Unit 1, (ii) a minor component (16 percent) of water flowing from Waste Area 3 is discharging into till and thence to weathered bedrock beneath the eastern outslopes; and that groundwater cannot be developed because of topographical constraints and institutional controls, and (iii) the bedrock groundwater to the east of the former landfill is discharging into the Black River, with no detectable levels of VOCs measured in water samples from the river.

Remcor concluded in the FFS that, after implementation of the management of migration operable unit, the only risk posed by the Old Springfield Landfill Site is a risk of dermal contact with surficial soils in certain areas of the Site. Accordingly, Remcor concluded that all Site risks to public health and the environment, remaining after implementation of ROD I, could be eliminated by covering (as opposed to capping) surficial contaminated soils presenting an incremental lifetime cancer risk _via_ direct soil contact in excess of the 10^{-6} point of departure used by EPA. In accordance with the requirements of the ACO, the FFS prepared by Remcor set forth a number of alternative remedial action plans, including fencing the Site, covering surficial contaminated soils, and installing a source control well within Waste Area 3.[4]

On July 9, 1990, EPA Region I released its Proposed Plan for the source control operable unit for the Old Springfield Landfill Site. In the document announcing the Proposed Plan, the Agency explained that it had rejected the risk assessment (and other conclusions) set forth in Remcor's FFS, and was relying, instead, on the 1988 Endangerment Assessment which the Companies had challenged in extensive comments, responses to which were never provided by EPA. Thus, the Agency continues to maintain that the Site presents an unacceptable risk of inhalation of landfill gases and an unacceptable risk of ingestion of bedrock groundwater. On this basis, EPA has now proposed a source control remedial action consisting of installation of a multi-layer RCRA cap over Waste Areas 2, 3 and 4; construction of

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[4] In a draft FFS submitted to EPA on April 12, 1990, Remcor recommended source control remedial action consisting of fencing the site, installation of a source control well, and covering contaminated soil areas. EPA instructed Remcor to delete the recommendation from the draft final FFS submitted on June 7, 1990, and that recommendation does not appear in the final document.

active and passive gas collection systems; installation of french drains; stabilization of the eastern outslopes of Wastes Areas 2 and 3; installation of source control wells; institutional controls to restrict future site use; and five-year reviews of the effectiveness of the remedy. EPA announced further that it is considering the complete excavation and disposal of Waste Area 2 rather than capping and sideslope stabilization in this area, because excavation, in the opinion of the Agency, may prove to be less expensive than stabilizing and capping the area.

In these comments, the Companies reiterate their position that the Site poses no unacceptable risk of inhalation of landfill gases or ingestion of bedrock groundwater, and that, after implementation of Operable Unit 1, the only risk posed by the Site is a risk of dermal contact with surficial soils in certain areas. On this basis, the Companies believe that source control actions, including RCRA capping, aimed at preventing the non-existent inhalation and ingestion risks are unwarranted. Furthermore, the Companies maintain that, in the absence of inhalation and ingestion risks, there is no requirement under CERCLA for installation of a RCRA-compliant cap. Finally, in the event that the Agency insists on the installation of a RCRA-compliant cap and other basic elements of the Proposed Plan, the

Companies believe that the Proposed Plan requires refinements which would be equally protective and more cost-effective and, therefore, consistent with CERCLA and the NCP.

II. EPA'S ISSUANCE OF THE PROPOSED PLAN AND ANY SUBSEQUENT ROD VIOLATES THE COMPANIES' PROCEDURAL RIGHTS UNDER CERCLA, THE ADMINISTRATIVE PROCEDURE ACT, AND DICTATES OF DUE PROCESS

On May 19, 1989, Emhart and Textron filed with the Regional Administrator, EPA Region I, a "Petition for Reconsideration of ROD Issued 9/22/88 and for Supplementation of Administrative Record." In that document, which is incorporated herein by reference as part of these comments, the Companies sought: (1) amendment of ROD I to strike therefrom the Agency findings regarding the alleged inhalation and ingestion risks with respect to which the Companies filed comments not addressed by EPA; (2) a response to the comments filed by the Companies on August 23, 1988; and (3) supplementation of the Administrative Record for the Site.

The Companies argued that, in adopting ROD I without responding to the Companies' comments on the risk assessments, EPA violated CERCLA § 113(k) which requires that EPA "provide for the participation of interested persons, including potentially responsible parties, in the development of the Administrative

Record," and which further provides, inter alia, that public participation must include "a response [by EPA] to each of the significant comments, criticisms, and new data submitted in written and oral presentations." Moreover, the Companies argued that EPA's adoption of ROD I without responding to the Companies' comments on the risk assessments violated CERCLA § 117(b) which provides that a final remedial plan "shall be accompanied by a discussion of any significant changes (and the reasons for such changes) in the proposed plan and a response to each of the significant comments, criticisms, and new data submitted in written and oral presentations . . .."

The Companies further pointed out in their Petition for Reconsideration of ROD I that the CERCLA public participation requirements impose on EPA obligations greater than those imposed by the rulemaking procedures in Section 553 of the Administrative Procedure Act ("APA"), 5 U.S.C. § 553; and that courts construing the APA have held that the notice and comment procedures therein require that "there must be an exchange of views, information and criticism between interested persons and the Agency," and that "a dialogue is a two-way street: the opportunity to comment is meaningless unless the Agency responds to significant points raised by the public." Home Box Office, Inc. v. Federal Communications Commission, 567 F.2d 9, 35-36 (D.C. Cir. 1977).

Additionally, in their Petition for Reconsideration of ROD I, the Companies argued that EPA's failure to respond to their criticisms of the ROD I risk assessments violated the dictates of due process. As the court stated in United States v. Rohm & Haas Co., 669 F. Supp. 672 (D.N.J. 1987), the Administrative Record under CERCLA must be built on "an exchange of opinions and comments by experts and informed citizens . .." Id. at 681.

Because the EPA now bases its proposed source control plan and the forthcoming ROD II operable unit on the very same 1988 risk assessment challenged by the Companies, the Agency has compounded its violations of the Companies' procedural rights and, indeed, has committed additional violations of those rights. As set forth above, EPA responded to the Companies' Petition for Reconsideration of ROD I with a terse letter to the effect that it had no obligation to respond to a Petition for Reconsideration of a ROD. But, because the Agency adopted the risk assessments challenged by the Companies, it obviously disagreed with the Companies' comments. By not providing the bases for its disagreement with the Companies' comments, EPA has precluded "the exchange of views, information and criticism" and the exchange of opinions and comments by experts" which the courts have required.

In their Petition for Reconsideration of ROD I, the Companies also pointed out that numerous documents were withheld from the Administrative Record on ROD I, and requested that the Administrative Record be supplemented to include "all items developed and received" by the Agency on ROD I, including documents specifically listed in the Petition for Reconsideration of ROD I. EPA failed to supplement the Administrative Record, as requested, and has thus deprived the Companies of the opportunity to fully participate in the development of the Administrative Record for ROD II. The Companies reiterate their request for supplementation of the Administrative Record and contend that adoption of ROD II with an incomplete administrative record would violate the Companies' procedural rights.

Finally, with respect to procedural violations by the Agency, the Companies have recently learned that EPA officials and/or officials of the State of Vermont met with persons interested in the Proposed Plan for ROD II and distributed copies of or described the Proposed Plan to those persons prior to the distribution of the plan to the Companies and other members of the public. The Companies were not informed of the meeting, have no idea of the content of the discussions at the meeting, and can find no minutes of the meeting in the Administrative Record. The Companies have also learned that EPA and Vermont officials met with officials of the Town of Springfield and that elements of the Proposed Plan were discussed at that meeting. Again, the Companies were not advised of that meeting, have no idea of the substance of the discussions at that meeting, and can find in the Administrative Record no minutes of that meeting. The Agency engaged in this course of conduct despite the fact that it had declined to meet with the Companies, even after the Companies had suggested that members of the public be advised of and invited to attend such a meeting and further suggested that minutes of such a meeting be included in the Administrative Record. By proceeding in this fashion, EPA has further violated the Companies' procedural rights and has tainted the adoption of ROD II.

III. EPA HAS NOT DEMONSTRATED ANY SITE RISKS BEYOND DERMAL CONTACT RISKS AND, THUS, PROPOSED SOURCE CONTROL ACTIONS AIMED AT MITIGATING LANDFILL GAS INHALATION RISKS AND BEDROCK GROUNDWATER INGESTION RISKS ARE ARBITRARY AND CAPRICIOUS

A. EPA May Not Rely on the 1988 Endangerment Assessment to Support Source Control Actions Aimed at Mitigating Alleged Inhalation and Ingestion Risks

As set forth above, despite the Companies' unrebutted comments to the June, 1988 Endangerment Assessment and despite a revised risk assessment presented by Remcor in the June, 1990 FFS, EPA has concluded in the Detailed Evaluation Memo that "the 1988 EA is the only appropriate baseline risk assessment acceptable for use in evaluating source control alternatives for the Old Springfield Site." Thus, EPA has once again stated that risks which must be addressed by the Source Control Operable Unit include "ingestion of contaminated groundwater" and "inhalation of contaminants in landfill gas."

The preceding discussion and the Companies' Petition for Reconsideration of ROD I, incorporated herein by reference, demonstrate that EPA has violated the Companies' procedural rights by incorporating contested risk assessment findings in ROD I and by now relying on those same findings to support the source control ROD II. EPA may not, consistent with the public participation requirements of CERCLA and the dictates of due process, rely on the contested 1988 EA to support any source control action aimed at mitigating or eliminating the alleged risks of inhalation of landfill gases and ingestion of bedrock groundwater.[5]

Equally important as the procedural flaws in EPA's reliance on the 1988 EA is the fact that the 1988 EA does not demonstrate any unacceptable risks associated with inhalation of landfill gases or ingestion of bedrock groundwater. As the Companies explained in detail in their August 23, 1988 comments, the 1988 EA was based on erroneous assumptions, incorrect calculations, and highly unrealistic exposure scenarios.

With respect to the alleged risk of inhalation of landfill gases, the 1988 EA failed to consider the characteristics of the municipal solid waste/soil mixtures on the Site (by using an unrealistic low fraction of organic carbon or "FOC" value), overstated the emission source area (by using maximum contaminant concentrations found anywhere in the soil on

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[5] The proposed source control actions aimed at eliminating or mitigating those alleged risks include, according to EPA's documents: impermeable capping of Waste Areas 2, 3, and 4; installation of passive and active gas collection systems in Waste Areas 2, 3, and 4; and covering of the eastern outslopes of Waste Areas 2 and 3.

the Site as representative of the entire Site), exaggerated the rate of landfill gas emissions (by assuming an emission rate which, if accurate, would have resulted in the depletion of the contaminants of concern on the Site within a matter of hours or days), and overstated exposure possibilities (by using an exposure assumption based on Site residents remaining outside and breathing every breath from birth to age 70 in the vicinity of the highest contaminant levels found anywhere at the Site). A detailed discussion of these issues is found at page 5 and pages 14-17 of the August 23, 1988 comments and on page 5 and pages 19-21 and Attachment 1 of the August 23, 1988 Remcor report filed with and incorporated by reference into those comments.

With respect to the alleged risk of ingestion of bedrock groundwater, the 1988 EA used flawed models which overstated the amount of contaminants predicted to leach from wastes into shallow groundwater, overstated the amount of contaminants predicted to reach bedrock groundwater, ignored fundamental environmental transport and fate processes (including dilution, dispersion and adsorption), and ignored the fact that Site data showed upward vertical gradients indicating that the bedrock groundwater allegedly threatened was actually flowing upward in portions of the Site (and, thus, was not threatened in those areas by contamination in overlying aquifers). A detailed discussion of these issues is set forth on pages 4-5 and pages 7-13 of the Companies' August 23, 1988 comments, as well as pages 3-5 and pages 11-19 of the August 23, 1988 Remcor report transmitted with and incorporated by reference into those Comments.

Field studies conducted by Remcor and reported in the FFS demonstrate that a number of the assumptions and conclusions in the 1988 EA and RI were unquestionably erroneous. For example, Remcor had predicted that the FOC value used in the 1988 EA (2.3 X 10^{-5} grams per gram [g/g]) was unrealistically low, and confirmed during its field studies a much higher actual FOC value (at least 9.37 X 10^{-3} g/g).[6] Because FOC value influences both the rate of VOC emissions to ambient air and the degree of leaching of contaminants into bedrock groundwater, Remcor has confirmed that the 1988 EA overstated both inhalation and ingestion exposure point concentrations and risks. Additionally, through extensive groundwater monitoring and hydrogeologic modeling, Remcor confirmed the presence of the upward vertical gradients and otherwise confirmed that the 1988 EA overstated by

[6] FOC data developed by Remcor are presented in Tables 10 and 11 of the FFS.

a significant degree the amount of contamination in bedrock groundwater east of the former landfill. For this additional reason -- the acquisition of new data (in studies required by EPA) which contradict assumptions in the 1988 EA and findings in the 1988 RI -- the 1988 EA may not be relied on to support proposed source control actions aimed at mitigating alleged inhalation and ingestion risks.

B. Remcor's Revised Risk Assessment Shows the Absence of Ingestion and Inhalation Risks and Was Improperly Rejected by EPA

Since the 1988 EA was published, a number of conditions relating to the Site and to risk assessments, in general, have changed dramatically. For example, all residents of the mobile home park have been relocated; and the Companies (and the Town of Springfield) have agreed to implement ROD I (including collection and treatment of contaminated leachate and contaminated groundwater and implementation of institutional controls restricting site access and water use). In addition, through extensive sampling and modeling, Remcor has gained a thorough understanding of Site conditions and has obtained data which contradict data and assumptions underlying the 1988 EA. Finally, EPA has issued several new risk assessment guidance documents which undermine continued reliance on the 1988 EA. In view of the foregoing and the fact that EPA refused to respond to the Companies' comments on the 1988 EA, Remcor included in the FFS a revised risk assessment.

The Companies acknowledge that certain data obtained by Remcor during the FFS field studies do not support portions of the Companies' 1988 comments concerning contamination of bedrock groundwater. However, Remcor's risk assessment shows that the Site does not present unacceptable risks of inhalation of landfill gases or unacceptable risks of ingestion of bedrock groundwater. With respect to the ingestion of bedrock groundwater, Remcor monitored contaminant concentrations and groundwater levels in Waste Areas 2, 3, and 4 and in other areas of the Site, conducted aquifer pumping tests and other tests aimed at understanding groundwater flows at the Site, and employed modeling to arrive at a hydrogeologic budget, conceptual groundwater flow model, and mass balance for chlorinated ethenes (i.e., the principal threat identified in the EA).

Remcor's 1990 FFS contains, inter alia, the following significant conclusions: (1) a highly permeable sand and gravel unit which underlies much of the Site acts as a "drain" conveying contaminated shallow groundwater to the western leachate seeps which will be collected and treated as part of the ROD I management of migration operable unit; (2) the majority of the water flowing through and from Waste Area 4 (which does not exceed MCLs) is collected and conveyed by this natural "drain" to the western leachate seeps; (3) the remaining water flowing from Waste Area 4 as well as some of the water percolating into till from Waste Area 3 also is collected and conveyed by the sand and gravel "drain" to the western leachate seeps; (4) the groundwater, including bedrock groundwater, beneath the sand and gravel "drain" lies within formations less permeable than the sand and gravel formation and, thus, flows upward into the sand and gravel "drain" and is conveyed to the western leachate seeps; (5) as a result of the foregoing factors, the bedrock groundwater underlying much of the Site is uncontaminated and will not become contaminated; (6) to the extent that water flowing from Waste Area 4 and from Waste Area 3 is not collected by the underlying sand and gravel "drain," a majority of that flow emanates at eastern leachate seep LSE03, which will be collected and treated during implementation of the ROD I management of migration operable unit; (7) the vast majority of the water flowing through and from Waste Area 2 emanates at eastern seep LSE04 which will be collected and treated during implementation of the ROD I management of migration operable unit; (8) to the extent that any water from Waste Area 2 flows downward toward bedrock, such flow has been found to be uncontaminated as is evidenced by Well 49S screened immediately below Waste Area 2 and Wells 42S and 42T installed downslope of Waste Area 2 and screened at the lacustrine silt/deltaic sand interface and within the till, respectively; (9) to the extent that any waters from Waste Area 3 or Waste Area 2 are not collected by the sand and gravel "drain" or do not emanate at the eastern seeps, that water flows into bedrock groundwater underlying the steep eastern outslopes of the Site; (10) the bedrock groundwater underlying the steep eastern outslopes of the Site, which does contain chlorinated ethenes in excess of MCLs, is not capable of development for groundwater usage because of topographical constraints (and, in any event, usage of that water is restricted by institutional controls required by EPA in ROD I); (11) the bedrock groundwater underlying the steep eastern outslopes of the Site is discharging into the Black River, which is not used as a water supply; and (12) no detectable levels of VOCs have been found in sampling of water from the Black River. EPA apparently has accepted each of these conclusions (Ebasco, July 1990).

In view of the foregoing, Remcor concluded that the alleged risk of ingestion of bedrock groundwater is non-existent.

The only bedrock groundwater threatened by the Site lies underneath the steep eastern outslopes which is undevelopable because of topographical constraints and institutional controls and discharges into the Black River. There is no completed exposure pathway and no potential receptors of the contamination in the only contaminated bedrock groundwater on Site. And, in the absence of a completed exposure pathway and receptors, there can be no unacceptable risk of ingestion.[7]

With respect to the risks of inhalation of landfill gases, Remcor's revised risk assessment followed essentially the same procedure and model used in the 1988 EA, making corrections consistent with Site data obtained during the field studies and consistent with EPA guidance documents published following the 1988 EA. First, Remcor determined VOC concentrations representative of the Site by using the 95th percentile of the arithmetic mean of all VOCs found in the upper 4 1/2 feet of the

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[7] Indeed, EPA itself has recognized that, in such a situation, there is an absence of ingestion risk and MCLs are not applicable or relevant and appropriate requirements under CERCLA. In EPA's "CERCLA Compliance With Other Laws Manual," issued in August of 1988 (EPA/540/G-89/006), the Agency stated, "MCLs are generally not appropriate for site-specific circumstances where a well would never be placed and groundwater would thus never be consumed (e.g., a twenty-foot strip of land between the toe of a landfill and a river, if there is no surface water contamination resulting from man-made ground-water contamination at the Site)." Id. at 1-68, -69.

Site (utilizing over 100 data points).[8] Second, Remcor calculated the VOC emission rate employing the same Thibodeaux model used in the 1988 EA, but using a conservative FOC value of 9.37×10^{-3} (.937%), based on actual FOC data of the soil/waste matrix within Waste Area 3 at the Site.[9] Third, Remcor employed the Near Field Box Model, the same model used by EPA in the 1988 EA, to estimate concentrations of VOCs in the air at the nearest receptor. Fourth, despite the fact that there are no residents remaining on-site, Remcor used a worst-case scenario of residential exposure and assumed that the nearest receptor would be residing on-site. Fifth, Remcor assumed an exposure duration of 30 years in predicting the Reasonable Maximum Exposure

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[8] Use of the 95th percentile of the arithmetic mean, as opposed to the maximum VOC concentrations used in the 1988 EA, is consistent with EPA's Reasonable Maximum Exposure ("RME") Scenario as defined in the Agency's Risk Assessment Guidance for Superfund ("RAGS"), published in December of 1989.

[9] As Remcor had postulated in comments on the 1988 EA, the FOC value used therein (2.3×10^{-5} or .0023%) was, indeed, unrealistically low. Moreover, the actual FOC used in Remcor's recalculation of VOC emissions is also conservative. Had Remcor used FOC values assumed by EPA Region I at other sites, such as the 5% FOC value used at the Keefe Environmental Services Site in Epping, New Hampshire, the resulting inhalation risk would have been even lower than now predicted by Remcor.

inhalation risks.[10] Sixth, Remcor established an appropriate inhalation dose using ventilation assumptions from the EPA Exposure Factors Handbook (Versar, July 1989). Seventh, Remcor utilized inhalation carcinogenic potency factors for all VOCs, deriving such factors from EPA's Integrated Risk Information System ("IRIS") database. Eighth, Remcor evaluated potential carcinogenic effects, consistent with the RAGS published by EPA in 1989, by averaging over a 70-year lifetime the dose received by an individual during a 30-year exposure period. The result of Remcor's revised risk assessment is that the plausible worst case or RME risk of inhalation of landfill gases is 8.89×10^{-7}, which is within the acceptable risk range and, in fact, below the point of departure specified in the NCP under CERCLA. Thus, Remcor's revised risk assessment demonstrates that the Site does not pose an unacceptable risk of inhalation of landfill gases.

Notwithstanding the foregoing, EPA Region I has rejected Remcor's revised risk assessment, stating in the

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[10] The 30-year exposure is consistent with the RAGS published by EPA in December of 1989 and the Exposure Factors Handbook published by EPA in July of 1989. The 30-year value set forth in the Exposure Factors Handbook is based on a 1983 Bureau of the Census survey which included a sample of 18,825 households. The 1988 EA assumed residential exposure to an individual for a period of 70 years, which is no longer consistent with EPA's RME guidance.

Detailed Evaluation Memo that "the 1988 EA is the only appropriate baseline risk assessment acceptable for use in evaluating source control alternatives for the Old Springfield Landfill." EPA set forth three reasons for its rejection of Remcor's revised FFS. First, according to the Agency, "there was no requirement for [the Companies] to perform and submit a new baseline risk assessment as part of the FFS." Detailed Evaluation Memo at 2. Second, the Agency stated that it had advised the Companies that any revised risk assessment "must be based on validated results" and "there were no validated results of the FFS which suggested a need to revise the Risk Assessment." Id. Third, the Agency stated that Remcor's revised risk assessment "was not prepared according to the EPA Region I Supplemental Guidance for Risk Assessment." Id.

EPA's rejection of Remcor's revised risk assessment on these grounds is arbitrary and capricious. Whether or not the Companies were required to submit a revised risk assessment is wholly irrelevant, given the facts that the Agency refused to respond to the Companies' comments on the 1988 EA, that Remcor obtained data during the field investigations (such as FOC data) which shows the 1988 EA to have been based on faulty assumptions, and the fact that the 1988 EA is inconsistent with risk assessment guidance documents published by EPA Headquarters following issuance of the 1988 EA.[11/]

EPA's claim that "there were no validated results of the FFS which suggested a need to revise the risk assessment" is similarly irrational. If EPA is referring to the fact that air monitoring data collected by Remcor were not validated by Contract Laboratory Program ("CLP") protocols, the Agency appears to be forgetting that previous EPA air monitoring data were invalidated because of significant contamination in blank samples. As a result, the 1988 EA was not based on actual air monitoring data validated by CLP protocols. Rather, the 1988 EA was based on modeling as described above; and in the FFS Remcor merely corrected the model using the same CLP validated soil data used in the 1988 EA, and following EPA Headquarters' guidance documents published since issuance of the 1988 EA. The issue properly before the Agency at this time is not whether the Site presented risks requiring source control remedial action in 1988, but whether the Site at this time requires source control

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11/ Furthermore, the Companies consistently advised EPA that they would be submitting a revised risk assessment and the only issue of contention between the Companies and EPA was whether that revised risk assessment would be included in the FFS document, itself, or in a separate document filed with public comments.

remedial action at an estimated net present value cost of as much as $9.6 million (Ebasco, July 1990, at 41).

Finally, the fact that Remcor's revised FFS may be inconsistent with an EPA Region I Supplemental Guidance for risk assessment is not a reasoned basis for rejecting the Remcor risk assessment. The EPA Region I Supplemental Guidance was not promulgated in accordance with notice and comment rulemaking proceedings, and the Agency may not rely on the mere existence of that document to reject Remcor's risk assessment. Moreover, as discussed above and in greater detail below, the Remcor revised risk assessment is consistent with EPA Headquarters guidance documents published after the Region I Supplemental Guidance for Risk Assessment.

The arbitrary nature of the Region's rejection of the Remcor revised risk assessment is shown by examination of the alleged "critical deviations from EPA Guidance" discussed in the Detailed Evaluation Memo. First, it is stated that Remcor changed the current use scenario from residential, which was the assumption in the 1988 EA, to casual trespasser. In fact, the current use of the Site is not residential.[12/] More

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[12/] All residents of the mobile home park have been relocated and, contrary to EPA's assertion, the owner of the property does (continued...)

importantly, this issue is a "red herring" because the worst-case inhalation risk calculated by Remcor assumes a residential scenario, and that risk is within the acceptable range and below the point of departure specified in the NCP.

The second alleged deviation from EPA Region I Guidance mentioned in the Detailed Evaluation Memo is that Remcor's risk assessment assumes implementation of Operable Unit 1, including successful implementation of institutional controls. Detailed Evaluation Memo at 2-3. EPA stated that the role of the baseline risk assessment is to address the risk associated with a site in the absence of any remedial action or control, including institutional controls, and cited in support thereof a statement in the preamble to the NCP. In the first place, Remcor's revised risk assessment relating to inhalation of landfill gases does not take into account successful implementation of institutional controls or any other aspect of Operable Unit 1. Similarly, Remcor's conclusion about the absence of bedrock groundwater

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[12](...continued)
not reside on-site, as is evidenced by the fact that his residence is outside the fence line described by EPA in the Proposed Plan. EPA's statement in the Detailed Evaluation Memo that "present use scenarios include those that have a present potential of occurring as well as those known to occur" is inconsistent with the RAGS discussion of current use versus future use at Section 6.2.2.

ingestion risks is based on the fact that the bedrock groundwater exceeding MCLs on the eastern outslopes of the Site is undevelopable because of topographic constraints, as well as institutional controls. Moreover, the NCP Preamble language cited in the Detailed Evaluation Memo refers to the impropriety of assuming institutional controls in a risk assessment at a site where no such controls are in place. At the Old Springfield Landfill Site, however, EPA already has ordered implementation of institutional controls as well as a number of other remedial measures (including collection of contaminated leachate seeps and VOC emissions associated therewith). As stated previously, the issue now before the Agency is whether additional remedial action and the expenditure of millions of dollars is warranted to alleviate Site risks not addressed by the management of migration operable unit; and it would be arbitrary and capricious to make that decision in disregard of the implementation of Operable Unit 1.

The third alleged "critical deviation from EPA Guidance" mentioned in the Detailed Evaluation Memo is that, in calculating the risk of inhalation of landfill gases, Remcor used a trichloroethylene ("TCE") inhalation cancer potency factor that has been withdrawn from EPA's Integrated Risk Information System

("IRIS") pending further review. At the time of submission of the FFS, however, the TCE potency factor had not been withdrawn from the IRIS database. More importantly, according to EPA's Risk Assessment Guidance for Superfund ("RAGS") published in December, 1989, in the absence of IRIS data, the next hierarchial source to be used as a basis for a carcinogenic potency factor is the Health Effects Assessment ("HEA") Summary for the contaminant of concern. The TCE carcinogenic potency factor incorporated in Remcor's inhalation risk assessment is identical to that reported in the most recent Health Effects Assessment Summary Tables for TCE (EPA, January/April 1990).

The fourth alleged "critical deviation from EPA Guidance" asserted by EPA Region I concerns the appropriate exposure duration to assess carcinogenic effects. Detailed Evaluation Memo at 3. As EPA correctly noted, Remcor used 30 years and 9 years as the plausible maximum and average exposure durations under the residential scenario, consistent with the current RAGS and the EPA Exposure Factors Handbook published in July, 1989. EPA apparently believes, however, that Remcor failed to average doses over a 70-year lifetime for carcinogenic effects. EPA has misunderstood this aspect of Remcor's risk assessment. Remcor did, in fact, average doses over a 70-year lifetime, as is shown in Appendix E-2 to the FFS.

The final alleged deviation from EPA Region I Risk Assessment Guidance concerns Remcor's use of the 95% upper confidence limit to derive exposure point concentrations in the inhalation risk assessment. The use of the 95% upper confidence limit is entirely consistent with the RAGS, published in December of 1989. Region I, however, suggests that Remcor should have used the 95% confidence limit as well as the maximum levels of contaminants in its inhalation risk assessment. This is inconsistent with the EPA Headquarters RAGS. That document states that decisions regarding the need for remedial action to adequately protect public health are to be based on reasonable maximum exposures (RMEs), not on maximum exposures as suggested in the Detailed Evaluation Memo. The RAGS further states that "[b]ecause of the uncertainty associated with any estimate of exposure concentration, the upper confidence limit (i.e., the 95% upper confidence limit) on the arithmetic average [contaminant concentration] will be used" as "a reasonable estimate of the concentration likely to be contacted over time." RAGS at 6-19 and 6-20. Additionally, the RAGS states that, although a risk assessor "may wish to use the maximum concentration from the medium as the exposure concentration for a given pathway as a screening approach to place an upper bound on exposure . . . , if a screening level approach suggests a potential health concern, the estimates of exposure should be modified to reflect more probable exposure conditions." RAGS at 6-25. Not only was Remcor's use of the 95% upper confidence limit entirely consistent with the EPA RAGS, but also it was entirely rational based on the fact that over 100 soil data points were averaged in the analysis. It would be unreasonable to assume that the maximum contaminant levels found anywhere on the Site are representative of the entire Site in the face of such a significant amount of data to the contrary.

In summary, EPA Region I's rejection of Remcor's revised risk assessment is arbitrary and capricious. Remcor's revised risk assessment, performed consistent with Site data and EPA Headquarters guidance documents, shows that the Site poses no unacceptable risk of inhalation of landfill gases and that there is no unacceptable risk of ingestion of bedrock groundwater due to the lack of a completed exposure pathway. Moreover, it is not the Companies' burden to demonstrate the absence of risk, but EPA's burden to demonstrate the presence of risk sufficient to justify the proposed remedial action. The 1988 EA does not demonstrate the existence of inhalation or bedrock groundwater ingestion risks and, in any event, EPA may not rely on that document in light of its failure to respond to the Companies' comments thereon, changed Site circumstances, new data, and recent EPA guidance documents.

C. There is No Public Health Risk Rationale for Placement of a Low Permeability Cap on Waste Areas 2, 3, and 4 or for Gas Collection Systems or for Covering the Outslopes

A number of the source control measures proposed by EPA are premised on the necessity of mitigating unacceptable risks of inhalation of landfill gases and unacceptable risks of ingestion of bedrock groundwater. For example, EPA apparently is taking the position that placement of a RCRA-compliant cap on Waste Areas 2, 3, and 4 is necessary to mitigate the risks of ingestion of bedrock groundwater as well as the risks of inhalation of landfill gases. Additionally, the Agency has stated that passive and active gas collection systems are necessary to mitigate the risks of inhalation of landfill gases. SFS at 17, 28, and Appendix C. Also, according to the Agency, the placement of a soil cover on the outslopes of Waste Areas 2 and 3 is necessary to mitigate risks of inhalation of landfill gases. SFS at C-3 (Appendix C).

As set forth above, however, EPA has not demonstrated that the Site poses unacceptable risks of bedrock groundwater ingestion or landfill gas inhalation. Accordingly, to the extent that these source control remedial measures are premised on the existence of non-existent risks, their selection in the ROD would be arbitrary and capricious.

IV. IN THE ABSENCE OF RISK, THE CONSTRUCTION OF A MULTI-LAYER RCRA-COMPLIANT CAP CANNOT BE JUSTIFIED AS AN "APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENT" UNDER CERCLA

A. At Most, Capping is an Action-Specific ARAR Which is not Triggered Unless Necessary to Alleviate Risk or to Achieve a Chemical-Specific ARAR

In the Detailed Evaluation Memo, EPA has stated that placement of a low permeability cap over Waste Areas 2, 3, and 4 is required under CERCLA because RCRA hazardous waste landfill closure requirements are "applicable or relevant and appropriate requirements" ("ARARs") under CERCLA. EPA has misinterpreted the statute as well as its own regulations and guidance documents.

Section 121(d) of CERCLA, entitled "Degree of Cleanup," provides that "remedial actions . . . shall attain a degree of cleanup of hazardous substances . . . which assures protection of human health and the environment." In addition, CERCLA § 121(d)(2)(A) provides, with respect to any hazardous substance that will remain on-site at the completion of the remedial action, that the cleanup must comply with standards, requirements, criteria, etc. that are "legally applicable to the hazardous substance . . . or relevant and appropriate under the circumstances of the release or threatened release of such hazardous substance . . . ." (Emphasis added.)

As discussed above, EPA has declared that the remedial measures required by Operable Unit 1 protect public health and the environment. After implementation of Operable Unit 1, moreover, no remedial action other than prevention of dermal contact with surficially contaminated soils has been demonstrated to be necessary to protect human health and the environment.[13] The question remaining, therefore, is whether, in the absence of a risk to public health and the environment, a RCRA-compliant cap is required as an ARAR.

The NCP and EPA guidance documents establish three categories of ARARs: (1) chemical-specific ARARs which are usually health or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in the

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[13] A RCRA-compliant cap is not required to mitigate the risks of dermal contact with surficially contaminated soils. Rather, as stated in the Companies' 1988 comments and in the Remcor FFS, and as has often been recognized by EPA, a soil cover is sufficient to mitigate risks of dermal contact.

establishment of numerical values representing acceptable amounts of a chemical that may be found in or discharged to the environment; (2) location-specific ARARs which are restrictions placed on the concentrations of hazardous substances or the conduct of activities solely because they are in specific locations; and (3) action-specific ARARs which are usually technology or activity-based requirements or limitations on actions triggered by particular remedial activities selected to accomplish a remedy. See NCP at § 300.400(g) and EPA's "CERCLA Compliance With Other Laws Manual" ("The 1988 Manual") at 1-13 through 1-56.

The procedure for identifying ARARs, succinctly illustrated in Exhibit 1-4 of the 1988 Manual, shows that the necessity, if any, and type of remedial action to be undertaken at a CERCLA site is dictated in the first instance by chemical-specific ARARs. Under the statute and EPA guidelines, chemical-specific ARARs must be met, unless there exist statutory grounds for a waiver. Once chemical-specific ARARs (and location-specific ARARs are identified), remedial alternatives are evaluated for compliance with those ARARs. 1988 Manual at 1-56. It is only at that point in the process that action-specific ARARs are identified. The 1988 Manual makes clear that "action-specific requirements do not in themselves determine the remedial alternatives; rather, they indicate how a selected alternative must be achieved." Id. at 1-29. Thus, action-specific ARARs are not triggered unless remedial action is necessary to protect public health and the environment or to achieve a chemical-specific ARAR.

Because RCRA capping, if it is an ARAR, can only be an action-specific ARAR, RCRA capping cannot be required unless necessary to protect public health and the environment or necessary for achievement of a chemical-specific ARAR. As we have shown above, EPA has found in ROD I that the management of migration remedies specified therein protect public health and the environment and will ensure achievement of all ARARs. Furthermore, as we have shown above, after implementation of Operable Unit 1, the Site presents no risks other than dermal contact risks; and RCRA capping is not required to mitigate dermal contact risks.

Additionally, RCRA capping of Waste Area 4 is not required for achievement of any chemical-specific ARAR, because the contaminants in Waste Area 4 are not the chlorinated ethenes with respect to which MCLs are exceeded in the eastern bedrock groundwater; and the water within Waste Area 4, itself, meets all chemical-specific ARARS for contaminants of concern identified in the EA. Also, RCRA capping of Waste Area 2 is not required to achieve chemical-specific ARARs, because the majority of flow from Waste Area 2 emanates at eastern leachate seep LSE04 which will be collected and treated in implementation of Operable Unit 1;[14] and the portion of the flow from Waste Area 2 not emanating at seep LSE04 already meets MCLs, as is evidenced by the lack of contamination in wells 49S, 42S and 42T, screened immediately below Waste Area 2 or downslope of Waste Area 2. Finally, capping of Waste Area 3 is not necessary for achievement of chemical-specific ARARs, because the chlorinated ethenes in the vicinity of Waste Area 3 have migrated into till groundwater beneath the waste and, in any event, the MCLs for chlorinated ethenes in eastern bedrock groundwater are not appropriately considered ARARs at this Site .[15]

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[14] As discussed in Section IV.B. below, the quality of leachate currently emanating from seep LSE04 has improved dramatically since the time of initial sampling in January of 1985 and is nearly in compliance with MCLs in the absence of any remedial actions. Remcor's regression analysis and desorption model predict that seep LSE04 will meet all MCLs within the next few years, even in the absence of any remedial action. See Exhibit II (attached).

[15] As previously stated, in the 1988 Manual, EPA has taken the position that "MCLs are generally not appropriate for site-specific circumstances where a well would never be placed and (continued...)

In view of the foregoing, EPA may not justify low permeability capping on the ground that it is an ARAR required to be met under CERCLA. At most, capping is an action-specific ARAR; and "action specific requirements do not in themselves determine the remedial alternatives . . . " for a site. 1988 Manual at 1-29.[16]

B. Even if Action-Specific ARARs are Triggered at the Site, RCRA Capping is not "Appropriate Under the Circumstances of the Release" of Hazardous Substances

Even if action-specific ARARs somehow are triggered at the Site, RCRA capping is not an ARAR because it is not "appropriate under the circumstances of the release." CERCLA § 121(d)(2)(A). The NCP and EPA guidance documents make clear that the determination whether a requirement is relevant and appropriate is a two-step process: (1) first, it must be

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[15] (...continued)
groundwater would thus never be consumed (e.g., a 20-foot strip of land beneath the toe of a landfill and a river, if there is no surface water contamination resulting from man-made ground-water contamination at the site." Id. at 1-69.

[16] Taken to its logical extension, EPA's position seems to be that CERCLA requires RCRA caps at all sites, including municipal landfills, where any amount of hazardous substances may have been disposed, regardless of public health risk demonstrated by risk assessments or exceedences of environmental criteria. Such an extreme position has never been espoused by the Agency; and would be inconsistent with CERCLA and the NCP.

determined whether a requirement is relevant and, second, it must be determined whether a requirement is appropriate. NCP at § 300.400(g) and 1988 Manual at 1-60 through 1-70. As stated in the 1988 Manual:

> In general, this involves a comparison of a number of site-specific factors, including the characteristics of the remedial action, the hazardous substances present at the site, or the physical circumstances of the site, with those addressed in the statutory or regulatory requirement. In some cases, a requirement may be relevant, but not appropriate, given site-specific circumstances; such a requirement would not be ARAR for the site.

Id. at Section 1.2.4.3. Similarly, the 1988 Manual states:

> First, the determination focuses on whether a requirement is relevant based on a comparison between the action, location, or chemicals covered by the requirement and related conditions of the site, the release, or the potential remedy. This step should be a screen which will determine the relevance of the potentially relevant and appropriate requirement under consideration. The second step is to determine whether the requirement is appropriate by further refining the comparison, focusing on the nature/characteristics of the substances, the characteristics of the site, the circumstances of the release, and the proposed remedial action.

Id. at 1-67. "A requirement may be relevant but not appropriate for the specific site. Only those requirements that are determined to be both relevant and appropriate must be complied with." Id.

EPA's language in the Detailed Evaluation Memorandum concludes that a RCRA-compliant cap is relevant at the Site.[17] However, except with respect to the steep outslopes of Waste Areas 2 and 3 (where RCRA capping was determined not to be "appropriate"), the Agency has failed to make any factual findings that would show a RCRA-compliant cap to be "appropriate" under the circumstances of the releases at the Old Springfield Landfill Site. In fact, the Agency has ignored the detailed, site-specific data presented by Remcor which show that capping is not, in fact, appropriate at the Site.

Low permeability capping over a waste disposal area is appropriate where waste leachates, generated through rainwater infiltration, pose a threat to groundwater (i.e., potentially contaminating groundwater to levels that cause a public health or environmental risk or lead to exceedences of environmental

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[17] The language in the Detailed Evaluation Memo and in the Proposed Plan states that there are "substances disposed of and found at the Site similar to RCRA hazardous waste. In addition, objectives of the remedial action, such as preventing the leaching of soil contaminants to the groundwater and preventing public contact with contaminated soil or leachate that may present a risk, are similar to the purposes of the RCRA hazardous waste landfill closure requirements."

quality standards). With respect to Waste Area 4, however, Remcor's FFS shows that the contaminants of concern at the Site (the chlorinated ethenes for which MCLs are exceeded in eastern bedrock groundwater) are not present in Waste Area 4 and that the water within the saturated waste in Waste Area 4 already meets all MCLs for contaminants of concern.[18] Also, the FFS shows that the majority of the water flowing through and from Waste Area 4 is drained through the till to a highly permeable sand and gravel unit which underlies much of the Site and which acts as a "drain" conveying groundwater to the western leachate seeps, which will be collected and treated as part of the ROD I management of migration operable unit. Under these circumstances, it is not "appropriate" to place a RCRA cap over an area which clearly does not contribute to any public health risk or to any exceedence of an MCL.[19]

18/ The fact that the waste is saturated means that further leaching of any contaminants in Waste Area 4 will not cause exceedences of any MCLs.

19/ The Companies agree, however, that it is appropriate to place a soil cover over Waste Area 4 to prevent dermal contact with surficially contaminated soils. In addition, the Companies believe that efforts should be made to prevent water leaving Waste Area 4 from flowing into Waste Area 3. This, however, can be accomplished by surface drainage improvements and by installation of french drains upgradient of Waste Area 4 and between Waste Area 4 and Waste Area 3.

It is also not "appropriate" to place a RCRA cap over Waste Area 2. Remcor's FFS shows that Waste Area 2 is almost completely unsaturated and that the majority of water that does flow through and from Waste Area 2 emanates at eastern seep LSE04 which will be collected and treated during implementation of the ROD I Management of Migration Operable Unit. Through natural flushing processes, the quality of seep LSE04 has improved dramatically since Site sampling began in January, 1985. Remcor's regression analysis and desorption model (Figure 1 attached hereto) predict that, through natural flushing alone and even without implementation of Operable Unit No. 1, water quality in seep LSE04 will meet all MCLs within the next few years. According to the construction schedule announced during the July 12, 1990 public meeting, the start of construction for operable unit 2 is estimated to be the summer of 1994. It is expected that leachate seep LSE04 will already achieve MCLs before capping could be completed. Furthermore, according to Remcor's FFS, to the extent that any water from Waste Area 2 flows downward toward bedrock (rather than toward seep LSE04), such flow is uncontaminated by site-related VOCs as is evidenced by well 49S screened immediately below Waste Area 2 in the lacustrine silt and upper till and by wells 42S and 42T screened downslope of

Waste Area 2. In these circumstances, it is not "appropriate" to place a RCRA cap over Waste Area 2.

Finally, although Waste Area 3 does represent the principal source contributing chlorinated ethenes to bedrock groundwater, Remcor has shown that a significant portion of the water flowing through and from Waste Area 3 either drains to the permeable sand and gravel unit and is conveyed to the western leachate seeps for collection and treatment during Operable Unit No. 1 or emanates at seep LSE03 for collection and treatment during Operable Unit No. 1. Furthermore, Remcor has concluded in the FFS that the contaminants of concern in Waste Area 3 have migrated to the till below the waste, itself, and that placing a RCRA cap over Waste Area 3 will not shorten the timeframe for achievement of MCLs at seep LSE03. Moreover, bedrock groundwater east of the former landfill will continue to receive contaminants from the contaminated till groundwater, regardless of source control action at Waste Area 3. Capping of Waste Area 3 will, to some extent, reduce flushing of till groundwater and actually extend the time required for bedrock groundwater to achieve MCLs. Under these circumstances, capping Waste Area 3 is not "appropriate" because it will retard the natural flushing of flows that either will be collected and treated during implementation of Operable Unit No. 1 or which discharge to the Black River where no detectable VOCs can be found.

In summary, the studies required by ROD I were intended to determine if capping or other waste isolation measures "would decrease the time needed to attain groundwater cleanup levels and eliminate the risks associated with the contamination of bedrock." ROD I at 25. Remcor has shown, however, that capping will not decrease the time needed to attain groundwater cleanup levels or eliminate the risks of concern to EPA, which we dispute, associated with contaminated bedrock groundwater. Accordingly, low permeability capping is not "appropriate under the circumstances of the releases" at the Old Springfield Landfill Site.

C. To the Extent that RCRA Requirements are Considered ARARs, Soil Covers on Waste Areas 2 and 4 would be Consistent with "Hybrid Closure" Under RCRA

To the extent that EPA insists that RCRA closure requirements are among the ARARs for the Site, that determination does not require the construction of a multi-layer, low permeability cap over Waste Areas 2 and 4. Rather, as Remcor suggested in the FFS, covering of the contaminated surface soils within Waste Areas 2 and 4 would be consistent with the "hybrid closure" concept frequently utilized by EPA. An example of a soil cover design that would be consistent with hybrid closure is included in Figure 4, Detail F (attached).

As stated in the preamble discussion to the proposed NCP, "the Superfund program has been using several different types of hybrid closure (where RCRA closure is not applicable) that give the decision maker additional choices for the long-term management of hazardous substances as well as treated residuals." 53 Fed. Reg. 51394, 51446 (1988). One type of hybrid closure "that is used by the Superfund program," id., is referred to as the alternative land disposal closure. As EPA has stated:

> This type of closure is identical to RCRA landfill disposal closure except that the cover requirements are relaxed because the wastes being contained do not pose a threat to groundwater. Direct contact and surface water threats, as well as other threats, can be adequately addressed with a soil cover. This type of closure is usually appropriate for wastes at low concentrations but still above "walk-away" levels. EPA has found this type of closure to be useful in addressing wide areas of contaminated soils in a relatively inexpensive but very reliable manner.

Id. A similar discussion of the hybrid closure concept under CERCLA is set forth in Directive 9234.2-04S (October 1989), prepared by the EPA Office of Solid Waste and Emergency Response ("OSWER").

For the reasons set forth in preceding sections of these comments, the hybrid closure concept is suited to Waste Area 4 because that area does not represent a threat to groundwater. As demonstrated by Remcor's FFS, the contaminants of concern at the Site (the chlorinated ethenes) are not present in Waste Area 4 and the water within the saturated waste in Waste Area 4 already meets all MCLs for contaminants of concern. The only threat posed by Waste Area 4 is a threat of direct contact with surficially contaminated soils, and that threat can be eliminated with a soil cover.

Similarly, the hybrid closure concept is suited to Waste Area 2 because groundwater in the vicinity of that waste area is uncontaminated by site-related VOCs, as is evidenced by Well 49S screened immediately below Waste Area 2 in the lacustrine silt and upper till and Wells 42S and 42T screened downslope of Waste Area 2. The majority of water flowing through and from Waste Area 2 emanates at eastern seep LSE04 which will be collected and treated during implementation of the ROD I management of migration operable unit. The only potential public health risk posed by Waste Area 2 is related to direct contact with surficial soils; and covering (as opposed to impermeable capping) of those soils within Waste Area 2, as specified in

Remcor's FFS, would be effective in interrupting the dermal contact pathway.

Notwithstanding the foregoing, in the Detailed Evaluation Memo EPA has rejected the hybrid closure concept because it "has never been promulgated as a rule under RCRA," id. at 6, and because "the wastes clearly present a threat to groundwater." Id. This rejection of the hybrid closure concept is arbitrary and capricious with respect to Waste Areas 2 and 4. EPA's belief that wastes in those areas "clearly present a threat to groundwater" is unsubstantiated and contradicted by the data in the FFS. Moreover, the fact that hybrid closure has never been promulgated as a rule under RCRA is wholly irrelevant, when EPA has recognized that hybrid closure has frequently been used under CERCLA and is available to the decision maker when RCRA closure requirements are considered ARARs.

Accordingly, even if EPA determines that RCRA closure requirements are "relevant and appropriate" for the Site, that determination does not necessitate the construction of a multi-layer, low permeability cap over Waste Areas 2 and 4. Rather, soil covers over those areas would protect against dermal contact threats and would be consistent with the hybrid closure concept repeatedly recognized by EPA.

*   *   *

In summary, EPA's proposed source control actions are aimed at mitigating risks that do not exist at the Site, are inconsistent with the NCP, are arbitrary and capricious, and should be deleted from EPA's chosen remedy. EPA has estimated that the net present value for implementation of the source control remedy described in the Proposed Plan could be as high as $9.6 million. In marked contrast, the net present value of Remcor's recommended source control action -- addressing all identified risks at the Site and consisting of fencing the Site, installation of a source control well, and covering contaminated soil areas -- is approximately $750,000. Remcor's recommended action is equally protective, more implementable, and much more cost-effective.

If, however, EPA nevertheless insists on selecting a source control remedy along the lines described in its Proposed Plan, alternative design options for several of the elements included in EPA's plan should be incorporated to achieve similar objectives at much lower cost, and to enhance both the implementability and effectiveness of the remedy. Specific design modifications and estimated cost savings are included in the following discussion.

V. <u>TO THE EXTENT THAT EPA INSISTS ON IMPERMEABLE CAPPING OF WASTE AREAS 2, 3 OR 4, THE CAP DESIGN SPECIFIED IS EXCESSIVE AND INEFFECTIVE</u>

If, despite the absence of risk justifying the installation of an impermeable cap over Waste Areas 2, 3 or 4, EPA nonetheless requires a cap over one or more of those areas, the cap design specified in the Agency's Proposed Plan is excessive in both complexity and cost and, moreover, is likely to be ineffective. The specified cap design is more elaborate than required by RCRA regulations, fails to reflect site-specific conditions as required by EPA's own guidance document, deviates from the Agency's own design in its 1988 preferred alternative for the site, and is likely to fail as a result of differential settlement.

The cap design specified in the Proposed Plan (Figure 3) consists of, from the bottom up, a 12-inch gas vent layer, geotextile filter fabric, a 24-inch compacted clay layer, a flexible membrane liner ("FML"), a 12-inch drainage layer, geotextile filter fabric, a 24-inch clean fill layer, a 12-inch top soil layer, and vegetative cover. EPA indicates in its Proposed Plan that this cap design is based on recent EPA guidance (EPA, July 1989) for capping of landfills and surface impoundments closed as landfills under

RCRA. However, this design is much more elaborate than that required by the RCRA regulations themselves. Moreover, even assuming the validity of EPA's reliance on the guidance document, the Agency has ignored its own instructions by applying design recommendations from the guidance document without consideration of site-specific factors. In defining the purpose of the EPA guidance document:

> "the [Agency] emphasizes that recommendations are guidance only and not regulations. The Agency acknowledges that other final cover designs may be acceptable, depending upon site-specific conditions and upon a determination that an alternate design adequately fulfills the regulatory requirements. . . ." (EPA, July 1989, Section 1.1, at 1) (emphasis in original)

There are a number of site-specific conditions that EPA should address, but has not, to develop an effective and implementable cap design at the Old Springfield Landfill. First, a 24-inch compacted clay layer should not be included in the cap design without consideration of the likely unavailability of native clay and, therefore, without consideration of alternative design options for that layer. Second, the inclusion of a 12-inch gravel layer for gas venting in the cap design is unnecessary in Waste Areas 2 and 3 based on the presence of sandy soil cover already in place atop the waste over much of the area proposed to be capped. Third, the inclusion of an FML is inappropriate in Waste Area 4 based on the potential for significant differential settlement at a landfill used for the disposal of municipal solid waste. If an FML is to be included, there is no basis for the 24-inch clean fill layer whose purpose -- but only in the absence of an FML -- would be to protect the low-permeability clay or soil layer from freezing and thawing action.

A. The Likely Unavailability of Native Clay Requires Consideration of Alternative Design Options

EPA's inclusion of a 24-inch compacted clay layer in its cap design for the Old Springfield Landfill simply ignores the likely unavailability of native clay which, significantly, led both EPA and its contractor to include a layer of compacted glacial till rather than clay in their earlier cap designs for the site.

In connection with Remcor's work on the FFS, Remcor personnel contacted the Vermont Department of Transportation to identify potential sources of materials for construction of remedial action components. Remcor then contacted several potential suppliers of clays, sands, gravel and similar materials. From these contacts, Remcor determined that an adequate supply of native clay soils in the area surrounding Springfield, Vermont is not likely to be available for remedial construction at the site.

For this reason presumably, both EPA and its contractor previously specified a layer of compacted glacial till rather than clay in their earlier cap designs. The 1988 FS describes this layer as a "2 ft. compacted glacial till" or a "2 ft. thick glacial till (impermeable soil) layer." FS at 5-11, 7-19. Likewise, EPA's preferred alternative issued in June 1988 contains a cross-section of the proposed multi-layer cap (EPA, June 1988, Exhibit 2) with "2 ft. compacted fill." Now, without explanation or justification, EPA is proposing a compacted clay layer which is not locally available and presumably would have to be imported at substantial and unnecessary cost. Consistent with the FS, however, locally available glacial till should be allowed for the low-permeability soil layer if the till satisfies the established permeability requirements. A glacial till layer would be equally as effective as a clay layer and would provide cost savings of an estimated $400,000 or more.

Further, if the till is deemed unsuitable, alternative design options also are available, consistent with EPA guidance documents and practice. The EPA guidance document for cap design "assumes that soil will be available that can meet the 1 X 10^{-7} cm/sec" permeability criterion for the low-permeability soil layer. EPA, July 1989, Section 4.2.2, at 28. If soil satisfying that criterion is not available, however, EPA has indicated at recent seminars presenting the Agency's design guidance (EPA, July and August 1990) that design options incorporating mixtures of soils and clay minerals (e.g., bentonite) are recommended.[20]

At the Old Springfield Landfill, such alternative design options consistent with EPA guidance would incorporate (1) bentonite panels and locally available fill soils, or (2) locally available fill soils mixed with bentonite. Bentonite panels consist of a relatively thin (0.25-inch)

20/ The purpose of these EPA-sponsored seminars, which were given at 10 locations nationwide, was to provide the technical community (e.g., design engineers, state regulatory officials) with the most recent EPA guidance for the design and construction of cover systems for RCRA landfills and surface impoundments closed as landfills.

layer of clay mineral granules sandwiched between a top layer of polyester fabric and a bottom layer of water-permeable polypropylene fabric. The bentonite panels, whose permeability is in the range of 1 X 10^{-10} to 1 X 10^{-9} cm/sec, would be covered with 2 feet of clean fill soil. Alternatively, in lieu of providing a bentonite panel overlain with clean soil, the clay mineral granules can be blended directly into the fill soils to produce a soil-bentonite mixture of low (1 X 10^{-7} cm/sec) permeability. Either of these designs would provide an equivalent or improved level of effectiveness (i.e., equivalent to 2 feet of clay at 1 X 10^{-7} cm/sec permeability), would be more readily implemented, and would provide cost savings of an estimated $150,000 or more.

For these reasons, EPA should specify in its source control remedy that the cap design may include glacial till or bentonite rather than clay in the low-permeability soil layer, so long as the permeability standards are met.

B. The Gas Vent Layer Should be Eliminated from the Cap Design for Waste Areas 2 and 3 Based on the Presence of Sandy Soil Cover Already in Place

The inclusion of a 12-inch gas gravel layer for landfill venting is unnecessary in Waste Areas 2 and 3 because of the existing sandy soil cover over much of the area proposed to be capped.21/

EPA's own cap guidance document indicates that a gas venting zone is an "optional layer" that could be required on a site-specific basis. EPA, July 1989, Section 5.1, at 3.1. If a gas venting layer is required, however, the existing sandy soil cover should suffice in Waste Areas 2 and 3. EPA's guidance document -- which shows the gas venting layer directly on top of the waste -- recommends that, if needed, a gas venting layer should be constructed of "coarse-grained, porous" materials and be a minimum of 12 inches thick. EPA, July 1989, Sections 5.1.1 and 5.1.2, at 31-33. The sandy soil cover at Waste Areas 2 and 3 meets these criteria.

21/ Furthermore, both the 1988 FS (FS at 5-11) and EPA's 1988 preferred alternative included a 6-inch, rather than 12-inch, gas collection layer. Neither the Proposed Plan nor the SFS indicates what new site data caused a design change increasing the thickness of the gas venting layer.

The existence of sandy soil cover overlying the waste in much of the areas proposed to be capped is documented in the ICF RI and FS and confirmed in the FFS prepared by Remcor. The existing surface above the waste in Waste Area 3 is comprised principally of sandy fill soils. For example, in drilling Wells MW-38S, MW-40S, and MW-51S (which provide a cross-section along the centerline of Waste Area 3), sandy fill soils were found to be at least three feet thick on top of the waste in Waste Area 3. FFS, Figure 9 and Appendix B. These sands are generally permeable. FFS, Table 25. Similarly, in Waste Area 2, the waste is covered with permeable sands. ICF Borings 47, 53, and 60 and the drillholes for ICF Well MW-16 and Remcor Well MW-49S all show the presence of at least one foot of sandy material at the surface. FFS, Figures 7 and 9 and Appendix B.

Accordingly, the sandy fill soils that overlay the wastes in Waste Areas 2 and 3 meet EPA's design criteria, and the importation of a separate layer of gravel to the site as a gas venting layer for these areas is unnecessary and should be eliminated. Rather than importing stone and building an additional layer into the cap, the preferred design is to require grading and scarifying the landfill surface to ensure that the upper landfill zone is comprised of permeable sands. Eliminating a separate gas venting layer from the cap in Waste Areas 2 and 3 would provide the same degree of environmental protection and would result in a cost savings of an estimated $95,000, based on the pricing information provided in the SFS.

C. The Flexible Membrane Liner Should be Eliminated from the Cap Design for Waste Area 4 Because It is Not Recommended for a Landfill Containing Municipal Solid Waste and a High Potential for Differential Settlement

Whatever its advantages at other types of landfills, an FML should not be included in the cap design for Waste Area 4 at this site due to the potential for significant differential settlement. Differential settlement at the Old Springfield Landfill is likely to undermine the integrity of the FML and the cap, if not in the short term then certainly in the long term. In contrast, a cap comprised solely of natural materials would provide improved performance over an FML and would be less costly to construct and to maintain.

An FML is often ill-suited for use in capping a municipal solid waste landfill. As the organic fraction of landfilled municipal solid waste decomposes through biological action, the volume of the waste is reduced significantly which often results in landfill subsidence. Regrading the landfill prior to capping and cap placement can add significant loading on top of the waste and exacerbate landfill settlement. Significant differential settlement can produce sufficient stress to tear FMLs, rendering such membranes ineffective as hydraulic barriers. In addition, FMLs are much more difficult to repair than natural materials, because tears are likely to be obscured by the cover material and, when they are located, will require special materials and expertise to repair.

The suitability of using an FML at a municipal solid waste landfill has arisen at a number of Superfund sites nationwide, including sites in EPA Region I. For example, at the Charles George Landfill in Tyngsborough, Massachusetts, EPA selected a remedial alternative which included the installation of a cap containing an FML over a large municipal landfill, despite strong protests from a group of private parties based on the same concerns we are expressing here. Although EPA's contractor at that site estimated that only about 0.78 foot of settlement would occur following placement of the cap, another EPA contractor has already observed settlements in excess of 15 feet and expects settlements of as much as another 18 feet in some locations. See Technical Comments on Remedial Actions Selected for the Charles George Reclamation Trust Landfill, Dunstable and Tyngsborough, Massachusetts, August 1990.22/ At that site, the short-term and long-term viability of the cap, its consistency with the NCP, and EPA's ability to recover its costs from responsible parties are all being hotly contested in pending litigation.

The same factors arguing against the use of an FML cap at other sites apply to the three waste areas proposed to be capped at the Old Springfield Landfill -- but are especially acute in Waste Area 4, where former disposal trenches containing a high percentage of municipal solid waste lie between berms of native soils and till. Because of the likelihood of significant subsidence within the trenches and no settlement of the berms, an FML within Waste Area 4 would be particularly susceptible to failure induced

22/ This document is already in the possession of EPA Region I. We ask that it be included in the Administrative Record for this site.

by subsidence. Even without the added loading imparted by cap placement, differential settlements of 3 feet (vertically) over a (horizontal) distance of 10 to 15 feet have been observed at Waste Area 4. See FFS, Section 2.2.3.4 and Figure 8.

As discussed above in Section IV, a multi-layer, low-permeability RCRA cap is not required at this site. To the extent that EPA requires a low-permeability cap, however, a cap comprised of low-permeability soils with no FML would be appropriate in Waste Area 4. The cap design for Waste Area 4 should be modified to eliminate the FML component, replacing it with low-permeability soils or soils blended with admixtures to achieve an effective low-permeability cap. An example of such a design is included in Figure 4, Detail E (attached). This design alternative would improve long-term effectiveness and reduce cost by an estimated $175,000 for Waste Area 4, based on the pricing information provided in the SFS.

D. Where a Flexible Membrane Liner is Included, A 24-Inch Clean Fill Layer is Not Needed to Protect the Low-Permeability Clay or Soil Layer from Freezing

Where an FML is included in the cap design above the low-permeability soil layer, the 24-inch thick clean fill layer above the drainage layer is excessive. The thickness of this layer should be reduced to 12 inches.

EPA presumably has included this thickened fill layer in the design to protect the underlying, low-permeability clay or soil layer from freezing and thawing action, based on EPA's guidance document which recommends that the low-permeability soil layer be entirely below the depth of frost penetration. EPA, July 1989, Section 4.2.2, at 29. If the FML is retained, however, the additional protection is not required, because the FML itself provides adequate protection against water percolating downward into the low-permeability soil layer and causing freeze-thaw damage. Similarly, the underlying sandy soils prevent the upward movement (by capillary action) of water into the low-permeability soil layer.

The most significant potential effect of freezing and thawing on a low-permeability soil layer is an increase in the soil permeability. If a soil is saturated, the pore spaces between the solid soil grains are filled with water. If the soil is then frozen, the water in the pore spaces turns to ice, expands, and pushes the soil grains further apart. Ice lenses tend to form as the pore water freezes. When the soil subsequently thaws, the pore spaces remain expanded and do not return to their original condition. This expanded soil matrix has a higher permeability than before its deformation.

As described in the FFS (Section 4.1.6), the FML protects the underlying, low-permeability soil layer from infiltrating water, thereby maintaining the moisture content of that soil at a level no greater than at the time of initial placement of the soil. This initial moisture content is below the saturation point of the soil. In this unsaturated condition, the pore spaces within the soil are partially air-filled and partially filled with water. Any freezing of pore water would not cause significant damage to the integrity of the soil, because any frost-induced expansion would be absorbed into the air-filled pores. Further, the presence of air-filled pore spaces is not conducive to the forming of ice lenses.

In addition to the FML, which prevents water from entering from above, the presence of a sandy soil layer beneath the low-permeability soil layer prevents this layer from becoming saturated from water entering from below. Permeable materials (e.g., sandy soils) prevent the movement of water (by capillary action) from underlying saturated materials. Tschebotarioff, 1973.

Accordingly, the low-permeability soil layer that underlies an FML and overlies permeable soil would remain unsaturated and not susceptible to damage from frost penetration. Elimination of the excess 12 inches of clean fill layer would provide equivalent protection and be more cost-effective. An example of a design without this excess fill is included in Figure 4, Detail D (attached). If an FML liner were retained in Waste Areas 2 and 3, the elimination of the excess fill in those areas would result in a savings of an estimated $80,000 or more, based on the pricing information provided in the SFS.

VI. THE DESIGN PROPOSED FOR THE FRENCH DRAIN TO BE LOCATED UPGRADIENT OF WASTE AREA 4 IS FLAWED AND SHOULD BE REPLACED WITH A DESIGN THAT IS MORE EFFECTIVE, MORE IMPLEMENTABLE, AND LESS COSTLY

EPA's Proposed Plan includes a french drain to be constructed around Waste Area 4 to prevent shallow subsurface and surface water from entering Waste Area 4. There is some confusion in the Administrative Record concerning the proposed french drain design. EPA's Proposed Plan includes a diagram of the french drain detail which contains, for example, a 6-inch pipe and non-woven geotextile fabric on the drain faces. The SFS, however, depicts the french drain with a 12-inch pipe and an FML on the downgradient face of the drain. FFS, Section 5.3.1, at 24. To the extent EPA intends to retain the design contained in the SFS, that design is less effective, more difficult to construct, and involves greater construction and operating costs than necessary to achieve its intended objectives.

The disadvantages of the SFS design relate primarily to the decision to combine surface water and groundwater flows in the french drain. This combining of flows will result in wide fluctuations in flow volumes and therefore will require a larger and more costly hydraulic system (i.e., pumps and pipes) than for a drain handling groundwater alone. The combining of flows also could lead to the commingling of uncontaminated surface water with groundwater from Waste Area 4 so that the combined flow might require treatment of large quantities of water prior to discharge. To protect against that possibility, the SFS design includes an FML on the downgradient face of the drain to act as a hydraulic barrier to groundwater infiltration from Waste Area 4. The installation of an FML in a vertical trench, however, involves a very difficult construction procedure. In addition, the presence of the FML makes it much more difficult to achieve EPA's objective of dewatering Waste Area 4 prior to cap placement.

In contrast to the SFS design, the design proposed by Remcor in Figures 2 and 4, Detail C (attached) would provide a separate shallow surface water collection ditch along the uphill (western and southern) sides of Waste Area 4 for surface water diversion. This alternative design would eliminate the combination of surface and groundwater flows, reduce the size of the required hydraulic system, eliminate the need for a hydraulic barrier on the downgradient face of the french drain, and allow use of the french drain for dewatering of Waste Area 4.

A. The Size of the Hydraulic System Can be Reduced

The combining of surface water and groundwater flows in the french drain creates a number of disadvantages, including an unnecessary increase in the size of the hydraulic system for pumping the combined flows from the drain. During a peak rainfall/runoff event, surface runoff rates are much greater than groundwater flows. Using the widely accepted rainfall-runoff calculation methodology developed by the U.S. Department of Agriculture, Soil Conservation Services (Barfield, et. al, 1981), the surface runoff is calculated to be 60,000 gallons per day (gpd), or about 40 gallons per minute (gpm), for the upland drainage area at Waste Area 4 (13 acres) during a "design storm" (25-year, 24-hour) event. If the design storm event were to coincide with initial spring runoff from snowmelt, the peak surface water flow rate could be 16 million gpd. This surface runoff compares to the average (and relatively constant) groundwater flow of 1,150 gpd, as predicted by the hydrologic modeling presented by Remcor in the FFS. FFS, Section 2.5.2.1, Table 28.

For these reasons, the hydraulic requirements for a system designed to pump both surface water and groundwater (as proposed in the SFS) are much larger than those for a system capable of pumping groundwater alone (as proposed by Remcor). In the design presented in the SFS, the specifications include a 12-inch diameter pipe in the french drain and two 25-gpm pumps to pump the water from the drain to a discharge line. SFS, Section 5.3.1, at 26 and Figure 5-2. With a separate surface water diversion ditch, however, as Remcor has proposed, the piping in the french drain can be reduced from 12-inch to 6-inch diameter and the pumps can be reduced from 25-gpm to approximately 5-gpm capacity. Furthermore, these reductions are not offset by increased hydraulic requirements associated with the surface water diversion ditch, which can be designed for gravity flow rather than pumping of storm water flows. Reliance on gravity flow would also minimize operation and maintenance requirements and assure surface water diversion even when the pumps were inoperative (*e.g.*, during power losses).

B. The Flexible Membrane Liner Can be Eliminated

There is another, more significant, negative consequence of the SFS proposal to combine the surface water and groundwater flows in the french drain upgradient of Waste Area 4. In order to prevent the uncontaminated surface water from becoming contaminated and requiring treatment of large quantities of water, a hydraulic barrier is required to prevent contaminated groundwater flow from Waste Area 4 back into the drain. To provide such a hydraulic barrier, the SFS design includes an FML on the downgradient vertical face of the french drain.

The installation of an FML in a vertical trench, however, is fraught with technical difficulty. FML materials were not designed for this type of installation. Tearing of the material and breaking of seams are significant problems during installation, especially during the withdrawal of sheet piling or other trench shoring. Furthermore, in vertical trench installations the FML cannot be inspected for integrity once it is in place.

The separate diversion of surface water, as Remcor has proposed, will avoid the need for a hydraulic barrier and thus avoid these technical difficulties. The FML is not needed for the drain to function properly, and with separate diversion of surface water, the more effective design is to collect the relatively small quantity of groundwater in the drain (from upgradient of Waste Area 4 and from Waste Area 4 back into the drain) and convey it to the Springfield POTW or any wastewater treatment facility constructed as an element of the management of migration remedy. The flow of potentially contaminated groundwater to the french drain is estimated to average less than 5 gpm, which would have no material effect on the design of any wastewater treatment facility. In short, with the ready availability of the Springfield POTW or a wastewater treatment facility, there is little additional burden associated with treating the comparatively small quantities of contaminated groundwater that would be withdrawn from Waste Area 4 in the early stages of the operation of the french drain.

C. Dewatering of Waste Area 4 Can be Improved

Another, related problem associated with the french drain design proposed in the SFS is that it does not allow for effective dewatering of Waste Area 4 prior to capping. The SFS provides for the initial dewatering of Waste Area 4 through the use of pumping wells. SFS, Section

5.3.1, at 26 and 28. Based on the results of Remcor's field studies at the site, however, attempts to dewater Waste Area 4 using pumped wells would likely be ineffective.

During the FFS, Remcor installed Well MW-32S in the waste in Waste Area 4, intending to use it as a pumping well in aquifer testing. During a pumping test at Well MW-32S, the finely divided products of decomposition of the municipal solid waste in this area quickly clogged the sand pack and screen of the well, effectively preventing the well from dewatering the waste trench in which it was placed. Apparently, suspended and flocculated solids in the water in the waste matrix choked the sand pack around the well and plugged the well screen. While proper design of the dewatering wells could reduce the problems associated with fouling and plugging, Remcor's permeability testing of the waste in Waste Area 4 indicated very low waste permeability (e.g., 2.50 X 10^{-5} and 1.55 X 10^{-5} at Borings RTB-19 and RTB-20, respectively). FFS, Table 15. These low waste permeability values would preclude efficient dewatering by pumped wells.

Remcor's alternative design for the upgradient perimeter french drain would allow dewatering of Waste Area 4 without the use of pumping wells. Eliminating the FML on the downgradient face of the french drain and allowing flow from Waste Area 4 into the drain would aid considerably in dewatering of Waste Area 4. This dewatering, combined with the upgradient surface water diversion and preliminary grading of Waste Area 4, would provide sufficient stabilization of this area to allow placement of a cap. Proper sequencing and scheduling of construction activities would ensure adequate time for this area to be dewatered prior to cap construction.

In sum, for a number of reasons, Remcor's alternative design for the french drain would be more effective and more implementable than EPA's design. In addition, it would provide equal or better protection at a cost savings estimated to be $50,000 or more, based on the pricing information provided in the FFS.23/

23/ The actual cost savings could be significantly higher, because some of the costs estimated in the FFS (e.g., the cost of an FML liner in the french drain, including installation) may be artificially low. Remcor estimates that the actual cost savings associated with its design could be $150,000 or more.

VII. EPA'S PROPOSAL TO STABILIZE THE OUTSLOPES OF WASTE AREAS 2 AND 3 IS ILL-CONSIDERED AND, IF SLOPE STABILIZATION IS REQUIRED AT ALL, SHOULD BE SUBSTANTIALLY MODIFIED

EPA's Proposed Plan provides for the stabilization of the side slopes of Waste Areas 2 and 3 to protect the cap and the leachate collection system in Operable Unit 1 and to minimize the potential for slope collapse. With respect to the outslope of Waste Area 3, however, Remcor has determined, after careful analysis, that stabilization is not necessary to ensure against slope failure. Further, if slope stabilization is required in Waste Area 3, Remcor's proposal to construct a buttress/fill in this area is more effective, more implementable, and involves significantly reduced risks than the design proposed by EPA. With respect to the outslope of Waste Area 2, EPA has not even provided a conceptual design. However, Remcor's design for Waste Area 3 can be easily adapted to Waste Area 2 to provide similar benefits.

A. Stabilization of the Outslopes of Waste Area 3 is Not Necessary to Ensure Stability against Mechanical Failure

Without performing any analysis of slope stability in the SFS, EPA's contractor assumes that "[i]n the absence of any stabilization measures the caps might induce instability on the side slopes." SFS, Appendix F, at F-2. The SFS also states that "the long-term factor of safety [against slope failure] after remediation should be at a minimum 1.3." Id. at F-2. After performing the required analysis of slope stability, however, Remcor has determined that, with the management of migration remedy (Operable Unit 1) in place, the outslopes of Waste Area 3 will be stable -- with a factor of safety against slope stability exceeding 1.3 -- and, therefore, slope stabilization is unnecessary.

Remcor performed a slope stability analysis for the outslopes of Waste Area 3 based on widely accepted geotechnical principles. Soil located on a sloping surface has a tendency to move downward and outward under the influence of gravity. If this tendency is counteracted by the shearing resistance of the soil, the slope is stable and will not fail. Terzaghi and Peck, 1967. The geomechanical properties of the soil (e.g., grain size, particle shape and interlocking, and cohesion) and groundwater conditions determine the shearing resistance of any native soil or fill material located on a sloping surface. In general terms, the ratio of the magnitude of forces resisting failure to the magnitude of gravitational forces is expressed in terms of a factor of safety. Theoretically, if the factor of safety is greater than 1, the slope is stable; conversely, if the factor of safety is less than 1, the slope would be unstable. Because of the uncertainties associated with the properties of natural soils or fill materials, however, engineering practice typically requires safety factors in the range of 1.25 to 1.50. Schuster and Krizek, 1978.

Remcor performed its slope stability analysis using the STABL5 computer program developed by Purdue University and specifically identified in the SFS as a means for evaluating static and pseudostatic slope stability conditions. Table 1 (attached) presents the input data used by Remcor in this exercise. The computer analysis methodology involves the calculation of a large number of potential failure mechanisms and the determination of a minimum factor of safety for the overall slope. Using this methodology, Remcor calculated the factor of safety against slope failure -- under existing conditions -- to be approximately 1.2. Therefore, although the slopes would not be predicted to fail, the margin of safety is just below the preferred range of 1.25 to 1.50.

In connection with the implementation of the management of migration (Operable Unit 1) remedy, however, a drain will be constructed to collect seepage from Waste Area 3 (Seep LSE03). As described in the FFS, Remcor's preliminary design for the management of migration remedy provides for constructing this drain largely as above-grade fill in the ravine below LSE03. FFS, Section 1.1.4, at 1-6. Mechanically, this fill would act as a buttress at the toe of the slope. Remcor's slope stability analysis was performed assuming that the Operable Unit 1 drain is in place and the plateau portion of Waste Area 3 is capped with a 7-foot thick cap. These conditions represent the reasonable "worst-case" design conditions for the Waste Area 3 outslopes. While capping Waste Area 3 would lower the water table in Waste Area 3 and thereby increase the shearing resistance of the soils and the fill, these contributions to slope stability would be more than offset by the surcharge imposed at the top of the slope by the weight of the cap.

Under these conditions, Remcor calculated a minimum factor of safety for the Waste Area 3 outslopes of 1.34 -- within the required margin of safety and above the 1.3 factor recommended in the SFS. Therefore, no stabilization of the outslopes of Waste Area 3, beyond that to be provided in the management of migration remedy, is required.

B. If Stabilization of the Outslopes of Waste Area 3 is Required, a Buttress/Fill Should be Constructed and EPA's Proposed Regrading Should be Avoided

If stabilization of the outslopes of Waste Area 3 is required at all, the preliminary design described in the SFS involves significant risk that can be avoided with an alternative design. EPA's Proposed Plan states that "[t]he exact method of side slope stabilization would be determined during the remedial design stage," which indicates some flexibility on this issue. The SFS, however, describes a side slope stabilization design in which the outslopes of Waste Area 3 would be extensively regraded to establish a slope of 3 horizontal to 1 vertical (i.e., a slope of 3:1), with an intervening bench at Elevation 440 feet mean sea level (ft-msl).

There is no justification for such regrading, which would involve significant waste excavation with attendant short-term exposure risks from uncontrollable vapor releases, fugitive dust, and contaminated rainfall runoff. As described in the SFS, "[s]tringent environmental monitoring for possible contaminant releases (including air monitoring)" would be necessary. SFS at 39. Monitoring would be the only means to determine whether contaminant releases were so severe as to require evacuation of workers or local residents. In addition, airborne releases of contaminants could require remedial workers to be suited in supplied-air breathing apparatus and construction equipment to be fitted with pressurized cabs and supplied air. In the FFS, Remcor likewise discussed the almost certain severe adverse environmental impacts from waste excavation. FFS, Section 3.3.2.4, at 3-44 and 3-45.

To avoid the need for waste excavation and the serious adverse environmental impacts associated with it, Remcor developed an alternative design for stabilization of the outslopes at Waste Area 3, which is depicted in Figures 2 and 3 (attached). The design provides both for stabilization of the outslopes against mechanical failure and a cover over existing surface materials of 3.5 feet of clean soil fill. In Remcor's design, select clean fill would be placed in the ravine downslope of Waste Area 3, spread into relatively thin lifts (e.g., 9 to 12 inches), and compacted. Lifts of soil would be sequentially added until a uniform grade of 2.5:1 was achieved. Benches would be constructed at approximate Elevations 440 and 470 ft-msl for drainage and erosion control and stability, and the established surface would be revegetated to protect it from excessive soil erosion. This design would provide a stable slope with a long-term factor of safety against mechanical failure in excess of 1.5.

Remcor's alternative design would have other advantages over the design presented in the SFS. In contrast to the SFS design in which the soil cover "would not significantly reduce infiltration through the side slope areas" (SFS, Section 5.3.2, at 31), Remcor's design would reduce rainwater infiltration by an estimated 62 percent.24/ The effect of this reduction in rainwater infiltration, which appears to be an EPA objective, would be to reduce contami-

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24/ This calculated reduction in rainwater infiltration is based on the Hydraulic Evaluation Landfill Performance (HELP) modeling that Remcor performed in the FFS (FFS, Section 2.5.1.1, at 2-78 through 2-80) and the assumption that the permeability of the soils used in the upper portion of the fill would be equivalent to the HELP model default value for "silt" soil (Schroeder, et al., 1984). This assumption is reasonable because, in Remcor's design, the fill composition would be carefully selected and would change with depth in the fill. Coarser materials (e.g., sands) would be used at depth and finer-grained soils (e.g., clayey silts) would be placed in the upper portions of the fill.

nant loading to LSE03 downgradient of Waste Area 3 and to reduce contamination of the eastern bedrock.

To the extent EPA remains concerned about landfill gas emissions (a concern with which we strongly disagree), the Remcor design also would significantly reduce the potential for such emissions from the outslopes of Waste Area 3. Using the landfill gas emission model described in the ICF EA (1988a) and based on the increased depth of soil cover in the Remcor design, landfill gas emissions would be reduced by 86 percent. See FFS, Table 35.

In short, the Remcor design is more effective and implementable than the SFS design for the stabilization of the outslopes of Waste Area 3. The alternative design avoids the need for waste excavation and the associated risk. The mechanical stability of the outslopes would be enhanced and both rainfall infiltration and potential landfill gas emissions would be reduced. The design is based on conventional technology and is compatible with the preliminary design for collection of leachate from Seep LSE03 below Waste Area 3. The cost of the alternative design would be no more than that for the design presented in the SFS.

C. A Buttress/Fill Also can Be Used to Stabilize the Outslopes of Waste Area 2 and Avoid the Risks Associated with Regrading or Other Major Construction Activities

Neither EPA's Proposed Plan nor the SFS presents a conceptual design for stabilization of the outslopes of Waste Area 2. The SFS states that "[d]ue to the topographic complexities of the topography of Waste Area 2, a detailed side slope stabilization plan for Waste Area 2 can only be developed after the pre-design geotechnical investigation, including laboratory testing and stability analyses." SFS, Section 5.3.1, at 31.

It is apparent, however, that EPA and its contractor believe that extraordinary measures must be implemented to stabilize the Waste Area 2 outslopes. The SFS states that "[t]he side slope stabilization in Waste Area 2 has been assumed to potentially require construction of major retaining structures (such as steel sheet piles, concrete cantilevered retaining wall, reinforced diaphragm walls, etc.) at the toe of the waste area." SFS, Section 5.3.1, at 31. The SFS states further that "[c]reating a 3:1 stable slope in Waste Area 2 would require excavating significant amounts of waste." SFS, Section 5.3.1, at 31. Moreover, the SFS contains an astounding $1,000,000 estimate for the side slope stabilization of Waste Area 2. SFS, Appendix E, at E-12.

If any slope stabilization is required, such extraordinary measures to stabilize the outslopes in Waste Area 2 are clearly not justified. Apart from the technical complexity and excessive cost involved, the approach described in the SFS poses the same severe environmental and health exposures associated with the excavation of waste from Waste Area 2 as are described above for Waste Area 3. Therefore, as for Waste Area 3, Remcor developed an alternative design for slope stabilization in Waste Area 2 which avoids these severe effects. The design, as depicted in Figures 2 and 3 (attached), would stabilize the outslopes in Waste Area 2 against mechanical failure and cover existing surface materials with a cover of a minimum of 2 feet of clean soil fill.

The alternative design for the Waste Area 2 outslopes is very similar to that for Waste Area 3. Select fill would be placed in the ravine below Waste Area 2 and spread into thin horizontal lifts (e.g., 9 to 12 inches) to achieve a uniform 2.5:1 grade, with benches at approximate Elevations 450 and 480 ft-msl. This slope formation would provide a minimum factor of safety against mechanical failure in excess of 1.5. Fill soils would be selected to provide for coarser materials at depth and finer-grained soils at the surface. The finished grade would be permanently revegetated to provide protection against soil erosion.

As for Waste Area 3, the alternative design for the outslopes in Waste Area 2 would be effective and implementable. It would provide effective slope stability, avoid the risks associated with waste excavation, and reduce rainfall infiltration and potential landfill gas emissions. The design also would involve the use of conventional technology without construction of "major retaining structures" as suggested in the SFS, and would be compatible with the preliminary design for the leachate collection component of the management of migration remedy.

VIII. EPA'S CONSIDERATION OF THE COMPLETE EXCAVATION AND DISPOSAL OF WASTE AREA 2 RATHER THAN CAPPING AND SIDE SLOPE STABILIZATION IS BASED ON A FLAWED ANALYSIS AND INVOLVES SUBSTANTIAL ENVIRONMENTAL RISKS

In its Proposed Plan, EPA indicates that it is considering the complete excavation and disposal of Waste Area 2 rather than capping and side slope stabilization, based on the assumption that it "may prove to be less expensive." In the SFS, EPA's contractor also assumes that waste excavation may be less costly, as well as "technically more feasible and more easily implemented." SFS, Section 3.5.2, at 49. Those assumptions, however, and EPA's consideration of waste excavation, are seriously flawed. They are based on an incomplete analysis of technical issues, regulatory considerations, and cost implications of waste excavation compared with other alternatives for addressing Waste Area 2.

First, on the issue of implementability, EPA underestimates the environmental risks associated with waste excavation and exaggerates the technical difficulties associated with slope stabilization. As described in Section VII.B above, the environmental and health risks associated with the excavation of waste from Waste Area 2 are enormous. Both the FFS and the SFS express considerable concern about the risk to remedial site workers and, possibly, to the general public of exposure to uncontrollable contaminant releases. In contrast, Remcor's proposed design for slope stabilization avoids these risks and avoids the technical difficulties associated with the elaborate regrading option suggested in the SFS. EPA's failure to consider a slope stabilization design such as the one proposed by Remcor has skewed its analysis toward consideration of waste excavation, which is the least desirable option for addressing Waste Area 2.

Second, EPA gives insufficient consideration to the regulatory issues associated with the excavation of waste from Waste Area 2. EPA indicates that it "would most likely dispose of the excavated material by placing it in Waste Area 3 depending on whether RCRA land disposal restrictions [LDRs] apply." In the SFS, EPA's contractor also notes that, if Waste Areas 2 and 3 are defined as separate units, "movement of materials from Area 2 to 3 would constitute placement and LDR would be triggered." SFS, at 45. Having identified the issue, however, EPA does not consider the consequences of a finding that LDRs would apply to waste excavation.

As a general matter, based on EPA guidance and the preamble to the NCP, the movement of excavated waste from one area of contamination to another would constitute disposal of hazardous waste and trigger LDRs. OSWER Directive 9234.2-04FS (EPA, October 1989); Preamble to the NCP, 55

Fed. Reg. 8758 (March 8, 1990). If these requirements were deemed applicable here, waste excavated from Waste Area 2 would have to comply with treatment standards (or a treatability variance would have to be obtained) and be disposed of in a RCRA landfill meeting minimum technological requirements. Because Waste Area 3 does not meet these technological requirements, however, there is a question whether an EPA plan to place waste from Waste Area 2 into Waste Area 3 would satisfy ARARs and, therefore, would pass alternative screening under the threshold criteria established in the revised NCP. Further, the cost of compliance with LDRs -- involving the potential treatment of waste, construction of a RCRA landfill on-site, or disposal off-site -- would be tremendous. In short, these regulatory considerations will have a major impact on the viability of any plan to excavate waste and on the evaluation of any such plan consistent with the NCP. EPA's suggestion that waste excavation is a viable option, without performing the detailed analysis that it performed on other alternatives and is required by the NCP, is ill-considered and contrary to law.

Third, EPA's assumption that the cost of excavating waste from Waste Area 2 may be less than the cost of slope stabilization is erroneous. As the SFS makes embarrassingly clear, EPA does not even have a design concept for slope stabilization. The cost figure of $1,000,000 is apparently chosen at random based on the conclusion that "[i]nsufficient conceptual design inputs are available to accurately estimate construction components and quantities." SFS, Appendix E, at E-12. On this record, reaching any determination at all on this element of a source control remedy -- even by resorting to including two opposing alternatives -- is arbitrary and capricious.

In any event, before EPA can even consider waste excavation as a less costly alternative, it must develop some cost estimate for slope stabilization. Remcor's cost estimate for slope stabilization based on its design is approximately $170,000, or $830,000 less than the figure contained in the SFS. Therefore, the gross overestimation of cost in the SFS has led EPA to the errant conclusion that excavation of waste from Waste Area 2 could be less expensive than slope stabilization. Based on supportable costs, waste excavation from Waste Area 2 would not be less expensive, but rather at least $600,000 more expensive based on a comparison of the SFS cost estimate for excavation of Waste

Area 2 (i.e., $769,800), SFS, Appendix E, at E-26, and the cost estimate for Remcor's proposed stabilization plan. And if LDRs are applicable, the cost of excavating waste from Waste Area 2 could skyrocket.

In sum, excavating waste from Waste Area 2 would involve much greater short-term risk, would not improve effectiveness, and would cost substantially more than side slope stabilization. Accordingly, EPA should drop waste excavation from further consideration.

IX. AN ACTIVE GAS VENTING SYSTEM FOR WASTE AREA 3 IS UNNECESSARY AND SHOULD BE REPLACED BY A PASSIVE SYSTEM

EPA's Proposed Plan provides for an active gas collection system in Waste Area 3 and a passive gas collection system for the other waste areas. EPA apparently believes that an active gas collection system is necessary to "prevent the build-up of methane under the cap" and to "prevent the uncontrolled escape of landfill gases containing hazardous chemicals."

An active gas collection system in Waste Area 3 is not required, however, because there is no unacceptable risk associated with landfill gas exposure at the site. Further, even if there were an unacceptable risk, passive gas collection would be sufficient; the rate of landfill gas emission as calculated from site-specific data is not sufficient to warrant active gas collection. Although EPA apparently questions whether a passive gas collection system can be incorporated into its slope stabilization design, a passive system can be incorporated into Remcor's alternative design for outslope stabilization in Waste Area 3.

The purpose of a gas collection system, whether active or passive, is to collect and disperse gas (principally methane) generated as landfill organic waste decomposes, so that the gas does not build up underneath an impermeable cap. If sufficient gas were generated from the waste and allowed to accumulate, the gas pressure would eventually rupture the cap if the pressure exerted by the gas equaled or exceeded the downward pressure exerted by the weight of the overlying cap materials. In a passive gas collection/venting system, a permeable pathway is provided so that the gas pressure builds up only until the pressure is sufficient to push the gas through the permeable pathway and out from under the cap (to the edge of the cap or to a vent through the cap). In an active system, vacuum pumps are used to pump the gas out from under the impermeable cap.

First and foremost, an active gas collection system is not required at this Site because, as described above in Section III.B, none of the studies performed at the site has demonstrated an unacceptable risk to future site trespassers or residents from the inhalation of gases potentially emitted from the landfilled wastes. The 1988 EA, which serves as the basis for EPA's finding of unacceptable risk, failed to consider the characteristics of the municipal solid waste/soil mixtures on the Site, overstated the emission source area, exaggerated the rate of landfill gas emissions, and overstated exposure possibilities. In contrast, the risk analysis contained in the FFS, which is based on more recent, site-specific data and EPA guidance, shows no unacceptable risk from landfill gas inhalation.

Furthermore, even if there were an unacceptable risk, the rate of landfill gas emission from Waste Area 3 does not justify an elaborate, active gas collection system with common collection headers, two condensing units and two vacuum blower units, a vapor phase activated carbon treatment system, and nine telescoping vertical extraction wells.

SFS, Appendix C, at C-13. To the contrary, Remcor's calculations based on data developed by EPA's contractors show that gas buildup under the cap in Waste Area 3 would be well within the maximum pressure that a passive gas collection system could accommodate.

Remcor used the landfill gas velocity reported in the 1988 EA (Table C-4), i.e., 1×10^{-10} cm/sec, to calculate the rate at which landfill gases, primarily methane, would likely be generated under the capped portion of Waste Area 3.[25] The SFS shows a capped area in Waste Area 3 of approximately 115,000 square feet (ft^2), i.e., 1.07×10^8 square centimeters. SFS, at 24 and Appendix E, at E-9. Therefore, based on data supplied by the EA and the SFS, the total gas generation (flux) rate for the capped portion of Waste Area 3, which can be calculated by multiplying the landfill gas velocity by the landfill area, is 1.07×10^{-2} cubic centimeter per second (i.e., 1.07×10^{-5} liter per second).

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[25] This landfill gas velocity was calculated in the ICF EA (1988a) from measurements of methane gas concentrations in certain boreholes drilled through waste areas at this site. Remcor did not verify this landfill gas velocity value in the field studies for the FFS.

Next, Remcor calculated the potential effect of this gas generation rate on gas buildup under the cap. In order to evaluate the need for an active gas collection system rather than a passive system, Remcor assumed the presence of a passive system in making its calculations. For Waste Area 3, the gas venting layer is taken as a layer of 12 inches (30 centimeters) of sands with an estimated gas permeability of 1.6×10^{-3} cm/sec (i.e., 16 times the water permeability of 1×10^{-4} cm/sec).[26] The cap configuration presented in the SFS indicates that the maximum distance the gas would have to flow to reach the perimeter of the cap would be no more than 80 feet. Based on simple fluid me-

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26/ This water permeability is considered quite conservative (underestimating) for the sand fill materials that would be regraded to form the subgrade under the cap in Remcor's proposed design as described in Section V above and Figure 4 (attached). See also FFS, Section 2.3.2.1, at 2-45 and Section 2.3.2.2, at 2-46. The permeability of this sand layer for a fluid other than water (e.g., landfill gas) is determined by two factors: (1) the intrinsic permeability of the material, and (2) the viscosity and density of the fluid (both the viscosity and density can be described together as "kinematic viscosity"). The gas permeability to water ratio is calculated by dividing the kinematic viscosity of air (assumed to be representative of the landfill gas) by the kinematic viscosity of water. Todd, 1959. At 20 degrees celsius, the kinematic viscosities for air and water are 1.8×10^{-5} and 1.1×10^{-4} square feet per second, respectively. Streeter, 1971.

chanics, Remcor calculates that the pressure required to induce flow under these circumstances is less than 0.003 pound per square inch (psi). By contrast, the downward pressure exerted by the 5 feet of material comprising the overlying cap (based on Remcor's design described in Section V above and an average unit weight of 100 pounds per cubic foot [lbs/ft^3] of material) is 5 feet x 100 lbs/ft^3 = 500 lbs/ft^2 or 3.5 psi. Accordingly, Remcor estimates the maximum gas buildup pressure to be less than 0.1 percent of the downward pressure exerted by the overlying materials.

Clearly, therefore, even if the data provided in the EA are not entirely accurate, a passive gas collection system is adequate to remove whatever gas is generated within Waste Area 3. Further, Remcor's alternative design for outslope stabilization in Waste Area 3 can easily accommodate such a passive system as shown in Figures 2, 3, and 4, Detail G. Therefore, to the extent EPA shares the concern expressed in the SFS that the slope may not provide a stable base or access for equipment needed to install gas venting systems on the outslopes, that concern is misguided. Similarly, landfill gas emissions along the outslopes should not be a concern because, as described in Section VII.B above, Remcor's design will reduce uncontrolled gas emissions by an estimated 86 percent.

In sum, the inclusion of an active gas collection system in Waste Area 3 results in excessive capital costs of $263,000, based on pricing information provided in the SFS, and operating expenses without any benefit. A passive system is effective, more implementable because it avoids the complexity of an active system, and less costly.

X. A SINGLE SOURCE CONTROL WELL IS SUFFICIENT TO INTERCEPT THE GROUND WATER DISCHARGING FROM THE TILL BENEATH WASTE AREA 3

EPA provides in its Proposed Plan for the installation of source control wells through Waste Area 3 to intercept the groundwater discharging from the till into the sand and gravel unit to the west and into the weathered bedrock to the east. The SFS proposes two such source control wells based on the assumption that "[u]sing a minimum of two wells with variable pumping rates and schedules will provide an extra measure of control on the capture zone configuration." SFS, Appendix D, at D-1. Based on currently available data, however, one source control well may suffice.

Further, if EPA disagrees that one well would be sufficient, it should at least await the results of additional testing to be performed in connection with the design of the management of migration remedy before making a decision. During the FFS, the short-term pumping of Well MW-41G had a significant influence on the sand and gravel unit. Additional aquifer pumping tests will be performed in the predesign of the extraction well(s) to be installed as a component of the management of migration remedy. Those tests may demonstrate that the extraction well(s) will provide sufficient hydrodynamic control beneath Waste Area 3 to obviate the need for two or even one source control well.

Apart from the appropriate number of wells, the SFS proposes to use stainless steel risers in constructing the source control wells. Contaminant levels in the ground water and soils within Waste Area 3, however, are insufficient to warrant use of stainless steel riser pipes. Mild steel or polyvinyl chloride (PVC) would be acceptable materials for this purpose and would be less costly.

XI. THE SCHEDULE FOR IMPLEMENTATION OF THE SOURCE CONTROL REMEDY SHOULD BE INTEGRATED WITH THE SCHEDULE FOR IMPLEMENTATION OF THE MANAGEMENT OF MIGRATION REMEDY

Although EPA has chosen to separate remedial action at the Old Springfield Landfill into two separate remedies -- the management of migration remedy and the source control remedy -- the schedule for implementation of the two remedies should be integrated to achieve the best results. From a technical or engineering perspective, the division of the remedy into two parts is artificial. Failure to consider the effect of one remedy on the other may result in inefficiencies at best and in outright inconsistencies at worst.

There are a number of areas in which the design and construction of one remedy must be integrated with the design and construction of the other. For example, as described in Section XI above, the design and installation of one or more source control wells may have to await at least the design of the extraction well(s) as part of the management of migration remedy. Perhaps of greater impact, the design and installation of the seep collection system on the eastern outslopes cannot be completed until the design of the outslope stabilization measures on the eastern slope is likewise completed. The designs of those two remedial components are intertwined, because the soil fill associated with slope stabilization will likely extend beyond the points of seep collection on the eastern outslopes. It may also be necessary to integrate the actual construction of the seep collection system with the slope stabilization measures, for technical reasons and/or to avoid large inefficiencies.

In its Record of Decision for source control, EPA should acknowledge the relationship between the two remedies and either specifically integrate the two schedules or indicate the future need to do so. An integration of the two remedies is necessary for technical reasons and for efficiency reasons and is required by the NCP.

LIST OF REFERENCES

Barfield, B.J., R.C. Warner, and C.T. Haan, 1981, Applied Hydrology and Sedimentology of Disturbed Lands, Oklahoma Technical Press, Stillwater, Oklahoma.

Ebasco Services, Incorporated, July 1990, "Draft Final Supplemental FS Evaluation, Old Springfield Landfill, Operable Unit No. 2," Contract No. 68-W9-004 EPA Region I, Boston, Massachusetts.

Hathaway, M., July 1990, "Memorandum to Site File, Detailed Evaluation and Comparative Analysis of Alternatives (Detailed Evaluation Memo)," Remedial Project Manager, Maine and Vermont EPA Region I Superfund Program, Boston, Massachusetts.

ICF Incorporated, June 1988a, "Draft Final Endangerment Assessment Report, Old Springfield Landfill, Town of Springfield, Windsor County, Vermont," EPA Work Assignment No. 50-1L39, U.S. Environmental Protection Agency, Region I, Boston, Massachusetts.

ICF Incorporated, June 1988b, "Draft Final Feasibility Study Report, Old Springfield Landfill, Town of Springfield, Windsor County, Vermont," EPA Work Assignment No. 50-1L39, U.S. Environmental Protection Agency, Region I, Boston, Massachusetts.

ICF Incorporated, June 1988c, "Draft Final Supplemental Remedial Investigation Report, Old Springfield Landfill, Town of Springfield, Windsor County, Vermont, EPA Work Assignment No. 50-1L39, U.S. Environmental Agency, Region I, Boston, Massachusetts.

Olsen, R.L., and A. Davis, June 1990, "Predicting the Fate and Transport of Organic Compounds in Groundwater: Part 1," Hazardous Materials Control, Volume 3, No. 4, pp. 39-64, Hazardous Materials Control Resources, Inc., Silver Spring, Maryland.

Remcor, Inc., 1990, "Draft Final Focused Feasibility Study, Old Springfield Landfill Site, Springfield, Vermont," Project No. 89029, Emhart Industries, Inc., Hartford, Connecticut and Textron, Inc., Providence, Rhode Island.

Schroeder, P.R., A.C. Gibson, and M.D. Smolen, 1984, "The Hydrologic Evaluation of Landfill Performance (HELP) Model (Draft)," EPA/530-SW-84-010, U.S. Army Waterways Experiment Station, Vicksburg, Mississippi and U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

Schuster, R.L. and R.J. Krizek (eds.), 1978, "Landslides, Analysis and Control, Special Report 176, National Academy of Services, National Research Council, Transportation Research Board, Commission on Sociotechnical Systems, Washington, D.C.

Streeter, V.L., 1971, Fluid Mechanics, Fifth Edition, The McGraw-Hill Book Company, New York, New York.

Tchobanoglous, G., H. Theisen, and R. Eliassen, 1977, Solid Wastes, Engineering Principles and Management Issues, McGraw-Hill Book Company, New York, New York.

Teng, W.C., 1962, Foundation Design, Prentice-Hall, Inc. Englewood Cliffs, New Jersey.

Terzaghi, K. and R.B. Peck, 1967, Soil Mechanics in Engineering Practice, John Wiley & Sons, Inc., New York, New York.

Thibodeaux, L.J., 1981, "Estimating the Air Emissions of Chemicals from Landfills," Journal of Hazardous Materials, Volume 4. Page 244.

Todd, D.K., 1959, Ground Water Hydrology, John Wiley & Sons, Inc., New York, New York.

Tschebotarioff, G.B., 1973, Foundations, Retaining and Earth Structures, The McGraw-Hill Book Company, New York, New York.

U.S. Environmental Protection Agency, June 1988, "EPA Proposes Cleanup Plan for Old Springfield Landfill Site," EPA Region I Superfund Program, Boston, Massachusetts.

U.S. Environmental Protection Agency, August 1988, "CERCLA Compliance with Other Laws Manual - Draft Guidance," Office of Emergency and Remedial Response, Washington, DC.

U.S. Environmental Protection Agency, September 1988, "Record of Decision, Old Springfield Landfill, Springfield, Vermont," Region I, Boston, Massachusetts.

U.S. Environmental Protection Agency, March 1989, "Risk Assessment Guidance for Superfund, Volume II, Environmental Evaluation Manual (Interim Final)," EPA/540/1-89/001, Office of Emergency and Remedial Response, Washington, DC.

U.S. Environmental Protection Agency, October 1989, "RCRA ARARs: Focus on Closure Requirements," Directive 9234.2-04FS, Office of Emergency and Remedial Response, Washington, DC.

U.S. Environmental Protection Agency, December 1989, "Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A) (Interim Final)," EPA/540/1-89/002, Office of Emergency and Remedial Response, Washington, DC.

U.S. Environmental Protection Agency, January/April 1990, "Health Effects Assessment Summary Tables, 1st and 2nd Quarters, FY-1990 (Office of Solid Waste and Emergency Response Publication No. OS-230)," U.S. Environmental Protection Agency, Washington, DC.

U.S. Environmental Protection Agency, July 1990, "EPA Proposes Source Control Cleanup Plan for the Old Springfield Landfill Site (Proposed Plan)," Region I Superfund Program, Boston, Massachusetts.

U.S. Environmental Protection Agency, July and August 1990, "Seminars - Design and Construction of RCRA/CERCLA Final Covers," (Presentations made between July 17 and August 17, 1990, various locations), Technology Transfer CER1 90-50, Office Research and Development, Washington, D.C.

Versar, Inc., July 1989, "Exposure Factors Handbook (EPA 600/8-89/043)," prepared for Office of Health and Environmental Assessment, U.S. Environmental Protection Agency, Washington, DC.

EXHIBIT 1

RESUMES OF REMCOR PERSONNEL

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Transport of Immiscible Fluids in the Subsurface, by J.W. Mercer, NWWA, Baltimore, Maryland
Special Topics in Geotechnical Engineering, by D. Sangray, Carnegie-Mellon University, Pittsburgh, Pennsylvania
Groundwater Transport Modeling, by G.F. Pinder, Princeton University, Princeton, New Jersey
Loss Prevention, ASFE, Washington, DC

REGISTRATION

Professional Engineer: Connecticut, New York, Pennsylvania, Tennessee, Vermont, Virginia

PROFESSIONAL EXPERIENCE

1988 to Present: Mr. Black has been a member of the Environmental Engineering and Design Group at Remcor since March 1988. Initially hired as a Project Engineer, Mr. Black has been promoted to his current position as Project Manager in charge of the Group. In this capacity, Mr. Black manages projects and the activities of civil (geotechnical, structural, wastewater treatment), environmental, and chemical engineers; draftspersons; and engineering support personnel.

Mr. Black's specific engineering and project discipline expertise is related to geotechnical engineering, in particular, the behavior of soil, rock, and ground water. His background is especially suited to the design and evaluation of construction activities that involve the behavior of these media.

Descriptions of several projects that Mr. Black has played a lead role in at Remcor are given below:

- Feasibility study for a National Priority List (NPL) site in western Pennsylvania with solvent, paint waste, and metals contamination.

- Supervised the design of the ground water collection system for a hillside landfill in western Pennsylvania. The ground water collection system allowed extraction of polychlorinated biphenyl (PCB) contaminated oil and ground water while limiting impacts on adjacent wetlands.

- Managed environmental site assessments of six steel mills, automotive plants, and foundries.

- Managed the subsurface investigation and design of the ground water remediation system for a chemical plant in the Midwest. The ground water and soil contained elevated concentrations of cobalt, lead, nickel, potassium, and uranium.

- Managed the site investigation of a specialty steel plant (including the melt shop, pickling lines, three wastewater treatment plants, rolling mills, and four solid waste disposal areas) in Ontario, Canada. Mr. Black directed the activities of the 10-person field investigation team, coordinated the activities of the asbestos, drilling, and analytical laboratory subcontractors, and prepared the site assessment report.

- Developed closure plans for two biosludge surface impoundments in West Virginia. Mr. Black evaluated alternatives, prepared the final design, and assisted the client in obtaining approval for closure from the West Virginia Department of Natural Resources (WVDNR) and the U.S. Environmental Protection Agency (EPA).

- Provided civil and geotechnical engineering support for the development of an Operable Unit approach to remediation of a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site in the Northeast. The constituents of concern at the site included volatile organic compounds (VOCs), acids, metals, and PCBs. The first operable unit designed included ground water collection and treatment.

- Provided input to the development of realistic solutions to the closure and/or remediation of PCB, toxic metals, and VOC-contaminated facilities.

1980 to 1988: Prior to joining Remcor, Mr. Black was employed by D'Appolonia Consulting Engineers, Inc. (D'Appolonia) and had been involved in projects ranging from slope stabilization projects to the design of a 500,000-cubic meter underground storage facility. The main areas of Mr. Black's expertise have been associated with the analysis and design of structures that are related to the engineering behavior of soil and rock, hydrologic and hydraulic analysis of civil engineering structure, and the design and utilization of underground space. Projects that Mr. Black had been involved with, under the following categories, while with D'Appolonia include:

- Water Resources:
  - Planning and development of construction specifications for the excavation and closure of two mill sludge lagoons on the Ohio River.
  - Ground water modeling for paper sludge lagoons near Green Bay, Wisconsin. These models were used to design a slurry wall/gradient control system to limit migration of chlorides.
  - Layout and evaluation of conceptual hydroelectric power facilities on the Betsiboka River in Ambodiroka, Madagascar.
  - Evaluation of the effects of long-term dewatering on adjacent structures, of historical significance, for the Theater District project in Milwaukee, Wisconsin.
  - Evaluation of the consequences of failure of any one, or a combination of, three dams in the Hoosier National Forest, Indiana.
- Slope Stabilization and Remediation:
  - Subsurface exploration, design, and construction document preparation for the remediation of a 20-acre landslide, which moved 1,300 feet of the Conrail Railroad tracks into the Ohio River.
  - Stabilization of a hillside with approximately 100 private residences in Wheeling, West Virginia. This project involved stabilizing the hillside, four roadways, and approximately 100 houses with minimum disruption to normal activities.
  - Design of cut-and-fill slopes for the development of a mine haul road on an unstable hillside in Greene County, Pennsylvania and the proposed SRC II Facility in Morgantown, West Virginia.
  - Evaluation and redesign of a mine spoil disposal facility failure in Belcher, West Virginia. the failure of this facility resulted in spoil materials "flowing" into homes more than 2,500 feet from the initial disposal site.

- Mine Waste Disposal:
  - Development and consultation during implementation of an alternative coal refuse disposal plan for existing coal refuse disposal embankments, which were operating inefficiently. The alternative plan, now in use, included the development of a large dam built of coal refuse to impound a slurry of fine coal processing waste.
  - Evaluation of the mining sequence and resulting spoil pile stabilization requirements for an oil shale mining project in Queensland, Australia.
  - Design of surface drainage and sediment control systems including dams and drainage channels for several coal refuse disposal facilities in the Appalachian region.
- Underground Space:
  - Layout and development of the facility design and excavation method for a 500,000-cubic meter underground storage facility in the Middle East.
  - Development, supervision, and report preparation for a rock testing program conducted within the outlet tunnel of the John W. Flannagan Dam near Haysi, Virginia.
  - Development of remediation plans for a site on which leakage from underground storage tanks had created the potential for off-site ground water contamination.

1979 to 1980: Prior to joining D'Appolonia, Mr. Black was employed by Delon Hampton and Associates, Chartered of Silver Spring, Maryland. Delon Hampton and Associates is a consulting engineering firm that is involved mainly in transportation-related projects such as tunnels, airports, bridges, and planning. Mr. Black was involved in geotechnical research, design, and recommendations in support of the structural design group. The scope of this work included:

- Research into the use of geotechnical instrumentation for design and construction of both soft ground and rock tunnels and on the influence of geotechnical parameters in tunnel lining design. Various methods of improving tunnel design and construction through improved preconstruction geotechnical exploration were developed.
- Site investigation, analysis, and design of three projects at Washington National Airport.

1977 to 1979: During the completion of his Master of Science Degree, Mr. Black worked for Faculty Technical Consultants (FTC) in Buffalo, New York. His responsibilities at FTC included the calibration, installation, and monitoring of approximately 100 instruments utilized to evaluate the behavior of a long-span corrugated metal culvert in Bucks County, Pennsylvania. The field testing for this project included plate load tests, deformation, and stress measurements.

PROFESSIONAL AFFILIATIONS

Chi Epsilon, National Honorary Civil Engineering Fraternity
Tau Beta Pi, National Engineering Honors Association

PUBLICATIONS

Hampton, D., J.S. Jin, and J.P. Black, 1980, "Representative Ground Parameters for Analysis of Tunnels: Vol. 3, Tunnel Design and Construction," Report FHWA/RD-80/014.

LEO M. BRAUSCH
CHIEF OPERATING OFFICER

EDUCATION

M.S., 1976, Civil and Environmental Engineering,
University of Cincinnati
B.S.C.E., 1975, Civil and Environmental Engineering,
University of Cincinnati

REGISTRATION

Professional Engineer: Mississippi, New Mexico, Ohio, Pennsylvania

PROFESSIONAL EXPERIENCE

1985 to Present: As Chief Operating Officer, and previously as Vice President of Engineering and Project Development, Mr. Brausch provides senior management of Remcor's technical and project management staff. In keeping with Remcor's client-oriented, hands-on approach to problem solving, Mr. Brausch also serves as the senior technical director and principal-in-charge of integrated investigation, engineering, and remediation projects. In this position, he serves a variety of technical roles, including the following:

- Technical consultant in application of remedial technologies
- Evaluator of contaminant fate and transport data
- Client liaison/representation before regulatory agencies.

Mr. Brausch's key technical contributions are focused on the examination of site contamination data leading to the identification, evaluation, and conceptual design of cost-effective remedial measures. These evaluations have been applied to many types of hazardous waste projects, including the following:

- Closure of hazardous waste land disposal units (e.g., surface impoundments, landfills) under Resource Conservation and Recovery Act (RCRA) regulations
- Corrective action at solid waste management units (SWMUs) subject to continuing releases provisions of RCRA, as amended

- Removal actions and final remediation of waste sites under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

- Environmental liability assessments associated with the transfer of contaminated industrial real estate

- Industrial facility decontamination, including polychlorinated biphenyl (PCB) decontamination under the Toxic Substances Control Act (TSCA) PCB Spills Cleanup Policy.

This work has been performed for private-sector clients in steel, chemical, and manufacturing industries. Technologies applied to site cleanups generally focus on in-situ or on-site treatment of wastes and soil and ground water contamination, including bioremediation, soil vapor extraction, in-situ chemical fixation, and waste stabilization.

Mr. Brausch has also been the project director and/or manager responsible for technical quality, budget, and schedule for major turnkey hazardous waste projects undertaken by Remcor. Descriptions of representative projects follow:

- Investigation and subsequent cleanup of a 90-acre industrial complex in western Pennsylvania. This project involved the assessment of contamination and design and implementation of remedial measures associated with: PCB decontamination of plant buildings, equipment, and process sewers; closure of a former PCB waste disposal area; decontamination and closure of electroplating facilities; and plant-wide removal of asbestos-containing materials (ACM).

- RCRA closure plan development and implementation for five surface impoundments containing 14,000 cubic yards (yd^3) of electroplating sludge at a site in Mississippi. Closure involved on-site dewatering of the sludge, in-situ containment of contaminated soils, and ground water recovery/treatment. In addition, potential continuing releases from on-site SWMUs were investigated, and corrective measures were designed and implemented.

- Under the requirements of a CERCLA Section 106 Order, sampling and analysis of PCB concentrations in plant facilities, surface waters, and sediment associated with leakage from a heat exchanger that led to contamination of off-site drainageways, in eastern Pennsylvania. The investigation results were used to develop both on-site decontamination and off-site cleanup plans that were subsequently implemented under CERCLA Orders. The on-site decontamination included cleaning, scarifying concrete surfaces, and encapsulation; the off-site removal involved excavation and off-site disposal of PCB-contaminated stream sediments with strict erosion and sedimentation controls.

- Performance of the remedial investigation/feasibility study (RI/FS) and concurrent design/construction of a ground water treatment system at a site in eastern Pennsylvania. Ground water treatment employs two large air strippers in series to remove trichloroethylene (TCE) and other chlorinated aliphatics for a pumpage rate of approximately 300 gallons per minute. The treatment system effluent can either be discharged to the municipal water supply system or to a small stream when water demand is low. The pumping and treatment of ground water addresses the need for adequate local water supply and effectively controls and recovers the plume of contamination.

In addition to technical contributions and project management, much of Mr. Brausch's work involves representation of clients in regulatory agency negotiations and in intercompany negotiations involving real estate transactions. Mr. Brausch has served as an expert witness in a major civil action involving PCB contamination at four facilities in three states. Mr. Brausch served as the lead technical role for Remcor in the conduct of site studies, including a comprehensive subsurface evaluation of PCB and TCE contamination at one of the facility sites in Tennessee. At trial, Mr. Brausch testified relative to contamination assessment methods, decontamination procedures and costs, and PCB and TCE transport mechanisms and pathways.

1980 to 1985: Mr. Brausch served as the Manager of Project Development for International Technology Corporation in Pittsburgh, Pennsylvania (formerly D'Appolonia Waste Management Services). His primary role was in the planning and development of remedial response programs for formerly utilized waste disposal sites. Representative experiences included the following:

- Project manager for the investigation of the degree and extent of PCB contamination at seven manufacturing facilities in five states. This work included development and execution of investigation programs, evaluation of alternative decontamination technologies, and preparation of detailed decontamination plans and cost estimates.

- Project manager for the preparation of a RCRA closure plan at a formerly used secondary lead smelter site in Florida. The project involved a comprehensive contamination survey, subsurface exploration, and ground water monitoring. Mr. Brausch headed the design team for waste removal, facility decontamination, and ground water treatment aspects of the closure.

- Project director for preparation of a RCRA closure plan for two lagoons (containing nearly 100,000 yd^3) of mixed organic and inorganic sludges) at a plant site in southern Ohio. The closure plan called for dewatering and physical stabilization of sludges preparatory to on-site containment.

In addition to such assignments, Mr. Brausch served as in-house consultant on health and safety programs; air quality monitoring during waste site cleanup; and waste analysis, manifesting, transportation, and disposal.

1978 to 1980: Mr. Brausch served as the Lead Engineer, Environmental Issues, for the environmental and safety analysis of the Waste Isolation Pilot Plant (WIPP) proposed for a site east of Carlsbad, New Mexico. This position involved coordinating and leading investigations attendant to all environmental permits, approvals, and compliances required for this radioactive waste storage/disposal facility.

1976 to 1978: With D'Appolonia Consulting Engineers, Inc., Mr. Brausch served as a project leader and technical contributor on environmental investigations and engineering designs. His principal involvement was in environmental permitting and the design of pollution control facilities. Representative technical tasks included air quality and meteorological monitoring, preparation of emission inventories, and evaluations of control technologies for new-source air quality permitting. Mr. Brausch also prepared the process, hydraulic, and structural design of industrial wastewater treatment facilities. Key issues in the treatment schemes included the design and economic analysis of alternative treatment schemes (e.g., precipitation/clarification, ion exchange, biological); conveyance and disposal of metal hydroxide and organic sludges; and plant start-up, operation, and maintenance.

1972 to 1976: Prior to receiving his degrees, Mr. Brausch worked part time as an engineering technician in wastewater treatment design, highway planning, and surveying.

PUBLICATIONS AND PRESENTATIONS

Nakles, D.V. and L.M. Brausch, 1990, "Bioremediation of Coke By-Product Plant Sites," Paper No. 90-49.3, 83rd Annual Meeting of the Air and Waste Management Association, June 25 through 29, Pittsburgh, Pennsylvania.

Grantz, J.A. and L.M. Brausch, 1988, "Investigation, Remediation and Sale of Armco's Former Ambridge Seamless Steel Pipemaking Facility," Paper No. 88-39.4, 81st Annual Meeting of the Air Pollution Control Association, June 19 through 24, Dallas, Texas.

Husak, A.D., L.M. Brausch, and B.P. Bundy, 1985, "Recent Experiences in Waste Site Remedial Action," Symposium Proceedings, American Institute of Chemical Engineers 1985 Spring National Meeting, March 25 through 28, Houston, Texas.

Brausch, L.M. and J.S. Lewis, Jr., 1984, "Case Study: Leachate Containment System Installation, Lipari Landfill, Pitman, New Jersey," Superfund Update: Cleanup Lessons Learned, symposium sponsored by the Center for Energy and Environmental Management, May 21 and 22, Denver, Colorado.

Brausch, L.M., 1984, "Advances in Ground Water Treatment Technology," General Electric Environmental Protection Seminar, April 25 through 27, Philadelphia, Pennsylvania.

Brausch, L.M., 1983, "Implementation of Remedial Action Program, Enterprise Avenue Site," Proceedings, Conference on the Disposal of Solid, Liquid, and Hazardous Wastes, American Society of Civil Engineers, April 28 and 29, Bethlehem, Pennsylvania.

Brausch, L.M., 1982, "Siting and Design of Hazardous Waste Landfills," Hazardous Wastes Generation and Management Conference, June 9 and 10, Pittsburgh, Pennsylvania.

Brausch, L.M., 1982, "Design and Construction of Landfills for Hazardous Wastes," International Conference on Technology and Technology Exchange, May 3 through 6, Pittsburgh, Pennsylvania.

Hohmann, G.L. and L.M. Brausch, 1981, "Environmental Impact and Protection for the Waste Isolation Pilot Plant (WIPP)," Waste Management '81, American Nuclear Society Topical Meeting, Tucson, Arizona.

Laushey, L.M. and L.M. Brausch, 1979, "The Geometrics of Rill Formation on Hillsides," Proceedings of the XVIII Congress of the IAHR, International Associated for Hydraulic Research, Caligari, Italy.

Brausch, L.M., 1976, "Observations on Rill Pattern Development," Master's Thesis, University of Cincinnati, Cincinnati, Ohio.

JOHN A. GEORGE
DIRECTOR - SITE CHARACTERIZATION AND ASSESSMENT

EDUCATION

M.S., 1976, Terrestrial Ecology, Clarion University of Pennsylvania
B.S., 1975, Biology, Clarion University of Pennsylvania

PROFESSIONAL EXPERIENCE

1987 to Present: Mr. George joined Remcor in 1987. He currently serves as Director of the Site Characterization and Assessment Section, responsible for project scheduling, budgetary control, resource allocation, technical direction, review of deliverables, and client liaison. His Section is responsible for site investigations, definition of the extent of contamination in environmental media, evaluations of potential risks and remedial actions, particularly with reference to ground water.

Mr. George recently directed the completion of a focused feasibility study (FFS) of potential source control measures at a former municipal and industrial waste landfill in Vermont. This National Priorities List (NPL) site was the subject of extensive agency investigation since 1984; Remcor has worked with potentially responsible parties (PRPs) to coordinate the FFS, which included a major field investigation of the site hydrogeology. Mr. George also managed a remedial investigation/feasibility study (RI/FS) focusing on volatile organic ground water contamination at an NPL site near Allentown, Pennsylvania. Both of these efforts were conducted by Remcor on behalf of the PRPs and are currently in the remedial design/remedial action (RD/RA) phase, again led by Remcor. This work has involved extensive efforts on Remcor's part to work with the PRPs to negotiate the respective Consent Agreements for RD/RA.

Mr. George has participated in numerous site characterization efforts. Included among these are studies of waste management units at electronics components manufacturing facilities and abandoned steelmaking facilities, and wastewater settling lagoons at a primary aluminum reduction facility. He was also one of the principal authors of a Remcor study of potential effects of the U.S. Environmental Protection Agency (EPA) Resource Conservation and Recovery Act (RCRA) Corrective Action Program (CAP) on the domestic steel industry. Mr. George continues to lead Remcor's efforts to provide support to the American Iron and Steel Institute (AISI) in review of the potential cost impacts of the RCRA CAP.

1982 to 1987: Mr. George served as a Project Manager in the Waste Management Services Division of NUS Corporation (NUS) in Pittsburgh, Pennsylvania. During much of this period NUS was the prime contractor to the EPA for Remedial Planning and Field Investigation Team (FIT) support for the Superfund Program. Mr. George participated in several RI/FSs at Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites, both technically and in a managerial role. The following provides a representative listing of project experience:

- Groveland Wells Site, Groveland, Massachusetts - Project Manager - RI/FS for a 820-acre municipal wellfield in northeastern Massachusetts contaminated with volatile organics, principally trichloroethylene (TCE).

- Charles George Land Reclamation Trust Landfill Site, Tyngsboro, Massachusetts - Project Manager - RI/FS for a 70-acre municipal and industrial waste landfill in northeastern Massachusetts overlying contaminated fractured bedrock aquifer tapped by domestic wells; total landfill volume approximately four million cubic yards.

- Cannon Engineering/Plymouth Site, Plymouth, Massachusetts - Technical Lead - Wetlands and floodplain assessment in support of the FS.

- Drake Chemical Site, Lock Haven, Pennsylvania - Technical Lead - Assessment of vegetative stress due to discharge of herbicides from a former manufacturing facility.

- Sullivan's Ledge Site, New Bedford, Massachusetts- Project Manager - RI/FS for volatile organic/polychlorinated biphenyl/metals disposal in abandoned quarry pits.

- Leetown Pesticide Site, Leetown, West Virginia - Project Manager:

  - RI/FS for evaluation of a 2.5-square mile watershed contaminated through indiscriminant disposal of pesticides and the use of agrichemicals.

  - Bench-scale treatability study of microbial degradation of pesticides by indigenous soil microbes.

1980 to 1982: Mr. George served as Director of Mining Services with Penn Environmental Consultants (acquired by NUS in 1981), supervising a staff that provided complete engineering and permitting services to several moderate-sized Appalachian surface mining interests.

1979 to 1980: Mr. George served as a principal investigator with Michael Baker Corporation, Beaver, Pennsylvania. His responsibilities involved environmental assessments for utility line construction and development of environmental baseline data for surface affects on underground mining operations.

1977 to 1979: Mr. George served as Supervisor of the Land Stabilization and Reclamation Program (Surface Mining Reclamation) at Belmont Technical College, St. Clairsville, Ohio.

PREVIOUS PROFESSIONAL AFFILIATIONS

American Chemistry Society
American Institute of Biological Sciences
Pennsylvania Mining Professionals (Vice President, 1981/1982)
Soil Conservation Society of America

PUBLICATIONS

George, J.A. and L.A. Szuhay, 1988, "Implications of the RCRA Continuing Releases/Corrective Action Program Regulations for the Iron and Steel Industry," presented at the 81st Annual Meeting of the Air Pollution Control Association, Dallas, Texas.

Hubbard, A.E., J.A. George, R. Hubbard, and W. Hagel, 1986, "Quantitative Risk Assessment as the Basis for Definition of Extent of Remedial Action at the Leetown Pesticide Superfund Site," Presented at the HMCRI Superfund '86 Conference, Washington, DC.

George, J.A., 1982, "Erosion and Sedimentation Control Alternatives - Surface Mining in Northern Appalachia," presented at the Fifth Annual Meeting of the Water Pollution Control Association of Pennsylvania, Pittsburgh, Pennsylvania.

George, J.A., 1976, Seasonal Weight and Activity Relationships in a Free-Ranging Population of the Eastern Chipmunk (Tamias striatus) Rodentia: Sciuridae, Master's Thesis, Clarion State College.

PETER V. SWALLOW
PROJECT HYDROGEOLOGIST

EDUCATION

B.S., 1984, Geology, George Mason University

SPECIAL TRAINING

Annual Health and Safety Refresher Course, 1990
Waste Site Supervisor/Manager Training Course, 1987
Waste Site Worker Protection Course by Hygiene, Safety and Training Company, 1987
Safety at Hazardous Waste Sites by National Water Well Association (NWWA), 1985
24-Hour Course on Ground Water Geochemistry, NWWA, 1989
40-Hour Course on Analytical Aquifer Analysis Techniques, NWWA, 1987
Rutgers University Course on Soils and Site Evaluation, 1986
U.S. Environmental Protection Agency (EPA) Site Evaluation Seminar, 1986

PROFESSIONAL EXPERIENCE

1987 to Present: Mr. Swallow joined Remcor as a staff Geologist in 1987 and has served as a Project Geologist for Remcor since 1989. In this position, Mr. Swallow is responsible for developing and implementing ground water monitoring and extraction programs as well as a variety of contamination investigations resulting from hazardous waste disposal practices. Among these investigations are remedial investigations/feasibility studies (RI/FS) and remedial design and monitoring studies under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and preliminary assessments/site investigations for continuing releases under the Resource Conservation and Recovery Act (RCRA). Recent tasks include:

- Site coordinator and project hydrogeologist for a 10-man, 5-month field investigation for an RI/FS under CERCLA in southern Vermont, which included monitoring wells, extraction wells, borings, test pits, multi-well pumping tests and injection tests, single well tests, temporary treatment system construction, and operation.

- Seismic and electromagnetic investigation in South Carolina.

- Environmental oversight for 5-month decommissioning and demolition of a coking facility and 10-mile gas line in southwestern Ohio.

- Project hydrogeologist for an RI/FS and ground water extraction monitoring program under CERCLA in eastern Pennsylvania.
- Assisted in the conduct and evaluation of multi-well pumping tests in Charlestown, West Virginia.
- Assisted in several multi-site environmental audits including performing test pit, boring, and monitoring well programs.
- Assisted in the Superfund Amendments and Reauthorization Act (SARA) Title III audit and consultation for an explosives manufacturer in West Virginia.
- Contaminated soil/ground water investigation for construction projects in Ohio and West Virginia.
- Assisting in reduction and evaluation of pump test data for a RI of pickling wastes in Mississippi.
- Supervision of the drilling of test borings and installation of many monitoring wells for an RI/FS under CERCLA in eastern Pennsylvania.

1985 to 1987: Mr. Swallow was employed as a Geologist and Microcomputer Specialist for Geonics, Inc. in Clinton, New Jersey. In this role he was responsible for or aided in a diversity of geologic, hydrogeologic, and geophysical investigations. Projects included: Environmental Cleanup Responsibility Act (ECRA) reviews; ground water contamination studies; environmental liability assessments; waste treatment and disposal studies; and water supply investigations. In the process, Mr. Swallow designed and supervised the construction of various ground water monitoring programs, logged test borings and test pits; directed water and soil sampling programs, and performed electromagnetic, magnetic, and seismic geophysical surveys. Mr. Swallow also initiated and directed a restructuring of the firms' microcomputer system.

1985: Mr. Swallow served as an underground utility locating technician for So-Deep, Inc. in Manassis, Virginia. This position required the use and interpretation of electromagnetic and sonic detection equipment. Logging and surveying test pits were also performed.

PROFESSIONAL AFFILIATION

Association of Ground Water Scientists and Engineers (Division of the NWWA)

EXHIBIT II

DESCRIPTION OF CONTAMINANT DESORPTION MODEL
WASTE AREA 2
OLD SPRINGFIELD LANDFILL SITE
SPRINGFIELD, VERMONT

EXHIBIT II

DESCRIPTION OF CONTAMINANT DESORPTION MODEL
WASTE AREA 2
OLD SPRINGFIELD LANDFILL SITE
SPRINGFIELD, VERMONT

In the focused feasibility study (FFS) for the Old Springfield Site (Remcor, June 1990), analytical data from the sampling of Seep LSE-04 were presented. These data evidence a marked decrease in concentrations of volatile organic compounds (VOCs) in this seep since the time of its initial sampling in January 1985 (FFS, Section 2.2.3.2, page 2-18). The six sets of sampling data available for Seep LSE-04 were subjected to nonlinear regression analysis to develop a mathematical relationship reflecting the depletion of the sources of VOC contamination to ground water in Waste Area 2 (FFS, Section 2.5.1.5, page 2-85). The attached Figure 1 is a graph (on semi-logarithmic scale) showing total VOCs for the various sampling events and the regression analysis relationship of total VOC concentration versus time.

Figure 1 also presents the results of modeling desorption of VOCs from the solid waste in Waste Area 2 and into the water reflected by Seep LSE-04. This desorption modeling was performed by Remcor as a means to confirm the reasonableness of the source depletion model (i.e., regression analysis equation) presented in the FFS. As indicated in the attached Figure 1, there is good agreement between the results of the regression analysis and the desorption model. Both of these analyses reflect the significant decrease in VOC concentrations observed over the past five years and predict very low total VOC levels (i.e., total VOCs less than 5 micrograms per liter [μg/ℓ]) in the next few years. It is significant to note that the most recent sampling of Seep LSE-04, by the Vermont Agency for Natural Resources in May 1990, showed compliance with current and proposed maximum contaminant levels (MCLs) for VOCs, except for perchloroethylene (PCE). The reported PCE concentration from this sampling was 6 μg/ℓ versus the MCL of 5 μg/ℓ.

This exhibit describes the desorption model used by Remcor in the evaluation. In this description, frequent reference is made to a recent technical article by Olsen and Davis (1990) that summarizes much of the current literature on the factors affecting the migration rates and concentrations of contaminants in ground water.

<u>Overview</u>

The desorption model used by Remcor in this evaluation describes the "flushing" of the waste in Waste Area 2. This flushing occurs as rainwater (and, to a very limited extent, lateral ground water flow) infiltrates the waste. As this flushing occurs, contaminants present in the solid waste leach into the uncontaminated rainwater or upgradient ground water. The resulting leachate subsequently travels to Seep LSE-04 where it is discharged as contaminated seep flow. The quantity of contaminants present in the solid waste is correspondingly decreased by the amount dissolved into the water. The rate at which desorption occurs depends on a number of variables, including the physicochemical properties of the waste matrix, the specific chemical partitioning characteristics of the contaminant(s) of concern, and the rate of water infiltration.

The desorption modeling for Waste Area 2 involves the following initial steps:

1. Describing the physical and chemical characteristics of Waste Area 2
2. Defining the water flow rate through Waste Area 2 and the initial VOC concentration in the leachate from this area
3. Selecting a representative VOC to simplify calculations and defining the chemical adsorption and biodegradation characteristics of this compound.

Based on these input a series of sequential calculations are made for each time step:

1. Total accumulated time
2. Contaminant mass in solid waste at the beginning of the time step
3. Contaminant mass removed from the solid waste during the time step by flushing with water
4. Contaminant mass remaining after flushing during the time step
5. Contaminant mass removed from the solid waste during the time step by biodegradation
6. Resultant contaminant concentration in solid media
7. Resultant contaminant concentration in leachate.

These sequential calculations are repeated, by incremental time step, until the VOCs initially present in the solid media are "exhausted."

Physical and Chemical Characteristics of Waste Area 2

In modeling contaminant desorption, the following physicochemical properties of the waste matrix must be determined or estimated (Olsen and Davis, 1990):

- Fraction of organic carbon in the waste
- Bulk unit weight (bulk density)
- Porosity of the waste formation
- Gross volume of waste.

Table II-1 summarizes these data for Waste Area 2 at the Old Springfield site. As indicated in Table II-1, the values assigned to these input variables were determined primarily from data developed during the FFS.

Water Flow Conditions

The rate at which water enters Waste Area 2 is estimated from the site hydrologic model developed in the FFS (Section 2.5, page 2-77). On an annual average basis, the total water inflow to the waste is estimated as follows (FFS, Section 2.5.2.3, page 2-95):

- Rainwater infiltration - 1,200 gallons per day (gpd)
- Lateral ground water flow - 630 gpd
- Total - 1,830 gpd.

The "initial" total VOC concentration at Seep LSE-04 corresponds to the measurements made by NUS Corporation in January 1985 in which 37,946 µg/ℓ total VOCs were reported (ICF, 1988c, Figure 4-14).

Contaminant Properties

The rates of flushing of contaminants from solid media into water are compound-specific and are dependent on the molecular weight, solubility, and other intrinsic properties of each compound. For ease in modeling, a single, representative contaminant is typically selected. In modeling Waste Area 2 at the Old Springfield Site, trichloroethylene (TCE) was selected as the representative VOC. TCE and its degradation by-products (e.g., dichloroethylene, vinyl chloride) constitute the chlorinated ethenes that are the principal threat to ground water at the Old Springfield Site and represented more than 50 percent of the total VOCs in the initial sampling of Seep LSE-04.

In a two-phased system of water and solid media, TCE will both dissolve in the water and be adsorbed into the solid media. The overall distribution of contaminant concentrations between that dissolved in water and that adsorbed into solids can be described in terms of a retardation coefficient (Kd) as described in Olsen and Davis (1990). The retardation coefficient used in the desorption modeling at Waste Area 2 was calculated for adsorption of the TCE onto the organic carbon present in the waste. This adsorption is quantified by the organic carbon partitioning coefficient (Koc), which defines the milligrams (mg) of adsorbed TCE per kilogram (kg) of organic carbon present in the waste divided by the concentrations of TCE in the waste (milligrams per liter [mg/ℓ]). Koc is a compound-specific property and is equal to 138 liters/kilogram (ℓ/kg) for TCE (Table II-1). In modeling Waste Area 2, adsorption of TCE into mineral surfaces was not considered; this adsorption accounts for a very minor portion of the total adsorption of the TCE onto solid media (Olsen and Davis, 1990).

The retardation coefficient calculated in the desorption model for Waste Area 2 at the Old Springfield Site is 0.77 ℓ/kg. This value is calculated by multiplying the fraction of organic carbon (foc) by the organic carbon adsorption coefficient (Koc). The initial TCE concentration in the solid waste is calculated by multiplying the initial waterborne concentration (37,946 μg/ℓ) by the retardation coefficient (i.e., 37,946 μg/ℓ x 0.77 ℓ/kg = 29,233 μg/kg). The initial mass of TCE in the solid waste is calculated by multiplying this concentration by the gross mass of the solid waste (i.e., 29,233 μg/kg x 4.36 x 10^6 kg = 1.28 x 10^{11} μg).

In addition to water-solids partitioning, the biodegradation properties of the contaminant of concern must also be defined. In the desorption model, the biodegradation rate is defined in terms of the biodegradation half life (t_h). This half-life defines the time frame over which 50 percent of the mass of contaminant in the solid medium could be expected to be biodegraded. Biodegradation of the TCE can lead to the formation of dichloroethylene compounds, which, in turn, degrade to vinyl chloride. The overall length of this process is highly variable and depends on the nature of the waste matrix, the nature of indigenous microorganisms that could use these chlorinated ethenes as a food source, and the relative availability of other nutrients. Biodegradation half-lives for TCE and dichloroethylene compounds have been reported to be less than one year (in parallel, not series); biodegradation rates for vinyl chloride have been quantified but are believed to be significantly longer. These data have been summarized in Olsen and Davis (1990). For desorption modeling for Waste Area 2, a biodegradation half-life of 25 years was assumed. This value is sufficiently long so as to make biodegradation only a minor contributor to the overall depletion of TCE from the solid waste.

Desorption Calculations by Time Steps

With these described input data, TCE desorption from Waste Area 2 was calculated in a series of time steps (Table II-2). Each time step corresponded to one "pore volume", i.e., the time required for the inflowing water to displace a volume equal to the volume of the pore space in the waste (Table II-1). A pore volume is calculated by multiplying the gross volume of the waste times the porosity of the waste.

In each time step, the TCE mass in the solid medium is reduced by the mass transferred to one pore volume of water. Mathematically, the quantity of TCE transferred to the water is calculated in three steps:

1. Multiplying the retardation coefficient times the concentration of TCE in the solid at the beginning of the time step to determine the TCE concentration in the water serving as the flushing fluid.

2. Converting the quantity calculated in Step 1 to mass (i.e., multiplying concentration times volume of pore water).

3. Subtracting the mass calculated in Step 2 from the mass of TCE in the solid medium at the beginning of the time step.

The remaining TCE in the solid medium is then further reduced in the time step by calculating the reduction due to biodegradation. As described in Olsen and Davis (1990), this biodegradation is calculated as a "first-order" exponential depletion.

After subtracting out the TCE in the solid medium lost to biodegradation, the remaining concentration of TCE in the solid medium is calculated by dividing the remaining mass of the TCE by the total mass of the waste. The resultant waterborne TCE concentration at the end of the time step is then calculated by dividing the concentration in the solid by the retardation coefficient.

Further reductions by time step are then calculated using this same procedure. The data points shown in the attached Figure 1 show the total VOC concentration in water calculated (as TCE) at various times after the initial (January 1985) sampling.

TABLE 1

SUMMARY OF INPUT DATA
STABILITY ANALYSIS
WASTE AREA 3 OUTSLOPES[1]

MATERIAL[2]	TOTAL UNIT WEIGHT (pcf)[3]	SATURATED UNIT WEIGHT (pcf)	ANGLE OF INTERNAL FRICTION[4] (degrees)
Fill (existing)	106	115	35
Till (sand and silt)	106	115	35
Waste area (waste and sand)	75	105	35
Weathered bedrock	150	162	40
Alluvial sand and gravel	112	130	34
Gravel Seepage Collection Zone	120	140	45

(1) Values are estimated from physical descriptions of materials and published information on typical values, for example, see Teng (1962).

(2) Cap placement simulated by adding a vertical loading of 770 pounds per square foot (psf) to the plateau.

(3) "pcf" - pounds per cubic foot.

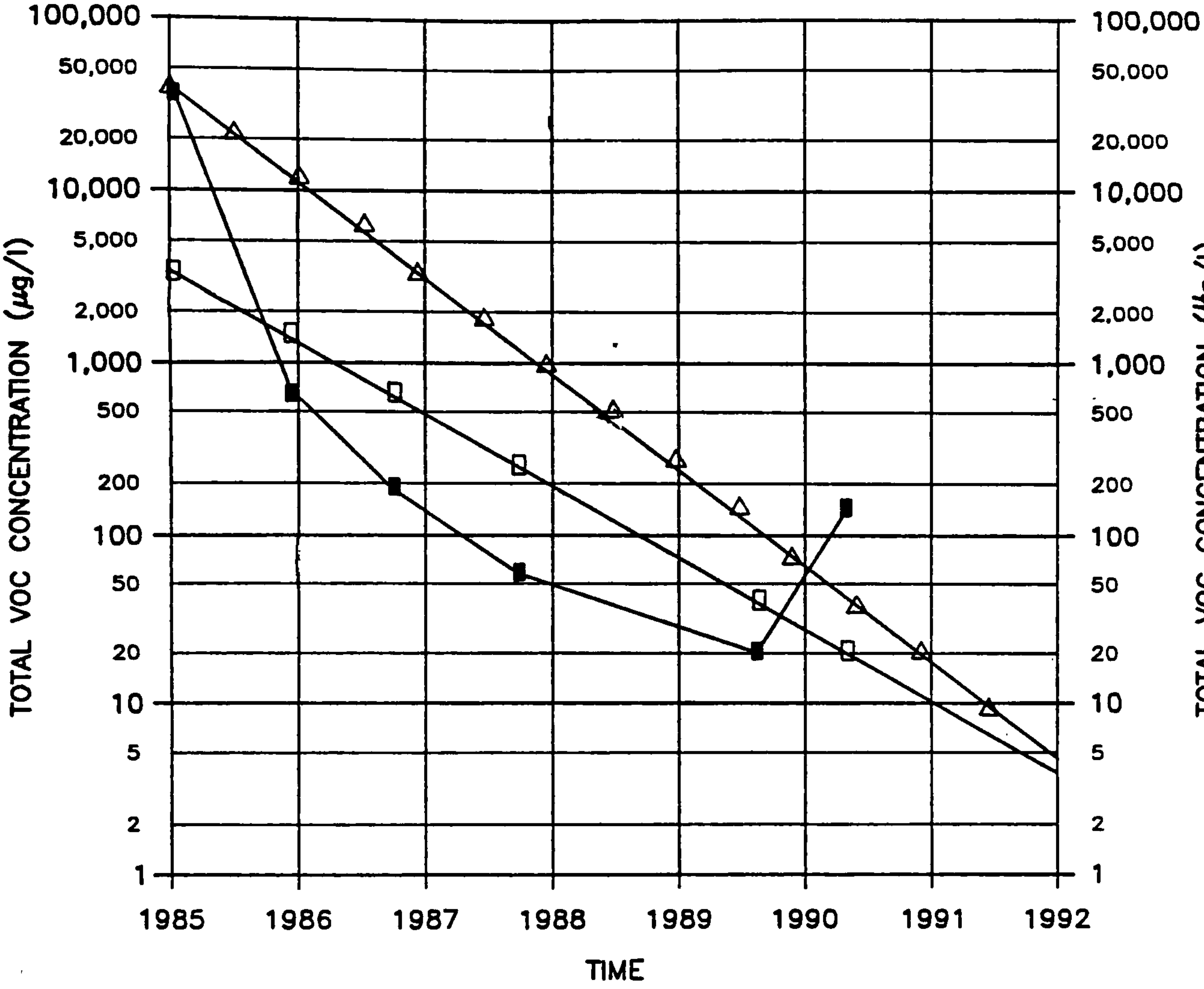
(4) Cohesion intercept taken as 0 psf for all materials.

TABLE II-1
SUMMARY OF INPUT DATA
CONTAMINANT DESORPTION MODEL
WASTE AREA 2

PARAMETER	UNITS	VALUE	DESCRIPTION/BASIS	REFERENCE
Contaminant Description (Trichloroethylene)				
Octanol-water partion coefficient (Kow)	1/kg	195	Compound-specific property	Olsen and Davis (1990)
Organic carbon partition coefficient (Koc)	1/kg	138	Compound-specific property	Olsen and Davis (1990)
Geomedia Description				
Fraction organic carbon (foc)	g/g	0.0056	Estimated from site data for industrial waste/MSW/soil mix	FFS, Tables 9 through 11
Bulk unit weight (p)	g/ml	0.89	Equivalent to 1500 lbs/cy for industrial waste/MSW/soil mix	Tchobanoglous, et al. (1977)
Porosity (n)	ml/ml	0.41	Calculated from p value with particle density of 2 g/ml	
Surface area coefficient (SA)	m^2/g	0	Not included in calculation due to high foc and waste/soil mix	
Retardation coefficient (Kd)	1/kg	0.77	Calculated value	Olsen and Davis (1990)
Biodegradation Constant				
Biodegredation half-life (th)	years	25	Estimate for TCE - DCE - VC	Olsen and Davis (1990)
First order k for biodegradation	1/yr	0.028	Calculated value	Olsen and Davis (1990)
Physical Description/Source Size				
Volume of solid material (Vs)	yd^3	6,400	FFS data	FFS, Section 2.2.3.2, page 2-14
Mass of solid material (Ms)	kg	4.36E+06	Vs x p (convert units)	
Volume of pore liquid (Pore volume, Pv)	liters	2.01E+06	Vs x n (convert units)	
Initial water concentration	ug/l	37,946	RI data	ICF (1988c), Figure 4-14
Initial contaminant mass in water	ug	7.61E+10	Pv x Water Concentration	
Initial solids concentration	ug/kg	29,333	Water concentration x Kd	
Initial contaminant mass in solid material	ug	1.28E+11	Solids Concentration x Mass	
Clean water flow rate through geomedia	gpd	1,830	FFS Hydrologic Model	FFS, Section 2.5.2.3, page 2-95
Time associated with one Pv	years	0.8	Pv/Flow Rate (convert units)	

TABLE II-2
DESORPTION CALCULATION
WASTE AREA 2

PARAMETER	UNITS					
Number of pore volumes	--	1	2	3	4	5
Total accumulated time	years	0.8	1.6	2.4	3.2	4.0
Initial contaminant mass in solid material	ug	1.28E+11	5.05E+10	1.96E+10	7.40E+09	2.74E+09
Contaminant mass removed by water	ug	7.61E+10	3.01E+10	1.16E+10	4.41E+09	1.63E+09
Remaining contaminant mass in solid material	ug	5.17E+10	2.04E+10	7.90E+09	2.99E+09	1.11E+09
Contaminants biodegraded	ug	1.12E+09	8.79E+08	5.05E+08	2.52E+08	1.15E+08
Remaining contaminant mass in solid material	ug	5.05E+10	1.96E+10	7.40E+09	2.74E+09	9.92E+08
Resultant concentration in soil	ug/kg	11,600	4,488	1,698	629	228
Resultant concentration in water	ug/l	15,006	5,805	2,197	813	295
Reduction in water concentration	percent	60.5%	84.7%	94.2%	97.9%	99.2%
Number of pore volumes	--	6	7	8	9	10
Total accumulated time	years	4.8	5.6	6.3	7.1	7.9
Initial contaminant mass in solid material	ug	9.92E+08	3.51E+08	1.22E+08	4.13E+07	1.37E+07
Contaminant mass removed by water	ug	5.91E+08	2.09E+08	7.26E+07	2.46E+07	8.16E+06
Remaining contaminant mass in solid material	ug	4.01E+08	1.42E+08	4.92E+07	1.67E+07	5.54E+06
Contaminants biodegraded	ug	4.96E+07	2.03E+07	7.95E+06	3.00E+06	1.09E+06
Remaining contaminant mass in solid material	ug	3.51E+08	1.22E+08	4.13E+07	1.37E+07	4.44E+06
Resultant concentration in soil	ug/kg	81	28	9	3	1
Resultant concentration in water	ug/l	104	36	12	4	1
Reduction in water concentration	percent	99.7%	99.9%	100.0%	100.0%	100.0%



NOTES:

1. REGRESSION EQUATION:
   $C_t = 3,500 - e^{-0.98t}$
   WHERE:
   C_t = TOTAL VOC CONCENTRATION AT TIME t, IN YEARS, MEASURED SINCE JANUARY 1985 (μg/l)
   e = BASE OF NATURAL LOGARITHMS.
2. FOR DESCRIPTION OF DESORPTION MODEL, SEE EXHIBIT II.

LEGEND:

■ ACTUAL DATA
□ REGRESSION ANALYSIS
△ DESORPTION MODEL

FIGURE 1

VOC CONCENTRATION VERSUS TIME
SEEP LSE-04

OLD SPRINGFIELD LANDFILL SITE
SPRINGFIELD, VERMONT

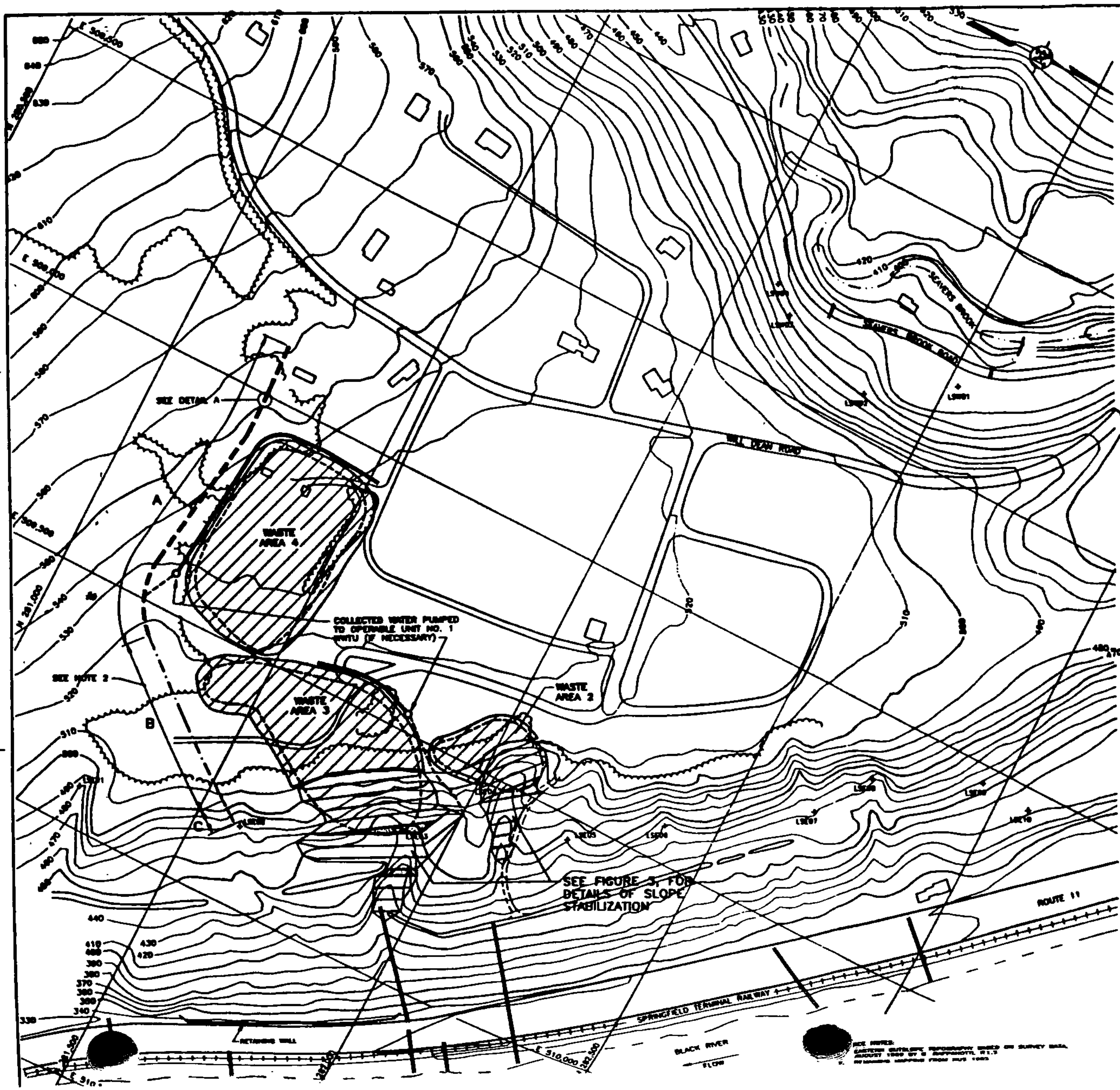
PREPARED FOR

OLD SPRINGFIELD LANDFILL
SITE RESPONDENTS

REMCOR

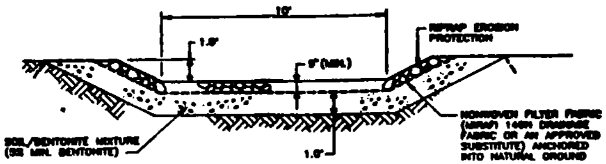
DRAWN BY L.H.K. 8/10/90 | CHECKED LMB 8/31/90 | APPROVED LMB 9/6/90 | DRAWING NUMBER 90268-A1

CHANNEL REACH	DETAIL	PEAK DESIGN FLOW (CFS)	MANNING'S NUMBER (n)	MAXIMUM BOTTOM SLOPE %	FLOW DEPTH (FT)	DESIGN FLOW VELOCITY (FPS)	EROSION PROTECTION
A	A	22	0.032	1.0	0.4	4.3	9" LAYER OF 3"-6"ø RIPRAP
B							DISPERSED OVERLAND FLOW
C	B	44	0.025	10.0	0.20	11.0	FABRIFORM



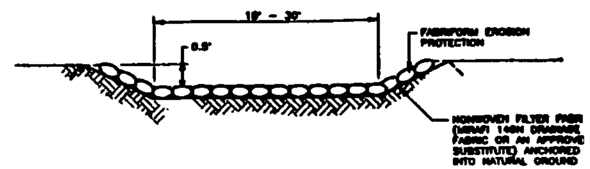
NOTES:

1. SOIL/BENTONITE MIXTURE TO BE DETERMINED BY LABORATORY TESTING PRIOR TO APPLICATION, MIXTURE TO BE MINIMUM OF 1 FOOT THICK WITH 5% MINIMUM BENTONITE CONTENT.
2. THE SURFACE DISCHARGE BEYOND THE LIMITS OF WASTE AREA 4, REACH B, WILL BE HANDLED BY OVERLAND FLOW.



DETAIL A

N.T.S.



DETAIL B

N.T.S.

LEGEND

DRAINAGE DITCH (SEE DETAILS, THIS SHT.)

FRENCH DRAINS (SEE DETAIL C, FIGURE 4)

WASTE AREA COVER/CAP (FIGURE 4 ILLUSTRATES VARIOUS COVER/CAP DETAILS)

LEACHATE SEEP OR SPRING LOCATION

BOUNDARY OF ...

FIGURE 2

ALTERNATIVE DESIGN ILLUSTRATIONS

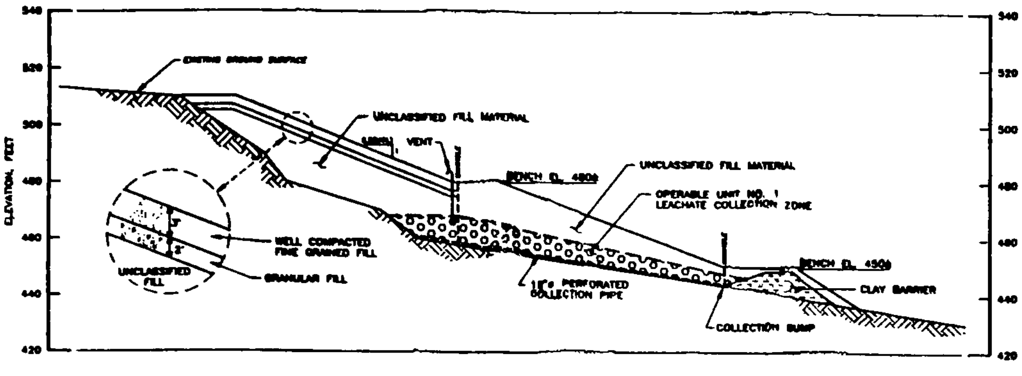
OLD SPRINGFIELD LANDFILL SITE

SPRINGFIELD, VERMONT

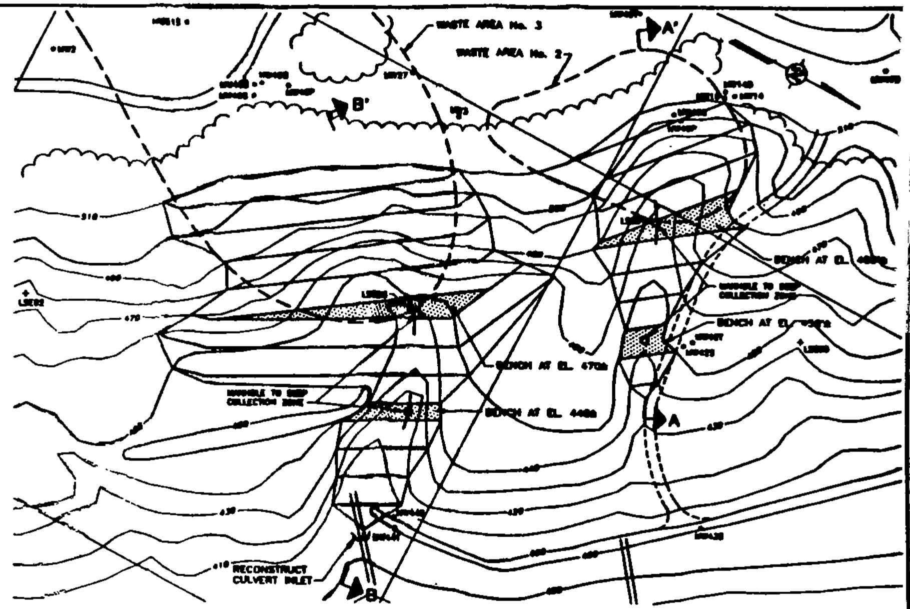
PREPARED FOR

OLD SPRINGFIELD LANDFILL SITE RESPONDENTS

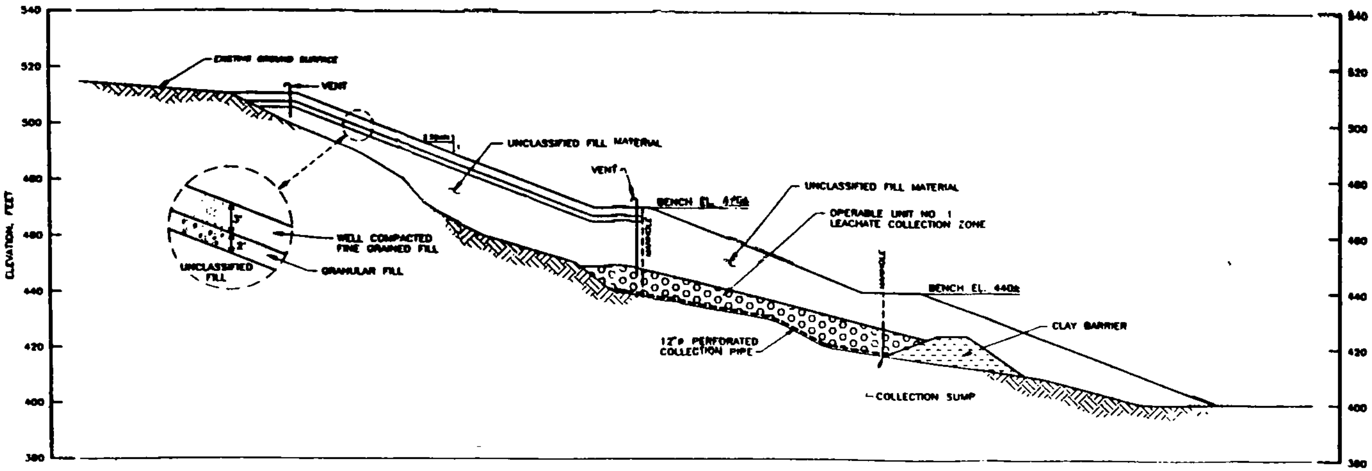
DRAWN		DRAWING NUMBER
CHECKED		90288-E2
APPROVED		



SECTION A-A



PLAN



SECTION B-B

NOTE:

SEE FIGURES 2 AND 4 FOR ILLUSTRATIONS OF COVERS/CAPS FOR THOSE PORTIONS OF THE WASTE AREAS ON THE PLATEAU.

FIGURE 3

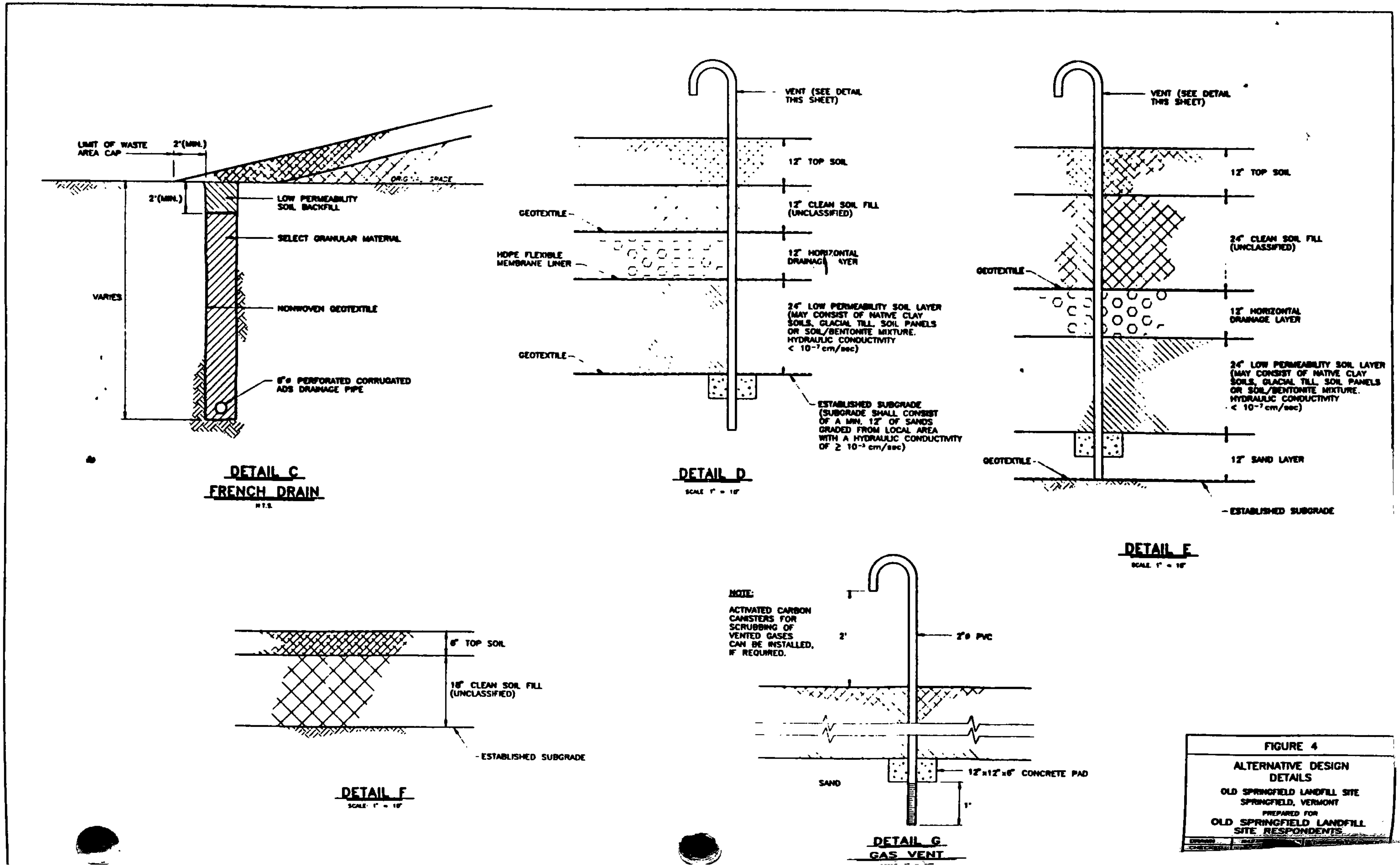
ALTERNATIVE SLOPE STABILIZATION ILLUSTRATIONS WASTE AREAS NO. 2 & NO. 3
OLD SPRINGFIELD LANDFILL SITE
SPRINGFIELD, VERMONT

PREPARED FOR

OLD SPRINGFIELD LANDFILL SITE RESPONDENTS

DRAWN	RAE		DRAWING NUMBER
CHECKED		9/5/90	90288-E3
APPROVED		10/-/90	

REMCOR


LIMIT OF WASTE AREA CAP
2'(MIN.)
2'(MIN.)
ORIGINAL GRADE
LOW PERMEABILITY SOIL BACKFILL
SELECT GRANULAR MATERIAL
VARIES
NONWOVEN GEOTEXTILE
6"ø PERFORATED CORRUGATED ADS DRAINAGE PIPE
DETAIL C
FRENCH DRAIN
N.T.S.
VENT (SEE DETAIL THIS SHEET)
12" TOP SOIL
GEOTEXTILE
12" CLEAN SOIL FILL (UNCLASSIFIED)
HDPE FLEXIBLE MEMBRANE LINER
12" HORIZONTAL DRAINAGE LAYER
24" LOW PERMEABILITY SOIL LAYER (MAY CONSIST OF NATIVE CLAY SOILS, GLACIAL TILL, SOIL PANELS OR SOIL/BENTONITE MIXTURE. HYDRAULIC CONDUCTIVITY < 10-7 cm/sec)
GEOTEXTILE
ESTABLISHED SUBGRADE (SUBGRADE SHALL CONSIST OF A MIN. 12" OF SANDS GRADED FROM LOCAL AREA WITH A HYDRAULIC CONDUCTIVITY OF ≥ 10-3 cm/sec)
DETAIL D
SCALE 1" = 10'
VENT (SEE DETAIL THIS SHEET)
12" TOP SOIL
24" CLEAN SOIL FILL (UNCLASSIFIED)
GEOTEXTILE
12" HORIZONTAL DRAINAGE LAYER
24" LOW PERMEABILITY SOIL LAYER (MAY CONSIST OF NATIVE CLAY SOILS, GLACIAL TILL, SOIL PANELS OR SOIL/BENTONITE MIXTURE. HYDRAULIC CONDUCTIVITY < 10-7 cm/sec)
12" SAND LAYER
GEOTEXTILE
ESTABLISHED SUBGRADE
DETAIL E
SCALE 1" = 10'
6" TOP SOIL
18" CLEAN SOIL FILL (UNCLASSIFIED)
ESTABLISHED SUBGRADE
DETAIL F
SCALE 1" = 10'
NOTE:
ACTIVATED CARBON CANISTERS FOR SCRUBBING OF VENTED GASES CAN BE INSTALLED, IF REQUIRED.
2'
2"ø PVC
SAND
12"x12"x6" CONCRETE PAD
1'
DETAIL G
GAS VENT
FIGURE 4
ALTERNATIVE DESIGN DETAILS
OLD SPRINGFIELD LANDFILL SITE
SPRINGFIELD, VERMONT
PREPARED FOR
OLD SPRINGFIELD LANDFILL SITE RESPONDENTS

ATTACHMENT C

TRANSCRIPT OF THE AUGUST 2, 1990
INFORMAL PUBLIC HEARING

ORIGINAL

UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

IN RE: OLD SPRINGFIELD LANDFILL SUPERFUND SITE

PUBLIC HEARING TO RECEIVE COMMENT ON PROPOSED

PLAN FOR SECOND RECORD OF DECISION

August 2, 1990

CYNTHIA FOSTER BENSON, RPR, Court Reporter.

North Country Court Reporters
West Lebanon, New Hampshire 03784
(603) 298-6400

DAVID WEBSTER: We can get started. Good evening. Thank you for coming tonight. I'd like to welcome you here tonight to a public hearing for the Old Springfield Landfill Superfund Site here in Springfield, Vermont. My name is David Webster. I'm the Chair of the Maine and Vermont Superfund Section at Region I EPA which is in Boston. My position with EPA as Section Chief of the Maine and Vermont section includes responsibilities in overseeing the implementations of Superfund remedial programs in the State of Vermont. I'd like to start off by introducing the people here at the head table. Actually the other person at the head table. To my left, is Tom Moye, the State Regional Project Chairman of the Department of Environmental Conservation, the Court stenographer. Other representatives from the State and Federal government, Jim Sebastian is here whose hand's raised in the back from EPA's Office of Public Affairs. And Bill Ahearn from the, who is the director of the Division of Hazardous Materials Management with Vermont Developmental Environmental Conservation. Ed Hathaway, Remedial Project Manager for the Springfield site is in the hospital and couldn't be here tonight. I will serve as Chairman for the hearing tonight and want again to welcome you all here.

The purpose of tonight's hearing is to formally accept your comments on the 1988 feasibility study, the 1990 focused feasibility study, 1990 supplemental feasibility study and the other documents which are in the administrative record and on EPA's proposed plan for the source control remedial action at the Old Springfield Landfill here in Springfield, Vermont. Copies of the proposed plan are available. If you didn't get one as you came in the door or in the mail, see Jim Sebastian in the back and he can help you out.

Before I begin the formal part of this evening's proceedings, I would like to describe to you the format of the hearing. Essentially the evening will be structured into several parts. First, I'll give you a brief overview of the site contamination and EPA's proposed plan for source control remedy at the Old Springfield Superfund Site. As many of you know, EPA representatives made a presentation to the public outlining the site contamination and proposed plan at a public informational meeting which was held here on July 12th. Following this overview, we will open it for other, for oral comments from anybody that's present tonight. That will be opened to anyone that wants to make a comment for the record. Those of you who wish to comment tonight should indicate your desire to do so by filling out on an index card if you haven't already that Jim Sebastian has in the back. Or at a later time I'll ask if there's any other comments and you can indicating by raising your hand. At that time I'll ask any of you who wish to comment to identify yourself and your association with the Old Springfield Landfill Superfund site. As I call upon you to make a statement or comment for the record I'd kindly ask you to come up to the front. We have a table over here or stand, whatever you feel more comfortable so that you can be here and so our court reporter can also hear you. I reserve the right to limit each oral comment to ten minutes. Although we don't expect this to be a problem in terms of time, I may have to impose this restriction. If I have to impose that restriction I will ask you to summarize your most important points and then ask you to provide EPA with a full copy of your comments either at the end of tonight's meeting hearing or prior to the close of the public comment period. Please note that the entire contents of the hearing is being transcribed and will become part of the administrative record for the site. After you've made your comments, I or a member of the State of Vermont DEC, Tom Moye, may ask you some clarifying questions to assist you in more fully addressing your statements or concerns. After all the comments have been heard, I will close the formal part of this hearing.

Just to remind you, the purpose of tonight's hearing is to receive your comments for the administrative record. During the formal part of this evening's hearing, EPA and DEC personnel here tonight will not be able to respond to your comments or questions when they are asked. However, after the close of the formal part of the hearing, we will remain available informally to answer your questions on any of the issues raised during the evening's hearing or any other aspect of the proposed plan. As many of you already know the public comment period for the proposed plan began on July 13th and was scheduled to conclude on August 11th. However, tonight EPA is extending the public comment period for an additional 30 days to September 10th, 1990, based on requests made on behalf of Emhart Industries and Textron, Inc., asked for more time to review the proposed plan and all other documents. Therefore, if you wish to submit written comments and I would encourage you to do so, they must be postmarked no later than September 10th. All written comments should be mailed to Ed Hathaway at EPA's office in Boston. The address of our office can be found on

Page 3 of the proposed plan.

Finally, at the conclusion of this evening's public hearing, please see one of us from EPA if you have further questions on the process for making written comments. Any written, any oral comments we receive tonight during the formal part of this hearing and those we receive in writing during the comment period will be responded to in a document we call the responsiveness summary. Therefore, I urge you to comment during the formal part of tonight's hearing. This responsiveness summary will be included in a decision document that we call a Record of Decision or ROD that EPA prepares at the conclusion of the comment period. In the record of decision, EPA will explain which cleanup alternative or alternatives has been selected by EPA for the source control remedy at the Old Springfield Landfill site.

I realize I presented a lot of information to you in this opening statement. Are there any questions on how we're going to proceed tonight? Okay. Again I want to thank you for coming. And encourage you to express any comments or concerns you have this evening after a presentation summarizing the proposed plan.

At this point, I'd like to switch hats for a minute to fill in for Ed Hathaway providing you with a brief overview of the site and the proposed plan which is open for public comment. I'll try and make this brief, too, since I see a lot of familiar faces and what I want to do is give you an overview of the source control proposed plan that we're seeking comment on and I'll try to work quickly through that overview, how these actions fill into other site work going on, what site conditions and risks we are addressing in the proposed source control remedy, what remedies were evaluated, and very importantly, what are EPA's criteria that we use in coming up with this preferred alternative and those criteria which we'll be using in selecting the final alternative. I emphasize again, this is a preferred alternative, it's not fixed at this point. We do seek your comment on it. And give you every opportunity to be part of this process here.

I used the word source control in the opening presentation and let me make sure that I'm clear what's going on here. Back in 1988, we were here about two years ago today and we had a proposed plan that dealt with two aspects of the site. One was what I'll call Operable Unit 1 or the management of migration. That has to do with leachate and the groundwater. What to do with the seeps coming out from beneath the landfill. We also at that time proposed a plan for Operable Unit 2, that included a capping the site. This is what I'm calling the source control and the landfill itself.

What happened at that point moving along here after reinvestigation, feasibility study, after that proposed planned we had comment on it, based in large part on comments received from the public and from the State, we decided to go forward with the first operable unit which had to do with the leachate and the groundwater. And we've gone on from that, parties have com forth much to their credit to come into an agreement with EPA and the State to perform that work. However, based on concerns, a lot having to do with understanding how the groundwater was interacting with the waste, was groundwater moving through the waste or not and a preference on the part of the State to try to get some way of getting the waste out of the groundwater and the groundwater out of waste decided to go forth with more study on the second operable unit. Or the source control. What should we do at the landfill itself so we find ourselves here two years later with proposing an alternative for the source control for the landfill. I'm not going to talk much about the first operable unit, this is where we are now. We have had a focused feasibility study. The proposed plan is available and we're in an important public comment period right now to consider your comments before a Record of Decision.

Remaining situation to be addressed in a proposed alternative and a Record of Decision has to do with three waste areas up on top of the landfill. Waste areas 2, 3 and 4. Two and 3 are areas that were ravines on the steep eastern slope of the landfill that were filled with waste. Area four is a little bit different. It's trenches, now, on the flat plateau part of the site they were filled with waste. Some other differences, groundwater wise almost all of Waste area 4 is underground water. So it's saturated. Waste areas 2 and 3 are, small part of it, portion of it is within the groundwater flow. These are important and we think we have a better handle on that thanks to some of the studies that have gone on particularly in a remedy which is trying to prevent more of the groundwater coming in contact with the waste and leaching it out into the groundwater and into the environment. Other information that's come to light in recent studies was a, what we call a water balance, where the water is coming from. Again, important if you want to try to cut the water off to know where it's coming from. About 60 percent of the water entering the waste and percolating through the, leach out of contaminants is coming from the surface. Rainfall, snow melt. About 40 percent is coming literally, either from this direction, I'm sorry, either coming off the hill from this direction or coming on the plateau. In the case of the Waste area 3, which is probably the most contaminated area, a lot of it comes from Waste area 4 so this is filled up like a bathtub generating water here and coming in infiltrating, important to realize that in the context of what we should do at the site. The contaminants, we have PCBs or polychorinated biphenyls; PAHs, or polycyclic aromatic hydrocarbons, these tend to be less volatile and persistant in the environment; and volatile organic compounds which tend to migrate faster than the other ones and are of primary concern in the groundwater. So you have a situation if I can draw a crude analogy to your drip coffee maker where you have the waste, you have wastewater going through that leaching that out. Where does it go, goes in the aquifers beneath it. Further down there is a sand and gravel unit which goes from someplace in this area over to the western sites seep. Carries water rather rapidly. Moves from here from Waste area 4 and part of Waste area 3 over to the western seeps by Seavers Road. Beneath the sand and gravel aquifer which doesn't extend all the way here there is a fractured bedrock. It appears that waste primarily from Waste area 3 is getting down into that bedrock aquifer and seeping down in the direction of the Black River. Of course some of the groundwater is migrating in an easterly direction and coming out at the leachate seeps along the eastern side as well. So the problems that we have, that we're trying to address and remedy here are the groundwater infiltrating the waste and contaminating the groundwater.

There has been a lot of talk about risk, what are the risks associated with the site. They are, while there is no individual out there that we feel is faced with an unacceptable risk as we are now, there are several what-if situations that we are concerned with and has triggered in our mind a need to take actions to be protective of public health and the environment. One of those is I just mentioned the groundwater which is contaminated and in a residential, if it were to be used in a residential drinking water for prolonged period of time we feel it would be an unacceptable risk. Another is gases emanating from the landfill and from the seeps. Someone over a long period of time exposed to that would be exposed to an unacceptable risk. And the third is contact with the soils themselves over a prolonged period of time, future, nobody at this point. But if that was to become residential and people were exposed to that for a long, throughout their lifetime, that buildup of exposure on the skin and incidental ingestion would be unacceptable based on the criteria EPA uses as to what kind of cancer risk they'd be exposed to.

Next step in the process after trying to understand the problem is to look at different possible solutions. We looked at in the course of these three feasibility studies that I mentioned before, some 11 alternatives. They ranged, that's in your proposed plan and I'd refer you to that for more of a breakdown. They range from a no-action alternative which we used for a baseline comparison to one that involves excavating all the waste and treating it with incineration. That by law is the preferable treatment. That in the statute says EPA is to treat the waste wherever it's practical to do so. In coming with the alternative we have we'd have to make a finding that it is not practical to do that at this site. But that's clearly the mandate from Congress on this. A number of those 11 alternatives deal with some kind of capping or containment to try to contain the waste with various add-on engineering features, some of which I'll describe because they're in the preferred alternative. Given these alternatives, what criteria does EPA use to make its first, it's preferred alternative and later our decision in the Record of Decision.

There are nine criteria in our regulation that we use in evaluating the alternatives. They're in the proposed plan with a little explanation of each one of them. Let me just hit on a couple. The first two are threshold criteria, they're pretty much directly from the statute, the law passed by Congress. And we consider the most important. If you don't meet these, then it's not an alternative that we can select. Overall protection of human health and the environment. I go back to those risks, if we don't feel that the alternative is addressing those risks that I indicated, we don't feel that it is prospective so in looking at the alternatives we're looking at the ones that addressed the risk I mentioned. Again the what-if risk of the inhalation of volatiles from the landfill, the dermal contact, coming in contact with a toxic or ingestion, or the potential future use of groundwater and ingesting chemicals that way. Second one, compliance with, there's a lot of words, applicable or relevant and appropriate requirements. Basically complying with the law. You can think of this as the let's not reinvent the wheel criteria. If you have a law that tells you how, what's protective or what should be done in a situation, the Superfund law says you've got to follow that law. For example, if you have drinking water, if there's a law that says how, to what level you're supposed to clean up groundwater we are bound to follow that law. There's a certain amount of logic to that. Another example relevant to this site if you have a law, a Federal law or a state law that tells you how to deal with a hazardous waste landfill, you are bound to follow that law if you find that that law is relevant and appropriate to the site. There are some exceptions where waivers can apply to this but basically these are the ones to bear in mind and I think hopefully we'll present a little bit of our thought process in coming up with our proposed remedy. Additional criteria have to do with effectiveness, cost. Let me point out the next two, state acceptance is one of the factors that we look into, we may be hearing more about that tonight. Community acceptance. That's what's this public comment period is all about. We do listen to it. This site, this one included were based on input from the State and community. If we have a deviation from the proposed plan. So this is an opportunity right now for the input on that. I think it will bear well if you consider these criteria that we are going to make the decision based on.

Okay. What then briefly is the preferred alternative, well, there are seven steps here. They're up here on the board here that I can refer to later on. The first one deals with capping areas one, three, excuse me, two, three and four. The basic overall strategy here was after some thought and looking at the water balance, is let's try to contain it as best we can. Let's try to keep the water from entering the waste to contain it and keep the contamination from flushing out and we'll take what measures seem to be practical to do that. And most of those fall in that category of trying to contain the waste to keep it from spreading out. First is capping the areas, Waste areas 2, 3 and 4 with an impermeable cap made of a combination of clay and synthetic materials. That's how it was scoped out. The area on the cap you recall, this is areas 2, 3 and 4, Will Dean Road, Route 11. Down over here. The area in the preferred alternative is that area with the crosshatch marks in here which extends over the areas of 2, 3 and 4. I'll get to these in just a second. Again, to prevent direct contacts and to try to decrease the infiltration of water into the waste to try to reduce the amount percolating out. The second is an active or passive gas collection system. The gas is built up on and I already mentioned that that's a potential risk that we have. It's in Area 3 where most heavily contaminated with volatiles we have an active system to purge those contaminants out and the other areas it will be by diffusion to build up of gases of either volatile organic compounds or landfill from the owner.

The next item, French drains, deals with another approach to try to catch the water from infiltrating into the landfill to try to cut down the amount of contaminants that are leaving and escaping down into the groundwater. The areas of what a French drain is basically is a trench that we backfill with, go down, this one is scoped out at 15 to 25 feet, goes down, backfilled with gravel, have a perforated pipe down at the bottom. A lot of you have around your house maybe for water protection so the water that's moving here will make its way down to the pipe. Basically if you have the water coming this way and you have the waste here what we're trying to do is avoid having the lateral flow go through the waste, we're trying to basically isolate the waste from the water by intercepting it in a trench like this going out around Waste area 4 and this was indicated as another flow of source of water infiltrating through Area 3 and down in Area 3, 2, 2. That's what we're thinking in terms of a French drain. Next item is a side slope stabilization. While we found that the, we do have a law for hazardous waste landfills which says one of the appropriate things you can do is either pick it up and treat it or put a cap of this type on it, we didn't think that that was appropriate for the steep slopes. Doesn't take much imagination if you try to put something that's six or seven feet of compacted soil on a slope it's going to fall down on Route 17: So what we try to do there is stabilize that slope so that it will support the cap that's on top of it. So basically in these areas here and here, we feel that to insure that the cap stays there, doesn't shift, doesn't slide, doesn't crack, doesn't fall down and here we have more weight up here and already that's a pretty unstable situation is to stabilize this slope here along the sides and support that cap.

The next component is source control wells. By source control wells we do have beneath the waste areas themselves contamination in the sand and gravel aquifer which then logically could be moving east, could be moving east and west from particularly Waste area 3, let's try to capture and keep it from spreading. Therefore we're proposing two wells that goes down into the sand and gravel aquifer loam indicated here within Waste area 3 to pump this contaminated water and that would be treated, plan there from the first operable unit as well. Try to hold back some of that contamination.

Six is institution of controls to restrict future use. Because this isn't what might be called a permanent remedy out at the site, it's not, you will be left with a landfill cover on the site. There are certain controls that we'd want to insure that it doesn't get used in a way that destroys the caps or counteracts all these things that we're doing. What I mean by institutional control rather than engineering, we're talking about fence, maintaining no trespassing, maintaining town ordinance in effect as far as uses that would compromise these other engineering features.

Finally, according to the law, we can't walk away from it. So you'll be seeing me or someone for a long time. If you're leaving the waste in place you have a mandatory five-year review process where you come back at the remedy, see how it's holding up. At this point we'll be looking at the cap and concentrations and see if we're still on track and see if there's a need for corrections along the line. That's basically the preferred alternative.

The cost of that comes down to $8.6 million is what we estimate with some degree of uncertainty. Some of the heavy features in there are the cap itself which is in the order of two and a half million dollars. The side slope stabilization which is in the order of about a million dollars. The French drain about a million dollars. And other components as well as engineering contingencies and such. Looking at that cost, one thing came to mind and we'd put as an option in the proposed plan that you can make comments on tonight if you wish, is well, of the cost of the side stabilization over here which is estimated to be about a million dollars. Maybe it would make more sense not to stabilize this cap with the side slopes stabilized side slope here and maybe you could save some money just excavate that soil there, I think it's around 6,000 cubic yards and if appropriate take it off-site. Which we would estimate to be a very small volume and otherwise put it underneath the cap that's in this area. That way no need to cap over here and put that expensive slope stabilization. That's kind of in there as an option that we're still considering and any comments that you have on that would be appropriate, too.

So we looked at the alternatives, we looked at our criteria, remember those two first threshold criteria, of the ones that meet those first criteria, public health and meeting the State and Federal laws, we felt that this one was the most cost effective. And the best balance of the remaining criteria. And that's what we're seeking your comment on. And I will invite you to give that comment and I hope this was helpful in preparing you for that.

Okay. We will now take your comments for the record regarding the proposed plan. And all the other studies conducted at the Old Springfield Landfill site. I'm going to start with the people that they had a card here and I'll start with Tom Moye from the Department of Environmental Conservation.

TOM MOYE: Again, my name is Tom Moye and I'm with the Vermont Department of Environmental Conservation. Very briefly, the State's position is that we support EPA's proposed plan as the best balance between protection of public health and the environment. And cost. We are currently considering the option to consolidate Waste area 2 under the cap for Waste area 3. And as more information becomes available we will finalize our position on that option. The State's final concurrence on the proposed plan will take place after we have carefully considered all comments received during the public comment period.

DAVID WEBSTER: Thank you, Tom. Wayne Golec? If you wouldn't mind coming up here to make sure we'd get it on the record, I'd appreciate it.

WAYNE GOLEC: I have four or five comments I'd like in the public record. What will be done with the town water line on that, that is on the site presently running through it. And when will it be done. Is Remcor going to relocate the Command Post decontamination facility, if so when. I understand there's some holdup in that it might possibly be out of that but EPA is waiting to and they're waiting for EPA to give them some okay on any source control wells. If they cannot come to agreement with EPA, how about relocating the Command Post decontamination facility, would EPA step in and take over the site. And that might allow them to move it. If Article 88-2 for the Town of Springfield is not enforced, which I understand it isn't, what is protecting the site from somebody doing digging on the site. And when EPA comes to a site, while it may not be a requirement, concern should go given to the aesthetic values of the property around and on the site. In other words, if it doesn't cost anything, why not be a little aesthetic about it and possibly more considerate. With EPA and the people they have do the work for them. And will there be, nothing's going to be done with Waste area 1. Will it be safe to dig in that area and whatnot in the future. And has the State approved the sewer plant use for the site. Thank you.

DAVID WEBSTER: Thank you very much. Again, after the formal part we can talk a bit more. Next I call on Ed Battles.

ED BATTLES: No comment at this time.

DAVID WEBSTER: John Tuttle.

JOHN TUTTLE: I have no comment at this time.

DAVID WEBSTER: Okay, I'll give you another chance in a minute if you want. Bill Newman.

BILL NEWMAN: No comment.

DAVID WEBSTER: John George.

JOHN GEORGE: My name is John George. I'm the Director of Site Charaterization and Assessment with Remcor, Incorporated. I'm here this evening on behalf of Emhart Industries and Textron, Incorporated. I have a statement I'd like to read into the record at this time. Emhart Industries, Incorporated, and Textron, Inc., are currently in the process of reviewing EPA's preferred alternative for Operable Unit #2. We have not yet completed our review and on July 26th made a formal request for extension of the comment period for a minimum of 30 days which I understand today was granted.

Despite the fact that we're not yet prepared to provide complete comments, we would like to state the following points for the record at this public hearing.

It is our position that there is no current unacceptable risk posed by the site and that the June 1988 endangerment assessment prepared by the EPA and used as a basis for conducting remedial action at the Old Springfield site does not adequately characterize potential future risks to public health. In particular, we believe that the model used to determine risks through future inhalation of landfill gases and ingestion of groundwater lacks technical justification and significantly overstates the potential risks. Comments made by Emhart and Textron in August, 1988, during the public comment period on the preferred alternative for Operable Unit #1, relative to the endangerment assessment were never responded to by the EPA. We would respectfully reiterate our request for a formal response to those comments.

The initial draft of the focused feasibility study report prepared by Remcor on behalf of Emhart and Textron had indicated that EPA alternative seven which was our alternative Number 3 was the recommended alternative, providing for protection of public health from all potential risks in combination with the management of migration controls provided by Operable Unit #1. This alternative included fencing the site, installation of a source control well and covering of surface soils that may pose a dermal contact risk. The capital cost of this alternative was estimated by Remcor at $495,000 with an annual operating and maintenance cost of approximately $18,000. A net present value ranging from $692,000 to $821,000. This is in comparison to the EPA's preferred alternative under consideration this evening with a base capital cost of seven and a half million dollars, and annual O and M of 130,000 and a range in net present value of 8.8 to 9.6 million dollars.

In the absence of a groundwater threat, an impermeable cap is not required at Waste area 2. To the extent that the EPA insists on construction of a low permeability cap over the former landfill areas, the EPA should permit alternate cap designs compliant with RCRA. Several points under there. There is no need for a twelve-inch gas vent layer at the base of the cap. Alternative materials such as soil admixtures or Bentonite panels should be permitted to substitute for the two feet of compacted clay incorporated in the typical cap cross sections provided in EPA's proposed plan.

There is no need for two feet of clean fill over the sand drainage layer when one foot of fill would be adequate.

Stabilization of the outslopes of Waste area 3 is not necessary from an engineering perspective to insure the stability of a RCRA-Compliant cap placed on the plateau portion of Waste area 3. Such stabilization will result in an unnecessary expense of approximately $300,000 in accordance with EPA's estimate.

If the EPA continues to maintain the covering of the outslopes of Waste area 3 is appropriate, provision of cover material could best be achieved by filling to a stable grade over the waste, rather than by excavating or regrading the waste materials. As set forth above, we do not accept that there is a risk-based justification for placing a cap on Waste area 2. To the extent that the EPA believes that this is necessary, there's no need for an elaborate stabilization scheme. The one million dollar cost estimate for stabilization of the outslopes of Waste area 2 is grossly inflated leading to the errant conclusion that excavation of Waste area 2 may be a more cost-effective solution. Excavation of the waste materials is unnecessary and would result in the potential for significant releases of contaminants within the municipal solid waste to air and water as well as exposing remediation workers to unnecessary risks.

If a French drain is to be installed on the upgradient side of Waste area 4 it should be dedicated to interception of shallow groundwater flow only and a surface water collection ditch should be placed upgradient of the French drain to reduce the volume of water that will have to be conveyed by the French drain system.

Dewatering of Waste area 4 could be more cost effectively achieved by installation of the French drain upslope of the waste area as proposed, but by eliminating the flexible membrane on the downslope face of the drain. Dewatering Waste area 4 through extraction wells as proposed by EPA and the proposed alternative was proven ineffective in the groundwater isolation study performed by Remcor.

And finally, Emhart and Textron and the Town of Springfield are among Respondents who under an administrative order by consent with the EPA are responsible for design of the leachate collection and groundwater extraction system as Operable Unit #1. Certain aspects of EPA's preferred alternative under discussion today such as the stabilization of outslope areas of Waste areas 2 and 3 are likely to adversely impact the current design of Operable Unit #1. Unless the EPA integrates the design of both operable units, significant cost and schedule inefficiencies are likely to occur to be paid for by both the town and Emhart and Textron. Thank you.

DAVID WEBSTER: One question, John, did I understand on the source control wells that that was not something you'd recommend at this point or did I miss that?

JOHN GEORGE: We have a question as to why two source wells. I have several questions that I'd like to ask later but we have a question as to whether two source control wells is exactly actually the best design.

DAVID WEBSTER: Okay. Thank you, I'll now take your comments for the record regarding the proposed plan or anything else if there's anybody else that would like to make a comment for the record tonight.

ROBERT YODER: Yes. Could I make a statement?

DAVID WEBSTER: Sure.

ROBERT YODER: I'm Robert Yoder, resident of Springfield and I'm a representative in the Vermont Legislature in the Vermont House for the District in which this landfill is located. We've heard, I've heard comments on the engineering and economic levels. And we've been informed about engineering considerations, what is the safest and best way to go, the perhaps least expensive way to achieve the end goal that you have.

But I wonder to what extent EPA has considered some of the political elements that, that is the feasibility of this town which has suffered a lot of economic reverses undertaking another, yet another expensive project. Ten years ago and for quite some time I guess we began it longer ago than that, we considered the possibility of developing a hydroelectric system and that's cost us some $3,000,000 which the taxpayers are paying off without having produced very much in revenue, we've had some. This has been a machine tool town which has seen reverses and loss of jobs in a very significant way over the past several years. And I wonder what will happen if we are after the discussion with Emhart and Textron, the town is faced with the prospect of having to cough up a significant portion of this 8.6 million. I would imagine that we would have to, this would have to be an article in the town warrants that the town voters would vote on. And has any consideration been given to the possibility that there could be a taxpayer revolt. And in that event, what do we do then. You mentioned the possibility of excavating one site and placing the contents thereof in another site. And this would reduce the the engineering costs by some $700,000. Why isn't that just automatically recommended. Why even consider spending more money when this would seem to be a sounder solution. I must confess that I'm not an engineer, but it seems to me that sometimes a common sense approach has some merit. And I toss out these ideas for what I understand their purpose is for EPA's consideration. And I hope that you will take this into consideration. Sometimes desperate problems need extraordinary and imaginative solutions and I'd like to throw one out that just occurs to me for your consideration. And I don't know how well this will fit in with existing law, bureaucratic regulations, labor union rules and labor laws, but it strikes me that it's possible that some of the labor might be done by volunteers. When a community had a problem in the past, quite frequently people would get together and volunteer their labor and their help. That may be that much of this has to be done by skilled engineers using heavy equipment. But we do have skilled people in this community and there may very well be some people who would volunteer some time to help keep costs down, to help keep the tax rate reasonable. And I wonder if that couldn't be explored, a volunteer team. Thank you very much.

DAVID WEBSTER: Thank you. Is there anybody else that would like to make a comment for the record at this time? Seeing no other comments for the record this evening, this concludes the formal portion of this evening's hearing. There will be no more oral comments for EPA's response and responsiveness summary of the Record of Decision.

Now, I'd like to entertain any comments questions or comments and maybe it would be appropriate to speak on some of the things I heard coming up here. Thank you very much again. I think that there is a lot to think about that's been presented here. Some of which we considered and some of which we haven't. Where should I start? On the facility that you may be aware, Wayne, we are trying to work with that. Our laws, as we indicated last time, deal with the release of hazardous materials, we're seeing if that poses something under the law and maybe we will in future agreements with Mr. Curtin in access if necessary by an EPA or by the PRPs will take those kind of things into consideration but unfortunately some of the considerations that are brought up, mainly aesthetic, is not specifically mentioned in the Act and it precludes us from taking that in a manner that's making something be more costly if it's to meet aesthetic criteria. However certainly if it was the same one, I think it would be a reasonable thing to do. Either trying kind of through those channels also perhaps the agreement regarding the access to the property and the location of those facilities as you are well aware is between the property owner John Curtin and it's either Remcor or Emhart and Textron, I'm not sure which. I don't know, do you have anything to say on that, John?

JOHN GEORGE: I know that we're beyond the part of the meeting here where we're being transcribed, right?

DAVID WEBSTER: You've being transcribed. But it's not, the distinction is that these are not ones where we're trying to consider these ones anything that's being said now in trying to address the community concerns under the statute. It's not a specific requirement that in responsiveness summary that everything that gets said here will necessarily be responded to in the official responsiveness summary. But yes, John, you're being recorded.

JOHN GEORGE: I don't have any specific knowledge of what the current status of that agreement is with John Curtin aside from the fact that it hasn't been concluded.

DAVID WEBSTER: I don't have much else to add, Wayne. I don't know if you want to follow that up. We have made a request although we have not seen that as a threat, release or threat of release of hazardous materials at this point which is our statutory authority.

WAYNE GOLEC: It is a decontamination center?

DAVID WEBSTER: Yes. As I understand it. That's the pool that they use to wash some of the equipment in.

JOHN GEORGE: Just to clarify, that pool was more or less an equalization basin to hold water so that it could be run through the treatment system before it was discharged to the municipal sewer. There was no, I mean there were some decon fluids that were placed into the basin but there wasn't any direct decontamination into the basin itself or into the pool.

DAVID WEBSTER: So if it's water in it now, it's rain water?

JOHN GEORGE: I don't know if there's water in it right now or not. There there might be a little bit of rain water, it's covered. So there really shouldn't be any rain water in it.

WAYNE GOLEC: The whole problem, the owner evidently has an ego problem and it should never have come about. From what I understand Remcor didn't want it there in the first place. They wanted it elsewhere. It was more convenient for them, maybe less costly for them, I don't know, but they were forced to put it there and from what EPA says, that it's going to be there another, I think it was maybe another two to four years. To me that's a problem. I don't like it at all. And there's no reason for it to be there other than the guy's got a problem.

DAVID WEBSTER: It kind of relates to your other question about, well, when will EPA step in and move that and again, we are bound by the authorities that have to do with we can take a lot of different actions dealing with their release or threat of release of hazardous substances, if it's not tied to that, we're looking into what authority we have that way and working hopefully in a way to resolve it but there's some limitations on it.

WAYNE GOLEC: Then I'm told that EPA is holding up Remcor as far as source control wells? They could drill those wells and probably be right out of there. But what's the holdup there.

DAVID WEBSTER: I'm afraid I'm going to have to get back on you about that one. I don't know.

SPEAKER: What's in the blue barrels behind the fence?

JOHN GEORGE: Those are drums of activated carbons that were used in the treatment system. Groundwater treatment system. All of what is up there as far as waste is concerned, the two red boxes, they're termed roll-off boxes, there are twelve drums of spent carbon from the groundwater treatment system. And one drum of decontamination fluids, mostly acetone, just common decontamination fluids. We anticipate with EPA's approval having those off-site by the middle of August. That's our current target and we're pretty close to realizing that.

DAVID WEBSTER: If that's the holdup you're talking about, EPA is involved with that and we go through a process of checking the facility that it's going to to make sure it's in compliance with the environmental laws in whatever states that it's going to and that is tied up in paperwork as Ed indicated but I think you're referring to something else.

WAYNE GOLEC: Except, source control wells which would be over in two or three.

DAVID WEBSTER: I'd have to get back to you.

WAYNE GOLEC: Why would it take so long to allow Remcor to move these red containers?

DAVID WEBSTER: What that process entails is whenever we're taking something off a Superfund site we have early in the problem basically gotten into trouble taking things from one site and taking it to another one which ended up making a Superfund site so we go through a lot of checks of if it's going someplace contacting the other regions, seeing what the compliance record is with that facility in Alabama or New York or Illinois, whatever it is and it's going through that process now.

WAYNE GOLEC: How long does that take typically?

DAVID WEBSTER: I think it's been between two and six months has been my experience. Depending on different waste, different facilities are licensed to do different wastes and when it got to be facilities whether there were fewer facilities handle those, a contaminant that fewer facilities were handling it's been very heavy.

WAYNE GOLEC: So it's not really Remcor's fault or EPA's fault?

DAVID WEBSTER: To tell you, I don't know enough of where the paperwork is. I can assume it is, I know that that takes a long time for EPA so it is plausible to me. I don't know whether you want to take credit for it or not.

JOHN GEORGE: You can take that one.

WAYNE GOLEC: If it was a site out in the back woods somewhere I guess there's no problem but when it's right across from houses, residents, it poses a problem.

DAVID WEBSTER: It is a problem.

WAYNE GOLEC: It does not look good.

DAVID WEBSTER: It's a problem here and nationally and there are very few facilities that are meeting the regulations for handle and treating hazardous wastes and to get those approvals is not necessarily an easy thing.

WAYNE GOLEC: Are they going to move area two to three, why can't that all be put under the cap, that's where it comes from, isn't it?

DAVID WEBSTER: In that option, all but I think it's in the option, it says assumes couple hundred cubic yards would be. There's one boring in that area that we felt was contaminated such that it should trigger taking it to an off-site facility.

WAYNE GOLEC: But you only got part of it then? The part you bored down?

DAVID WEBSTER: So in the area, that boring is our assumption we're going to have some that we should take off site but it's very small, it's a few percentages of the total ones. The rest of it we're doing in that option. We're doing exactly what you said. Which is excavating basically all of that filled ravine in Waste area 2 and placing it on Waste area 3 before putting a cap on it. To respond to one of the things that you mentioned, it was a bit of a timing situation. We were evaluating that at the last minute, one of the things that frankly was hard to get a handle on was the cost for the slope stabilization. And as those numbers came in, and this was a significant cost, that sent up the red flag of should we look at it. As you heard from John George, there are trade-offs involved with that. You have, you do have possibly more emissions or possibly more exposures to the workers any time you're excavating waste and there's a factor any time you're deciding to excavate but it's a trade-off and on the other hand it saves some money. There's another whole portion of the site which does not have to be behind a fence in perpetuity.

JOHN THURBER: John, isn't there going to a similar deal to what we have had with asbestos removal? Where they figured today it might be better if we left asbestos where it was because there was a greater danger to the environment with the removal as it would be when they left it?

DAVID WEBSTER: You mean whether you take the pipe and encapsulate it rather than removing it? I think from what I know about asbestos treatment there's a lot of people that recommend leaving it in place and maybe --

JOHN THURBER: Seems to be the consensus now. After they got everybody in the schools to remove it and

I didn't know whether this might be a --

DAVID WEBSTER: Any one of these remedies there's a trade-off and I think what's been pointed out is a good one. That on one hand it's tempting to say excavate it and get rid of it but that's the beginning of the problem. If it's hard getting approval to ship off the, to find a place to take the few drums that we're talking about, wait until we get into the hundred thousand cubic yards of waste and it is questionable whether it's better to take the risk of excavating it as opposed to trying to contain it and it's one that we face at a lot of sites and this one we felt that it would have been practicable.

JOHN THURBER: What is the risk if we leave it as it is? We haven't heard any risk that there was any great --

DAVID WEBSTER: If it's, when we look at the no action alternative we looked at what's the risk right now. We feel that currently there is nobody, no individual that's at risk. If there was somebody that was living on the site, current risk we feel would be the exposure to gases coming from the landfill over a prolonged period of time. And to get them to years and years of exposure. Then we get into what we call future risk or what-if risk, what if somebody built a house and started drinking the groundwater. That we think would be a risk, okay? You can debate on the policy of wait a minute, should EPA protect against those kinds of what-if risks, what if somebody puts a house on the site and plays on it. You can debate both sides, the way we do is we consider the what-if risks.

JOHN THURBER: There's been a good many years just as it is. Even an open pit at one time.

DAVID WEBSTER: That's a fair comment. If on the other hand I come up and say we're proposing to you walking away because it doesn't look very likely that anybody will ever expose it, forever, and besides we have ordinances or whatever to protect against it, I think we're up for, that's up for debate whether it's protective, too, in leaving it for the remainder of the time and none of those what-if's.

PRESTON CHILDS: I haven't heard a definition of the area under your code 6 institutional control, how much will that encompass, the whole site boundary? Last meeting we had I believe the answer was given that you would not allow any people to use the land above the caps because it might dislodge or affect the longevity of the cap. Seems to me that we're talking of a no man's land here that will not be able to be used, so-called, forever.

DAVID WEBSTER: The cap within the fence?

PRESTON CHILDS: I'm asking you how large an area are we talking about. Are we talking about the whole site boundary including Waste area 1 2, 3 and 4? Under this institutional control, are we taking that whole site boundary and putting that under institutional control? If we are, A, we've loss tax revenue on that land forever; B, nobody with live on it so you can't have your people in residence on it getting gas problems. Toxicity from the soil, or from the water. Because nobody will be able to be on that piece of land. If indeed, if your reference 6, institutional controls, locks off that whole site boundary you've got a no man's land that can't be touched. Therefore, and you say that at present there's not a problem. Down the road, if somebody tills the ground, opens the ground up, goes in for a well, well, if that's a no man's land nobody is going to be in there.

DAVID WEBSTER: There are several institutional controls which are envisioned and some of them were in the first ROD and there's additional ones in this proposed plan. I think to get to your immediate question, it's not on this map but I seem to recall some of the engineering maps indicating that basically it's the capped area and then whatever buffer zone is needed to protect the cap is what we're talking about. That is as you call it no man's land. That is, yes, in perpetuity, not going to be developed as far as I can see. Maybe they'll come up with something that's a compatible technology or recreational area or something like that where they, but yes, and it's, there are other institutional controls that have to do with until we achieve the groundwater cleanup standards in all the areas, institutional control or town ordinance to be enforced to prohibit use of the groundwater. Hopefully, by the combination of Operable Unit 1 and 2 we will reach a day when that won't be necessary anymore because we will achieve those clean-up goals, that it would be, meet any Federal or State standard for drinking waters, that's what we're trying to do. But yes, we're talking about institutional controls that would prevent damage to the cap.

PRESTON CHILDS: Your goal is that this will clean up back to the point that this can be put into residences.

DAVID WEBSTER: No. Not the cap itself. You're taking it off the rolls.

PRESTON CHILDS: The toxicity is forever under the ground so that is a no man's land forever.

DAVID WEBSTER: Right.

PRESTON CHILDS: Then I don't see where we need to go to all this expense.

DAVID WEBSTER: What we're trying to achieve with that is not only in this area where the cap is but also trying to get to the point where the contaminants in the groundwater is cleaned up. So that maybe the no man's land is just the landfill itself and not the area where the groundwater is contaminated beyond the landfill towards Seavers Brook and the Black River. You see what I'm saying?

PRESTON CHILDS: If that area in the water you've got contamination from the water in Seavers Brook now, why isn't that shown on that map as part of your contaminant site?

DAVID WEBSTER: This is the source area is where the waste was. This is contaminated all the way along here in the sand and gravel unit beneath the ground all the way to Seavers Brook. What are we doing about it? In the first Operable Unit there's a blank plan to collect at the seep here the water that's emanated and to treat it. Also to accelerate it in the first operable unit, there are proposed wells in this area to go down into that sand and gravel aquifer which is where you can get at the best to pull it up to shorten the amount of time it takes to clean up the contamination in this area. Thirdly, in the source control, we're trying to cut off the source of that contamination migrating to more so that will clean up faster. By cutting off the source, by a combination of things, keeping the water from infiltrating through it and also trying to hold it back with these source control wells here to pull it back into this area. So we've got a little built of distinction between the area that we're, basically what you're calling no man's land that will be a cap. In perpetuity on a landfill. This is not one where what you here, well, clean closure, go away, that's our goal, our goal is to leave the site so you can have a residential development and we can do it on some site but that's not what we're proposing on this one.

ED BATTLES: Following up on Preston's question, are you saying that the capped area, I understand, is up when it's forever fenced in and so on the other area of that is going to be able to be, to have homes or trailer park back on it?

DAVID WEBSTER: That's my understanding. And I'd rather get back to you with a definitive one but when we looked at Waste area 1 that it did not pose an unacceptable risk on it.

ED BATTLES: How long a period of time will it be before there can be something back on that property?

DAVID WEBSTER: I don't know. From a technical point it's very short. I don't know what the ownership and legal considerations are with that. But we feel that we have, there was an extensive boring program up here to look on a grid 70 feet apart of it and we feel pretty comfortable that we have delineated the source of where the waste was disposed of up at the landfill. And had one pocket here on closer inspection during Remcor's evaluation that did not appear to be as widespread. I don't know if Tom or John can comment a little built, I'm not real familiar with the details of what they found there and how that changed his thinking.

TOM MOYE: I think that's accurate. The work that Remcor did suggested that the waste that was at location one was a much smaller volume and maybe was related to some kind of incidental dumping, very small volume.

DAVID WEBSTER: I'm sorry. I'll try to recollect but feel free if you brought something up earlier and you want to see what my thoughts are on it.

ED BATTLES: You're saying now that once the cap is in place, and the wells are in place and so on that if they complete what you expect them to do, that people can inhabit the rest of the part?

DAVID WEBSTER: I think that's the goal and I think that's what we're trying to achieve and we're saying this is the area. There may be some area around here that it's getting into the integrity of the cap.

TOM MOYE: And there may be additional restrictions such as, you can't have a private well at that location, you might have to be hooked up to the municipal water supplies.

ED BATTLES: The water supply is already there.

TOM MOYE: Right, but I'm pointing out --

DAVID WEBSTER: If we achieve the objective which is the goal but it may take 10, 30, I don't know what the estimate is of years of pumping it to contain it and cut it off from the source of the contamination.

WAYNE GOLEC: At what point do you say that you put the cap on it, the fence around it, at what point do you say that these people are no longer responsible?

DAVID WEBSTER: Not responsible?

WAYNE GOLEC: Let's say John Curtin sells that land and they come up and build on it. Are these people going to be, oh, geez, more chemicals here, you people are responsible. How do you determine?

DAVID WEBSTER: As far as new owners up

there --

WAYNE GOLEC: Let's say the old owners, after it's cleaned up everything is clear and clean, Remcor and Emhart --

DAVID WEBSTER: If we have outstanding money on the site as far as free and clear is concerned. And one of the things that people settled in this case in that deal were that there were certain things that we would not press as far as future liabilities. John, I can, maybe you can help me but I think past costs that were involved previously was protection.

JOHN PARKER: Part of the partial consent decree, there is some statements and agreements there as far as the pro rata share of costs that might be recovered at a later date, that those were waived as part of this agreement. Among those parties only.

DAVID WEBSTER: Which is Emhart, Textron, the Town and BFI. That doesn't apply to John Curtin, he didn't settle. He has liabilities and we did not collect a hundred percent of what we spent on the site during that version and as you can see no matter what we pick here we're going to have more liability. So one is the previous one, they're liable until they either get a release of the liability which the town has on that previous work or there is no more outstanding Federal cost.

WAYNE GOLEC: That's not for everybody in the area, though.

DAVID WEBSTER: You're talking about legal liability, potential of ingesting contaminants?

WAYNE GOLEC: Liability. I mean I'd hate to think I'm going to live the next 30 years with that hanging over my head. Or the person that might buy my property or whatnot. What do I tell them? Good luck. See what I'm saying?

DAVID WEBSTER: I understand what you're saying.

WAYNE GOLEC: I'm glad the Town's off it and whatnot but that's --

DAVID WEBSTER: That's not you.

WAYNE GOLEC: Right.

DAVID WEBSTER: To tell you the truth we haven't gotten far enough in the Superfund process of dealing with --

WAYNE GOLEC: I hadn't thought about it until they brought it up.

DAVID WEBSTER: Recovery and what happens afterwards. We try to settle up liabilities with the people that we feel are responsible parties at some point. I'm involved in another site where we're doing that now after the clean up and trying to settle up the past costs but there are, as of right now, you're not one of the 14 parties who received the notice letter on it.

ROBERT YODER: When you say that the capped area are going to remain hazardous and toxic in perpetuity, do you mean forever? Is that an assumption or is there a study that points to that conclusion? I'm thinking that technology in that area seems to be evolving very, very rapidly. And you have bacteria which will help control oil spills. Is it possible that studies are ongoing that which might suggest that chemical changes, chemical processes, bacteriological, biological processes, may not over a long period of time render it nontoxic?

DAVID WEBSTER: Excellent point. Not only could there be biological action happening in there but also it is possible that as time goes on, we do a five year look at the site, new technologies will have progressed so that maybe injecting something in there to stimulate microbes could be something that's possible to do. Whatever. I am taking the pessimistic attitude but I think realistic that, hey, it's going to be there for a long time if not forever.

ROBERT YODER: When you say forever, that is an assumption.

DAVID WEBSTER: Also I'm on a little thin ground technically and I don't know, Bill or John, someone wants to help me out here, but I think that very slowly, any cap is going to be some continual leaching there. What we're hoping is that that's so insignificant that we achieve the groundwater cleanup levels and maybe that very small flow eventually will drain out. But that's definitely, that's not the strategy following, we're not following the flush strategy of trying to contain it and based on that strategy, you have to be ready to live with it that it's going to be a long time and it's not a piece of land that is prime for development or developmental forever.

ROBERT YODER: In a thousand years, the Listers can take another look at it.

DAVID WEBSTER: Every five years the Listers can look at it. Maybe there'll be a techology for doing it. Maybe. I don't know.

PRESTON CHILDS: I believe at the last meeting that it was stated that if the town, if this is the step that we're going to follow, and if it goes through, we're looking at four years before it's instituted. By your timetable. And instead of 8.6 million we're looking at probably four years down the road at twelve million dollars, in those, what is that, 1994 dollars. Then five years later you will do a test, how many times will you continue to do five-year tests and at what point do you say it's cleaned up? Do you say three good five-year tests, do you say four or what do you say?

DAVID WEBSTER: The law says any remedy where you leave waste in place, EPA shall conduct a review every five years of the site. That's the law.

ED BATTLES: Forever?

DAVID WEBSTER: That's as far as the law went. So I guess I can assume it's every or until that law is changed.

JOHN GEORGE: I wanted to clear up one thing that Mr. Yoder had said earlier and that was with respect to the excavation cost for Waste area 2 if it were to be removed and placed under the cap in Waste area 3. There was a comment that that would result in a savings of $700,000. Actually, the estimate for slope stabilization on Waste area 2 is a million. Which is a very rough number. The estimate for the net present value for excavation of Waste area 2 is in excess of 800,000. There's actually not a real significant difference between the two. There's certainly not $700,000 difference between the two in net present value and the point that I was trying to make earlier was that

Remcor believes anyway that the million dollar number is grossly overstated which we believe that the site, the stabilization if it's to occur on the outslopes the area two could be done for much less in the area than the cost of excavating and placing it on Waste area 3.

DAVID WEBSTER: We're very interested in seeing your opinions on that and looking at it. Right now that's what we came up with is there would be a -- there's a lot of engineering assumptions that could go into that.

JOHN GEORGE: When you're looking at the two different passive soil gas collection system and the three active systems, what combination of the five did you select for incorporation into in the preferred alternative?

DAVID WEBSTER: Passive systems in areas two and four and active ones in Waste area 3. Are you asking about how many vents and how much?

JOHN GEORGE: Which of the two passive systems did you choose and which of the three active systems did you choose that are identified in Appendix C of the supplemental feasibility study? I couldn't get the base capital costs to work out.

DAVID WEBSTER: Okay. I'm not sure of that one. And I'll get back to you on it. I'm not sure if one of them was picked and if so --

JOHN GEORGE: There's a significant value. That present value in the order of a million dollars difference between one end of the spectrum and the other.

DAVID WEBSTER: Okay. Got that one, John?

JOHN SEBASTIAN: Yes.

WAYNE GOLEC: I'm going to ask you the question. Does Mr. George or Remcor, they're disagreeing with you, with his comments there, I assume he was disagreeable with the preferred alternative.

DAVID WEBSTER: He's disagreeable on what the amount of cost savings if any there is with the movement of that I presented in the option of moving Waste area 2 under the cap here. Saying that by the time you excavated and put it under here, you have spent as much as you would have been saving by doing the slope. Our estimate of that says you save more money in not putting the cap in the side slope stabilization here than you do in the movement and it means that basically we've got to look at the assumption.

WAYNE GOLEC: You've already extended the comment period another month. I guess for Remcor or for whatever, is this disagreement or discussion going to hold it up, the cleanup any longer?

DAVID WEBSTER: What will happen to the comments such as the one made in the normal period and to the extent we can't, anything else is said tonight, is consider it and then explain how it was considered. So what you can expect on a comment like that one is okay, here's our assumption, we considered it and this is what we think now. And we may be in accordance with what he's saying and may be --

WAYNE GOLEC: But you don't see it as being a barrier of any kind or a stumbling block maybe that would --

DAVID WEBSTER: I don't see it as one right now. To begin with that was an option that was kind of vague. Additional option out there is and one default is to reject the option if the comments given --

WAYNE GOLEC: I guess I didn't understand everything he said. But it sounds --

DAVID WEBSTER: Basically he's saying it's not a good idea. He says engineer wise it doesn't save money.

JOHN GEORGE: He was right. We were in disagreement with the preferred alternative more or less in total. And I was also trying to clarify that there really isn't any cost savings associated, in fact there may be much greater cost associated with moving Waste area 2 under a cap in Waste area 3. So it was yes and yes.

ROBERT YODER: My comment about the savings of 700,000 is based on your paper of July this past month that states clearly estimated total construction operation and maintenance cost $8,600,000. If the excavation option is used $7,900,000. So if Mr. George is correct, then this statement is incorrect?

DAVID WEBSTER: That's right. That's based on, everything in there is based on certain engineering assumptions on how things are constructed. So you can come up with a cost. And engineers as you've heard will disagree on what the cost of something is on things.

ROBERT YODER: That leaves us with less confidence than before. Are there any other --

DAVID WEBSTER: I think any one of the cost estimates in there, we estimate the cost at this point because one of the criteria that we use is cost to assess it. We estimate it, we give instructions to the estimators that we're looking for something in the range of plus 30 percent or minus 30 percent so right there in a million dollars cost you're talking about anywhere between 700,000 and a million and a half dollars. Okay? Why that big a range? Well, it costs money to bring down the range. We're considering costs so that we pick the cost effective solution. I make no guess that we've got in it down to the penny and some of the other comments that Mr. George said is high, here's some other things to consider in the cap that may save the cost. And we'll consider those. You'll get another cost estimate when you design the cap. And even that may be different than what you get when you actually build it.

ROBERT YODER: That underscores my expressed concern about the burden to the taxpayer because there is kind of a rule of thumb that everything always costs twice as much.

DAVID WEBSTER: Well, there are certainly uncertainties in any one of them and when we try to estimate it. We do think that we were more realistic in our estimates of a cap on the site and the necessary components than what was done in some of the estimates in the focused feasibility study and John might take issue with that but in looking at things with the soil stabilization, you've heard a different opinion for that, too.

JEAN WILLARD: I'm not an engineer so I probably am missing something but in the reading that I've done, and what I hear you say, I hear a lot of contradictions. And between the first Record of Decision and this one, I wonder if some of the EPA officials shouldn't read their own material and resolve some of these contradictions.

DAVID WEBSTER: What are you referring to?

JEAN WILLARD: I just feel that there are areas that as I said, I'm not an engineer so maybe I'm missing something, but some of the decisions are not making sense to me.

DAVID WEBSTER: Okay. Let me know if this jogs any of the inconsistencies and I'll go through what I think as being some of the differences between the proposed plan of '88 and what's now. Because there are a lot of similarities.

JEAN WILLARD: There are some but there's some inconsistencies, too, and I just wanted to know when you were working on this decision if you took a good look at your first plan to meld it in with this one.

DAVID WEBSTER: I think --

JEAN WILLARD: You think you did in fact?

DAVID WEBSTER: I think this preferred alternative was done by a contractor of EBASCO which was our prime contractor before and they added it on. There are some different details. I think we had additional technical input on the slope stabilization in the interim there. I've been at one landfill where the cap was not stable and cracked on a slope for somewhat different reasons but it was next to a wet area because it wasn't anchored and it slipped and I think that's general engineering in the community that perhaps more awareness of that. Our first proposed plan didn't have that in that. Are we better now? Who knows but down the road we may be better off if this prevents it from sliding. Other differences we have thanks to work in the focused feasibility study we have a better area, in the area of extended contamination. There's a lot more tests done up there so the print of the cap has changed a little bit from one to the other one. The nature of materials, maybe you can help me out. But I don't think it's changed a whole lot because basically we're looking towards the law which governs hazardous waste sites and the regulations EPA has developed, the guidances EPA has developed under that to look at what's necessary. I think another change is looking at the active gas emission system and a big change is the French drain. It was not in the proposed plan two years ago and that comes in a lot of the raised concern of wait a minute, you don't understand the interaction between the water and the waste. I'm looking at that and we hope we're making a better decision saying there's something that we can enhance, we can add to effectiveness of isolating the waste from the groundwater by putting this interceptor French drain above it. I hope, you know, I would believe that it would work better because of that because there is less water that's going to be flushing through the waste. There are differences and they have to do with more, I think, study. I think that more study produces better solutions, probably so, and you reach at some point whereby if I rattle off a couple more feasibility studies, you reach diminishing returns at some point on it. But I can never say that we wouldn't learn more if we studied it more.

WAYNE GOLEC: If Remcor was doing the testing at the site with the PRPs and EPA was taking their material, why does there seem to be a disagreement now? Why didn't you and Remcor get together or EPA and Remcor get together and say this is what we found, okay, we see that's what you found, but we're going to do -- it would be better if you did that and come here with a plan that you both agreed on.

DAVID WEBSTER: That would be optimal. Why didn't it happen? My perception and John George can give his if he wishes but we got in the focused feasibility study one alternative that we didn't think we are meeting the nine criteria fully. Based on different interpretations of what risks were, what relevant and appropriate laws were, and at that point, we said well, that if that's not going to be evaluated we better evaluate what we think does meet those criteria.

WAYNE GOLEC: They were looking at money, you were looking at --

DAVID WEBSTER: We were looking at the same criteria, they evaluated those criteria but I think there were different interpretations if you want to elaborate on that.

JOHN GEORGE: I think we were working off of some fundamental disagreements with respect to the endangerment assessment that was done in June of '88, that established the basis in risk for performance of remedial action at the site. And we were also looking at integration of the source control remedy with management of migration which EPA was also looking at it but we were looking at it from a little different perspective. We didn't necessarily see and some of the objectives that are established in the supplemental feasibility study for management of migration seemed to be in excess of what were actually established in the Record of Decision. With respect to prevention of groundwater contamination off-site, to us that's more of a management and migration issue. I guess we, bottom line, we have some fundamental differences in terms of the approach to remediation of the site. Partly in risk assessment, and partly in the engineering. We have a difference of opinion, for instance, with respect to Waste area 2, the waste is currently unsaturated, monitoring wells in the waste actually monitoring groundwater immediately below the waste are clean. Wells that are just downgradient of the waste area. The leachate seep which is seep four on the eastern side of the slope is progressively been getting cleaner over time to the point where the only contaminant that exceeds the safe drinking water standard MCL exceeds it by one part per billion in the most recent sample. We don't really feel that that waste area merits an impermeable cap. We don't see any real benefit to an impermeable cap on the waste area here and there's a mechanism, Resource Conservation and Recovery Act, RCRA, that allows for what's called a hybrid closure which is a closure of a landfill where there's no ground water threat with a, with no requirement for low permeability cover. No requirement for a cap as such and these are some of the disagreements that we've had kind of on an ongoing basis.

DAVID YESMAN: Would it be possible, based on what Mr. George is saying tonight that there appears to be some changes in the way things are at the site, would it be possible to go back and reevaluate the endangerment assessment made for ROD 1. And if in fact that the assessment would change now because things are changed, that it may be possible to change the focus of what is proposed now to more closely parallel to what Remcor is suggesting?

DAVID WEBSTER: We did look at risk assessment although it wasn't required of Remcor and based on that consideration we thought that that was the best assessment to do with the site right now was that that implication of the risk in the air, direct contact and groundwater. Certainly they have analyzed this and put it in their feasibility study, we looked at it back and forth and put some things in the administrative record saying how and looking at these alternatives and our alternative, where the criteria, where we come up with on making that. A lot of it has been done. This is somewhat of a second chance because it's also an opportunity along with the folks in town also responsible parties making their engineer decisions on, wait a minute, you want two feet, how about one foot and these are also comments that we take a look at. So we look at the value particularly at those instructions, some of them that sound new, other ones are ones that Remcor put forth in the focussed feasibility study.

DAVID YESMAN: I have one other question, that deals with the comments that were made about the residual moneys that have been spent. But yet not reimbursed by, to EPA by PRPs that were not part of the consent decree. What kind of dollars are you talking about that this has to be paid off by the other PRPs. Ball park.

BILL STEELE: Three million estimated on the special notices, at the time of special notice, and past cost of 1.75 million was collected. Estimated three million.

DAVID WEBSTER: Part of the settlement, doing that. As well as reimbursing. It had a date of expenses to occur.

DAVID YESMAN: So that leaves a balance of 1.25 to be absorbed by the other PRPs?

DAVID WEBSTER: In past costs. Before that date. Then there have been expenses since that time, a lot of them because Remcor had been doing the investigation, not paying, but for example, our analysis, being here tonight, our evaluation of the supplementary feasibility study, enforcement actions and such, there are continuing EPA's expenses. What will happen, enforcement wise, is a couple things. First, once a Record of Decision is signed on this one, we will be contacting parties as far as trying to come to an agreement on this. As a separate issue, that I'm not going to comment exactly on what EPA's long-term strategy is, is to try to collect those past costs of 1.25 from the non-settlers, the people that did not participate in that first agreement.

DAVID YESMAN: What's the bill so far on this go around?

DAVID WEBSTER: Since that last date up until now?

DAVID YESMAN: Yes. Got a rough idea?

DAVID WEBSTER: I really don't know what it has been. I'm going to have to defer because I'm not project manager on this one. The cost, one of the expenses has been the oversight of the activities that we are going on with Remcor, another one has been a contractor hired to evaluate and come up with some of the cost estimates that we've heard tonight.

DAVID YESMAN: You think it's over a million dollars?

DAVID WEBSTER: What I'm not sure on is in that agreement what the structure was for reimbursement of EPA oversight costs, anybody want to help me with that one?

BILL STEELE: Estimated at 750,000 at one juncture.

DAVID WEBSTER: Typically I think we're going on a bill as you go basis. In other words, Emhart and Textron have, let me, typically PRP signing on an order like that, there's a provision that every year EPA will calculate what it's spent on oversight and send a bill to the PRPs for recovery and I think that's the way that that order is structured. I can't be positive without looking back on it. In those which the oversight cases aren't part of that bill, they have been settled up by one of those two responsible parties.

JOHN THURBER: I don't want to monopolize this hearing but there's one thing that's bothering me a little. That No. 7. Five year reviews. As I understood you to say last July, no guarantees when there is all done that there is going to operate it as you intend it, am I right?

DAVID WEBSTER: There's no guarantee.

JOHN THURBER: Now five years from now we've got a review, find things aren't working as you anticipated. Then what happens?

DAVID WEBSTER: We haven't gotten that far in the process but what I would anticipate if I was doing it today, you would look at it and see if there is, should be an amendment to what the decision was made.

Maybe it's the new technology that's come across. Maybe it's a finding out that there was, this was not the best material. Maybe there's a better material and it's so much better that we should be putting that as a cover over it instead. Maybe it's a look and seeing that the slope stabilization could be reinforced and we're getting some slipping in the cap. It may be looking at the institutional controls and saying gee, they're not being enforced, something that's going to change. If there is a need for a change, we look at the Record of Decision. And we have kind of policies on three different levels of changes. One that we consider rather minor, we'll make the change and announce the change. If it gets into the higher categories then it requires going out, a proposed change, going out for public comment and getting basically a Record of Decision.

JOHN THURBER: And that could mean another 8.6 million down the road.

DAVID WEBSTER: There are a lot of uncertainties.

BILL NEWMAN: If something is going, I'm using just plain language, going to hell, why do you have to wait five years? In other words, after two years there's things that have to be remedied, it's going to be much worse at the end of five years, why not do it at two years?

DAVID WEBSTER: I hope we're thinking as logically as that and I had would like to think we are. We're not that far away from it. If, for example, the cap started sliding down the hill, and there were fumes being detected coming out from the landfill, I don't think we would wait for the end of five years. In the operation and maintenance portion here, we'd be looking to do that and whether it means that EPA doing that or responsible parties doing that, we consider that operation and maintenance to look for things that need to be corrected. Maybe it's the fence gets knocked down, we're not going to wait five years to fix the fence. We have an operation and maintenance plan associated with the work.

JOHN GEORGE: With Emhart, Textron and the town under a consent order for design of Operable Unit #1, issues like the side slope stabilization being potentially affecting a portion of that design, how does EPA intend on integrating the final Record of Decision for ROD 2 with what we're currently attempting design for ROD 1?

DAVID WEBSTER: I think -- I don't know. There's been some talk of that and I think that if it looks like before we move forward on something in the implementation schedule that it might be a bona fide reason for holding back on that. For example, if we're putting in something that has to be covered over later on with a slope stabilization, I think we're aware of that possibility. But I think considering things speculative enough now and not at that critical juncture to act directly on that right now. Do you think I'm mistaken from your perspective on that? I mean we're going to use common sense as far as if you're worried that we're going to enforce, put this in this month and now dig it up and put this cover over and then put it in again underneath it.

JOHN GEORGE: I think though that if that's a real possibility that we probably ought to hold now on what we're doing until we get the thing worked out.

DAVID WEBSTER: Well, I hope we're proceeding reasonably so far on the design and that could be discussed.

JOHN GEORGE: Okay.

TOM MOYE: And there are certain things that could be done that are unrelated to eastern side slope stabilization like the west side.

DAVID WEBSTER: I think that the conversations we've had that the western slopes aren't affected by

Seavers Brook. So there are things to go and then as we're still in the P O, permit application and everything else.

PRESTON CHILDS: I don't know if this is an appropriate question but it's one on my mind. I think you've done a commendable job. I think you're very sincere about your job. I think both of you men are highly qualified but you have differences of opinion. This is understandable. What I want to know is what government agency came up with the brainstorm of saying we're going to have a Superfund and what knowledge do they have. If you engineers who are working with this on a day to day basis, you're trying to adhere to a Congressional law. But who designed that law? Do they know what they're talking about? If you two gentlemen who are highly qualified in your field have a difference of opinion you're still free to adhere under a law that we don't know they knew what they were talking about.

DAVID WEBSTER: I'm not sure I can respond to that.

PRESTON CHILDS: We operated at the time we had this Springfield landfill, we operated under the guidelines that the State had at that time. Now the State is out of it free and clear. It's our ball park. Who's to say that we are operating under your, the law we have today to the best of the knowledge that you have but it still isn't going to work? We're going to pay and pay and pay, build, rebuild, until this sort of thing is going to have anything. I'm concerned, as I said, probably my question can't be answered but it is a question I have in my mind. We try to do right. We went under the existing guidelines for the State at that time. And I'm not faulting the State. They didn't know the ramifications of the toxicity but it wasn't that we were a problem child and rebelling against their guidelines. But we have to pay and they don't. Okay? State's out of it. It's our ball park. Now again we're trying to comply with laws and in all intent we think we're doing, we're being compelled to do, go by the laws, when they may not be right either.

DAVID WEBSTER: Don't have a whole lot of response. There's a lot of things. Do we know how Congress developed laws? I'm sure there's a lot of people having input on how that's done including EPA and EPA is certainly in there opposing, proposing, this is a good idea. Certainly lot of people in public and companies were thinking it was a good idea, too. I don't know how to respond on that one. I can go through liabilities and what it is. I think basically Congress, I'll get a little philosophical, faced with a problem of who is going to pay for these waste sites and says is there anything that's equitable and they probably scratched their head and said no. Is it right to make it the general tax revenues and make everyone pay for everyone else's hazardous waste sites, no. And probably came up with a scheme that says well, here's a group of parties which I think may have had the best intentions in the world but we're going to name them liable. Owners, operators, parties. I don't think anybody's going to make a contention that there's in most of the cases that I see there's maliciousness or intent or certainly not some kind of adherence to what was going on all around the country. I think, you say you had good intentions, I think Congress did, to. When they saw the outcry, pass the bill. And I think there's some really hard questions. And they're hard engineering questions, they're hard assumption ones, how clean is clean, should it be permanent, should you dig it up, who should be liable. If anybody tries to tell you these are easy ones, don't believe them.

ED BATTLES: Mr. Curtin did not participate as a PRP in the first ROD, right?

DAVID WEBSTER: In the first consent decree, correct.

ED BATTLES: If Mr. Curtin decides to, you have a three to five year plan here to get whatever that you decide to do into operation, if Mr. Curtin decides that he's not going to participate in the second step and all of a sudden Mr. Curtin decides that he doesn't want anybody else on his property, does the EPA have the authority to go in and do this work whether Mr. Curtin wants you there or not or does it have to go through the Court system?

DAVID WEBSTER: We have authority to go get access to properties for the purposes of investigating or responding to release or potential release of hazardous substances. Exactly the legal mechanisms, I'm not sure. I know in some cases we go to a judge to get a court order to get on property. Whether that's the case here, I'm not sure. But we have authority whether that's through the Court or administratively to get on the property for the purpose of doing the action.

ED BATTLES: The question I'm asking is how long could this be tied up in the courts beyond the three to five years?

DAVID WEBSTER: Oh. Is there a lawyer in the crowd that wants to speculate on that one? I think a long time. And you just hit, access is one potential issue. We have other ones. Let me not be pessimistic on it. The way that the Act is structured, if there's not a settlement, EPA has a couple of options. One, it can order administratively one or more responsible parties to take any or all the actions that have been involved.

ED BATTLES: We understand that one.

DAVID WEBSTER: Now, if they say no, then my understanding it goes to court pretty fast at that point. Another option is that we have is to use the Federal Superfund money which is used to get industries to do that work and try to get that money later on. That is a way that might not add, doesn't hold up the act but will that end up in court, probably, because we will take action to recover that money.

ED BATTLES: That wasn't my question. My question is do you have the authority to go on that property?

DAVID WEBSTER: Right now?

ED BATTLES: To do this work?

DAVID WEBSTER: No. We have the authority in the statute to take the steps to get on the property. Do we have an access agreement or court order in hand for John Curtin's property, I don't believe so, but I don't believe so but I'm not the one day-to-day.

JOHN PARKER: We have the mechanisms to do that.

DAVID WEBSTER: We have the mechanisms because clearly we have made decisions so it has to have been possible for us to go on that site. So the law has the authority to go on there. Whether we take the steps and go to the right administrative person or judge, I don't think we have. But I could be wrong on that.

JOHN PARKER: It could happen very quickly, too.

ED BATTLES: What I'm asking is could it be held up for several years in court?

DAVID WEBSTER: It could be held up in court. Several years. Depending on the issue. Once it's in a judge's hands, what control we or the parties that were in litigation would have very little to do with.

JOHN PARKER: Depends on the nature of the remedy that you sought.

DAVID WEBSTER: You're hitting on the access one because that's a very good point because there's a lot of other ways that --

ED BATTLES: I'm not talking about the access, I'm talking about the physical work, do you have the authority to do the physical work on his property?

DAVID WEBSTER: In the statute. Yes. Specifically to this site it hasn't been pursued.

ED BATTLES: Without his permission?

DAVID WEBSTER: In the statute, yes. In a specific court order or agreement for this site, no. I think, there's some access agreements but I think it pertains to Emhart and Textron getting on to --

WAYNE GOLEC: If he says no, you go on and do the work anyway and then you go to court afterwards?

DAVID WEBSTER: As I understand access law, and I'm on my fringe here, there's a step of us getting a court order by the authorities in the statute to get on the property.

ED BATTLES: Is that like eminent domain, John, similar?

JOHN PARKER: Not really, philosophically it's different. You have a very specific, very narrow issue here, but the EPA has some mechanisms to move ahead if necessary.

ED BATTLES: What I'm getting at is they're talking about three to five years before this but what happens if he decides, is it going to drag, can he drag it through the courts for another five years before anything is done?

JOHN PARKER: Depends on the nature of the remedy that the moving party would seek. Some things you can get very quick answers now.

ED BATTLES: But it would be possible for him to drag it through the courts for a long period of time.

JOHN PARKER: Depends on the procedures, what's initiated and what the remedy is that's sought and so forth. There's no black and white answer to that.

DAVID WEBSTER: We've taken those steps on other sites to get access and it's happened in the time frame of months rather than years.

JOHN GEORGE: You brought up the issue before about the source control wells. I was wondering two questions. Why two source control wells and second one is there's a discussion in I believe it's Appendix D of the supplemental feasibility study that the intent was to reduce the eastward limit of the capture zone for the wells to the extent possible. I'm wondering why two and then the second question, why would you want to reduce the easternmost extent of the capture zone of the wells.

DAVID WEBSTER: Extend the easternmost extent of the capture zone?

JOHN GEORGE: Why would you want to reduce the capture of the wells by moving towards the east?

DAVID WEBSTER: Basically did the analysis on what would be optimal as far as the source control wells for cutting down the contamination, that's what caught me a little off guard in your statement. Because in some of your alternatives, I don't know in your preferred alternatives offhand you had one source control well in there.

JOHN GEORGE: Well --

DAVID WEBSTER: Basically looking at that saying one's good, two's better in analyzing it.

JOHN GEORGE: Two costs twice as much.

DAVID WEBSTER: There are certainly trade-offs. And part of the thought was I believe the sand and gravel aquifer that these are tapping into, you're in this area someplace in here you're on the divide in the sand and gravel aquifer where with the sand and gravel aquifers going towards Seavers Brook or contributing to the bedrock aquifer that in part is going to the Black River. And while you have further down here in the first operable unit wells that are extracting water from the sand and gravel aquifer, this is kind of your last chance on anything that's getting down into the bedrock. So let's design that to try to pull and keep things from going into the fractured bedrock in this direction. So I think there was an effort to do it close enough to affect out towards, as far as possible towards the east.

JOHN GEORGE: There's a statement though in the appendix that says that you want to limit the eastern extent of the capture zone of those wells. That's why it's in conflict with what you're saying now. I'm not sure why you want to limit that.

DAVID WEBSTER: I'm going to have to get back to you. Unless, Tom, you have any idea on that one.

TOM MOYE: No, I don't. I'm not sure. I can look at the intent was and maybe, in response to that comment relook at the analysis that was done as far as the number of wells at the site.

ED BATTLES: I'd like to ask Mr. George a question. You I believe read in your statement something to the effect that the French drain that is up there on the picture, that your French drain, you still had a French drain in but it wouldn't be as deep, right?

JOHN GEORGE: No, it wasn't so much that. That French drain detail doesn't really show --

DAVID WEBSTER: There's a plastic on one side.

JOHN GEORGE: I'm showing you what I was talking about. If there is what we're looking at here as far as Waste area 4, this is the northern side and this is the southern side. Of that French drain. See if you're looking at this, if this is the northern side of the French drain next to Waste area 4 and this is the southern side with the hillside coming up over here, what the EPA French drain system contains is a flexible membrane down the side adjacent to Waste area 4, about 25 feet deep with a twelve-inch corrugated pipe, perforated pipe at the base. What we're saying is the intent of that as I understand it was to prevent contaminated groundwater from migrating from Waste area 4 into the drain. What we were saying is that if instead of allowing the drain to collect both surface water and shallow groundwater flow, if you put up here a collection ditch and pick up the surface water and move it off which would be clean, and you use the French drain to collect only the groundwater then you're going to have a relatively low flow. You can allow that drain not to have an impermeable barrier on the side adjacent to Waste area 4, let the water from Waste area 4 come into the drain and treat it because you'll have treatment capability available through the management of migration treatment system. That would be a more effective way, more cost effective way of drawing the water table down in Waste area 4 which you need to do in order to cap Waste area 4 than to install the dewatering wells in which one of the four waste wells but we attempted to pump a well in one of the waste wells in Waste area 4 during one of the study and finally divided organic material came out of the waste drain and we just couldn't pump it.

ED BATTLES: Isn't there a large amount of water coming off the southern slope?

JOHN GEORGE: Surface water?

ED BATTLES: No. No. Underground water. Isn't most of the water feeding into area four actually coming off of the uphill side, southern side?

JOHN GEORGE: There's a lot of surface drainage area onto Waste area 4. You could pick up a lot of surface area runoff with a collection ditch.

ED BATTLES: Let me ask you this question, then. Do you know where the water is coming from that's coming out down on Seavers Brook?

JOHN GEORGE: We believe we do.

ED BATTLES: Is that water coming from the southern side of Waste area 4?

JOHN GEORGE: To an extent it is.

ED BATTLES: Southern sides up the hill, right?

JOHN GEORGE: Yes. There's a certain water that enters Waste area 4 and moves down through about 60 feet of till. Glacial till and enters the sand and gravel drain. That sand and gravel unit that kind of cuts across the site from the southeast to the northwest and we believe empties into the seeps that are on the Seavers Brook Road.

ED BATTLES: Now, the seeps, are you referring to the seeps on Seavers Brook Road as the springs? Are the springs on Seavers Brook Road the same as what you're referring to as seeps?

JOHN GEORGE: The ones that I'm referring to are the ones that are inside the fenced area.

ED BATTLES: That's the springs, okay.

WAYNE GOLEC: Are you putting French drains down there?

DAVID WEBSTER: Down by Seavers Brook Road?

WAYNE GOLEC: Yes.

DAVID WEBSTER: It was called for in the ROD, you guys can help me, too, that the collection would be subsurface or so there won't be volatilization. And we had one scheme for that in the proposed plan of ROD and I'm not up to speed who what may have proposed something different but achieve the same directive on design.

WAYNE GOLEC: One there and would the other side, they are not in --

DAVID WEBSTER: That's first operable unit stuff. That's in the leachate seep collection.

WAYNE GOLEC: I thought they were supposed to be already started then.

DAVID WEBSTER: First operable unit which is what the '88 ROD was went out and signed an agreement this past May by the judge to effect that one. And we are in, they are designing that one now. That would include the mechanisms at down by Seavers Brook Road and along the eastern seeps to collect those seeps without allowing the volatiles contact with the area. So that's in the design phase, they're not in there.

WAYNE GOLEC: They will collect the seeps? I thought they were in or supposed to go in shortly, though.

DAVID WEBSTER: They are being designed.

WAYNE GOLEC: What's shortly? Couple years?

DAVID WEBSTER: I think you're realistic talking that way. The one that seems to be on the critical path right now is not the design of that system by Seavers Brook Road, it's what to do with the collected water.

WAYNE GOLEC: If you stop the water that's coming down the hill in the four isn't that the water that goes across the gravel and that goes up to in Seavers Brook?

JOHN GEORGE: That's why it was a little bit difficult to answer that question. That's not just that water, there's other water coming from a lot of different sources.

ED BATTLES: With all the wells that you have put up there, have you been able to locate or have you been able to determine how much say gallons a minute of water is coming down off of that hill in the four and going down into Seavers Brook area?

JOHN GEORGE: Within the limits of, within fairly close limits I think we have been able to do that. Short of being able to measure every input to the system and knowing exactly where all the water goes through to, you can measure exactly what flow is ending up in a particular place. You can't get that 100 percent but we did develop in the feasibility, focused feasibility study a water balance for the site that I think hangs together pretty well. In other words, it is really a balance. You take the information that you have on rainfall and snow melt, entering in certain areas as you portion that across the site and you measure the flow say to leachate seeps and you go back and check and does it make sense that with bedrock groundwater entering sand and gravel with a certain amount of flow with certain sand and gravel been with a certain amount of infiltration can I come up with the flow that I'm seeing over western seeps and the model I think, I think that the model that we presented in the focused feasibility study hangs together fairly well. So that we, within a certain amount of error, I wouldn't, we could do it definitely without any error at all but I think within an acceptable area, we can do that.

HAROLD MILLAY: Do you know how many gallons a minute is going out there now?

JOHN GEORGE: Out the western seeps?

HAROLD MILLAY: Yes.

JOHN GEORGE: That flow is fairly constant. I think it's about 35 gallons per minute.

ED BATTLES: I think it's probably a little more.

HAROLD MILLAY: 55.

JOHN GEORGE: When I say 35 gallons per minute I'm saying an average basis over the year which is the way we did the water balance. There may be certain times when there's going to be contributions from snow melt or rainfall.

ED BATTLES: Those springs never change. They run the same yearround. They ran the same in the middle of the winter as they did in the spring and in the middle of the summer when it was the driest summer around.

HAROLD MILLAY: That's one culvert that takes care of the whole thing. Take a bucket and watch it and it comes up around 55 gallons.

JOHN GEORGE: If we projected 35 on the water balance and it was a hundred and 35, that would be close. If it was 55, that would be great.

ED BATTLES: Now let me go back to the French drain. Is the French drain going to collect most of that water?

JOHN GEORGE: It wouldn't collect most of it. It will collect a portion of that water.

DAVID WEBSTER: I think one thing, correct me if I'm on a different track here, but in putting the French drain in the proposed plan it was to dewater the water that was going through the waste. That's not going to get rid of water that's coming down the hill beneath the waste and ending up in that sand and gravel unit and coming back out. We're not concerned about that.

ED BATTLES: How deep is that water coming down off of the hill going through Waste area 4?

DAVID WEBSTER: There's no sand and gravel here so it's basically till overlying bedrock, right? I mean up this in this area?

JOHN GEORGE: Right.

DAVID WEBSTER: So you're not talking about a unit which has a lot of permeability which is why I would agree with what John said, major factor is how much is coming on the surface.

ED BATTLES: You're saying now the water is running through bedrock before it enters four?

DAVID WEBSTER: What I'm saying is the bedrock, the fractured bedrock may be the most permeable strata that you have in generally coming down here. Is that true or will they take sands in there?

TOM MOYE: It's more permeable than the till.

DAVID WEBSTER: We're not putting the French drain down to fractured bedrock. One because what with the stuff that's going down for the fractured bedrock in there isn't intercepting the waste. It's getting away from our purpose of the French drain which was to lower the water table and keep the water from going through the waste.

ED BATTLES: I'm -- just one more question.

DAVID WEBSTER: I'm sorry this is frustrating for you.

ED BATTLES: That's all right. No problem. With all the drilling and everything that you've done up there to locate the water and so on have you had anybody walk from Seavers Brook Road up from Will Dean Road to the main road across the southern side of that which would be above the French drain and dowse it and tell you how much water is coming off that hill?

DAVID WEBSTER: Not to my knowledge.

ED BATTLES: I suggest you do it. There's some pretty good dowsers around. There's some that can tell you, the old-timers can tell you where it is and tell you how deep it is and how much is there and they're awful close. I know it's not very scientific nowadays. But it has turned up a lot of good wells. Preston's got an awful good spring that I dug with a bulldozer. You couldn't see a drop of water but the dowser found it.

WAYNE GOLEC: It was mentioned tonight that Waste area No. 4 is running cleaner than it was before.

DAVID WEBSTER: I think he was talking about Waste area 2.

JOHN GEORGE: I was talking about leachate seep four.

DAVID WEBSTER: Down in this area.

WAYNE GOLEC: If it's been 20 years since water's been run through these chemicals, why aren't the chemicals all gone? It's coming cleaner, that's a good sign. Why are we bothering --

DAVID WEBSTER: First, I may be on shaky ground but there's inconsistency with the data coming in. There was one hit which hasn't been replicated in a couple of sampling rounds, is that the leachate sample?

JOHN GEORGE: Actually we sampled in August and the State sampled in May. And leachate seep four our results for chlorinated ethanes (phonetic) which are the volatile contaminants of concern were remarkably similar. That's a sample there back in 1985 and then subsequent years I believe there were two or three samples that showed considerably higher levels but it would appear as if leachate seep four is on a downward trend as far as contamination is concerned. And as I said, the only, there is one parameter, one contaminant that exceeds it's MCL by one part per billion which is almost beyond the limits of being able to make a distinction in the most recent analysis in leachate seep four.

WAYNE GOLEC: But there's 0still concern that it should be cleaned up.

DAVID WEBSTER: We look at it as that that is an area of hazardous waste disposal that hasn't been cleaned up and the risk associated with that is part of the plans to cap that to cut off the contamination.

WAYNE GOLEC: Is it possible what they're seeing is that maybe it's just cleaning a certain area and everything else is just waiting to move in on it?

DAVID WEBSTER: It's possible. I'm not sure if that's the only place that the water is going from that one, from the waste area and maybe that's like a record to walk away from at this point. Obviously we don't in our analysis. We feel that that should be contained in that, either contained or excavated. But I think those results were in our mind when we said also look at maybe this is one that we can get by with something less costly and I think in excavating it because it doesn't seem to be as concentrated a source as area 3.

WAYNE GOLEC: Has the State approved the use of the sewer plant yet?

TOM MOYE: No.

WAYNE GOLEC: Is there a reason for that? Will they?

TOM MOYE: The consent decree that was entered into by the three or four responsible parties required that they submit an application to the State.

WAYNE GOLEC: Who are they?

TOM MOYE: The respondents, Emhart and Textron, BFI and the town of Springfield. They have done that and the town, the State is reviewing that application now. But whether the State approves of that with pretreatment or without pretreatment, the Town of Springfield will decide whether they will allow the leachate to go there or being pretreated or not.

WAYNE GOLEC: What are you looking for, how will you decide?

TOM MOYE: Well, actually, I'm not involved in that process. I'm trying to speak for another branch of state government.

WAYNE GOLEC: Any idea how it will be decided?

BILL AHEARN: The industrial pretreatment, there's a program called Industrial Pretreatment Group. It's operated out of the Permits and Protection Division and what they do is they look at the ability of the treatment plant to assimilate, to take those substances that are coming into the wastewater and to treat them, successfully remove them and they look at the impact of those substances on the sludge quality as well. So they'll be looking to see if the wastewater can come into the plant and be successfully treated by it so it doesn't just run through the plant and they'll be looking to make sure that it doesn't change the quality of your sludge in any way that will prevent it from say a land application program or the composting program.

WAYNE GOLEC: Will you be using Remcor's results from the test to determine?

BILL AHEARN: They'll be using the results that are submitted in the application. So in an application the Applicant has to tell you what it is that they want to discharge so I'm not familiar with this application. But the standard practice is to look at what the Applicant tells you is there. To see if it's consistent with the general practice. For if they're looking at leachate then they would like to see what the leachate did and all the books showed this and if you have something that's in range, there isn't a reason to --

WAYNE GOLEC: You will look at just what the PRP sends you? You won't come down here to Springfield and look through all the books?

BILL AHEARN: You would look at what any Applicant sent you and typically you set up a monitoring program on that.

TOM MOYE: I can tell you that the people that are reviewing that application have looked, have come to us for any other sources of information that we have about the types of chemicals and the concentrations. So they're looking at EPA's reports, any sampling results we have, as well as the information that was submitted with the application.

BILL NEWMAN: Aren't you having, you're having a leachate coming from Newport, too, right, New Hampshire? And as well as this? My question is, another thing, I was wondering about the capacity of the treatment plant to be able to take this as long as any projected growth, you know, wondering about the capacities and reserve of the sewage treatment plant?

TOM MOYE: I believe those factors are considered in the review of that application. What are all the sources of leachate to the treatment plant and what would this proposed additional discharge, what impact might that have.

BILL STEELE: That's part of the 172 or consideration, both the quantity and quality of the leachate.

HAROLD MILLAY: Any figure on the quantity?

BILL STEELE: I don't have the figure in my head.

HAROLD MILLAY: 55 gallons coming out Seavers Brook, a minute, and I don't know how much on the west side, you're talking maybe a hundred excess gallons a minute, that's quite a bit, isn't it?

BILL STEELE: The plant just for background, the plant is rated at a hundred gallons a day. Capacity. A million gallons a day, two million gallons a day. We're climbing but we got there. Right now we're at approximately a million gallons a day. It's a lot of work. Basically half hydraulic capacity.

JOHN GEORGE: Question on the need for

stabilization of the outslopes, what are the different points that provide justification for covering and/or stabilization of the outslopes of the two waste areas?

DAVID WEBSTER: Covering we looked at the relevant and appropriate standard and we thought and concluded that that was not appropriate for the stabilization for covering, putting a RCRA cap on the side slopes. What was in our thinking was that one, to try to meet the, it was in our thinking was the protection of the cap on top of it. We had experts saying that if you put that load on top on the plateau area, and that's your slope after visiting the slope and seeing the slope, they said that will fail. That the cap will crack, it wouldn't be able to support that weight and you need to stabilize it in some way, look at some ways and chemicals and cost, so it was basically to protect the remedy on top of it.

JOHN GEORGE: So if it could be demonstrated through engineering calculations and in particular in Waste area 3 that the outslopes would be stable with an adequate factor of safety without any additional stabilization to protect the cap that that would be acceptable proof to justify any outslope covering or stabilization?

DAVID WEBSTER: I think you might follow that one up. I think we would be receptive to any comment made like that as far as the justification because it was in our thinking that that was to protect the slopes and to protect the integrity of the cap against possible releases in capped areas in the future.

TOM MOYE: John, I believe another reason was to stabilize the side slopes in such a way that promotes runoff from the side slopes rather than and discourages infiltration into that part of the waste area that's on the slope.

DAVID WEBSTER: As far as meeting the regulatory aspect of RCRA, of creating a reducing runoff and making a cover more impermeable than what you needed, I think another factor that was involved was thinking about the gas generation under the landfill. And if you had an impermeable cap on the plateau and something of much lesser permeability here, you better be careful that you're not making a conduit to concentrate the gas coming out in that conduit out the side slope more concentrated than it was so there was thinking back and forth between interaction between the permeability on the side slope and the gas collection system. With that factored into the design of a side slope is something that I'll respond to your office but it would be something that was raised in the kind of evaluation that doesn't have an impermeable cover on the site.

ED BATTLES: You extended this period for an extra 30 days, right?

DAVID WEBSTER: Right.

ED BATTLES: Will there be another informational hearing at the end of that 30-day period?

DAVID WEBSTER: We're not planning one at this point.

ED BATTLES: Then as far as the public is concerned, the plan that you proposed is the one that you're going to go ahead with?

DAVID WEBSTER: No. We are still receiving public comments. Once the public comment period is over, we have some things to start thinking about tonight. We anticipate that there will be probably some more people that write in. John, I heard John George is still looking at it, too. We consider the comment. Consider the analysis that we did prior to the comment and then try to make the best decision concerning both of those factors.

ED BATTLES: Then will there be a public hearing as to what your final analysis is or are you just going to go ahead and say this is what we're doing.

DAVID WEBSTER: The latter.

ED BATTLES: You're going to go ahead and say this is what we're doing.

DAVID WEBSTER: After consideration of the public comments, we will develop a Record of Decision and sign that and that will be what we're doing on the site.

WAYNE GOLEC: The weight of the cap, you've been discussing the weight of the cap, with heavy equipment up there, I don't know what you're going to be using, I don't know what the dump site was, is it possible that the equipment or the weight of the cap could cause a cave-in type thing with maybe something rotting underneath or maybe a pothole or something didn't fill in?

DAVID WEBSTER: Are you thinking now or here in construction or after it's finished?

WAYNE GOLEC: Both.

DAVID WEBSTER: Yes. That's why we try to do a plan that minimizes the chance of that. That's what we're trying to address. People looking at it were fairly concerned about the slope looking like it would not support much weight.

WAYNE GOLEC: What about in the center of the landfill or could that be an area that would sink after it was all done and rupture the cap or something?

Because of the weight of it. Do they know? I mean they drag a big square thing --

DAVID WEBSTER: I've heard some discussions in considering it particularly in Waste area 4 where you have a subsidance from the waste and I don't know, I can't say it was considered and this is what we did about it but I think this is something that we should consider if it hasn't been. You get in a particular municipal landfill it's more like a mountain, you get kind a bit of sides down there and you contend with that in your design plan for the cap. It's a little bit different situation on those filled ravines and you expect, it may be more catastrophic nature of all of a sudden sliding as opposed to --

WAYNE GOLEC: I understand it does settle under there under the trailers or it did.

DAVID WEBSTER: The trailers down towards the waste area?

WAYNE GOLEC: I don't know. I really don't.

DAVID WEBSTER: Because of the trailers aren't on top of waste. As you can see from that but there are some down in here that are or were pretty close, right?

JOHN GEORGE: Waste area 2.

PRESTON CHILDS: In today's mode of business, people have to be responsible for their actions and area of responsibility, somebody has to answer if they design something and it failed like we had a school that burned up and passed engineering studies and the whole thing status and the whole thing bit. In answer to Ed's question you're going to take the input of the meeting tonight and the subsequent written comments, evaluate it and come out and say, okay, this is the system we're going to put in. Okay. If it doesn't work, you're responsible? I'm saying in private enterprise, this is the way it is. And you're the one that's going to finally come to the town and say this is what, is the system that's going to be instituted correctly to correct it. What is it, is it an experiment? Is it an $8.6 million experiment or is somebody accountable for it?

DAVID WEBSTER: Kind of uncertainty. We try to factor in a decision to try to make the best decision possible. I don't think as far as if it required to amend it 20 years down the road, come up with something else, because of something that was not taken into account --

PRESTON CHILDS: If the first five-year inspection doesn't hold up?

DAVID WEBSTER: Then my first concern is to modify the remedy so it's protected. Who's liable from that, I don't believe under the statute EPA or me personally are liable for that. And I think if you had it you wouldn't find too many people going into government service.

PRESTON CHILDS: Am I from a reasonable assumption then, this is an $8.6 million experiment?

DAVID WEBSTER: Depends on your definition of experiment. If you're saying experiment with anything without a guarantee on it, if you're saying that we use the best judgment that we have available to come up with it, if you consider given that that it's still an experiment, yes. I think in some respects, what we've proposed is not from a financial viewpoint but from a technology viewpoint might be looked at as the conservative approach of this is more the traditional approach to take care of the landfill. Cap it, try to control the contamination whereas something along the lines of vitrification and fire remediation or incineration or some on other kind of stabilization or going with a flushing scenario might be considered more experimental if you will. I don't know if that, you take any heart in that one. As people start to drift out, written comments are accepted and you're encouraged and to do that.

WAYNE GOLEC: Would you look into the Remcor command post decontamination center, see what you can do on your end to move things a little faster so that they can do what they have to do to leave sooner?

DAVID WEBSTER: We are and I'm not aware of that. I'm not involved in that.

WAYNE GOLEC: I am looking at the process for moving the dumpsters.

DAVID WEBSTER: I know, you're getting that inferred that there was something that Remcor was waiting for an EPA approval in order to do that. I don't know what that is.

WAYNE GOLEC: Something you could say hey --

DAVID WEBSTER: Do you know what it is as far as taking the drums off-site? I don't know what it is as far as the Command Post. I know they spend a lot of time in it. And I'll check up on that.

WAYNE GOLEC: Okay.

DAVID WEBSTER: Okay. Thank you very much for coming out.

HEARING ENDED AT 10:10 P.M.

C E R T I F I C A T E

I, Cynthia Foster Benson, RPR, Notary Public and Court Reporter for North Country Court Reporters, West Lebanon, New Hampshire, on August 2, 1990, do hereby certify that the foregoing pages 2 through 101, inclusive, comprise a full, true and correct transcript to the best of my ability of the Public Hearing to Receive Comment on Proposed Plan for Second Record of Decision in re: Old Springfield Landfill Superfund Site, as to which a transcript was duly ordered;

Dated at West Lebanon, New Hampshire, this 15th day of August, 1990.

Cynthia Foster Benson

Cynthia Foster Benson, RPR

ATTACHMENT D

EPA RESPONSE TO CONTAMINANT DESORPTION MODEL

ATTACHMENT D

EPA COMMENT ON THE PRPs' CONTAMINANT DESORPTION MODEL FOR WASTE AREA 2

EPA concurs with the observation by the PRPs' consultant that examination of available groundwater sampling results for Waste Area 2 collected from 1985-1990 indicate evidence of a decrease in total VOC concentrations as measured at leachate seep LSE-04. EPA does not, however, concur with certain conclusions of the desorption model presented by the PRPs' consultant with respect to projected timeframes for natural remediation of volatile organic contaminants in groundwater at LSE-04. In particular, EPA does not concur with the desorption model prediction that the total volatile organic (VOC) concentration in groundwater at LSE-04 will necessarily decrease to less than 5 ug/l total VOCs by 1991.

First, as is clearly demonstrated in Figure 1 which accompanies the PRPs' desorption model discussion, the actual field data from LSE-04 do not closely coincide with model predictions. In particular, the most recent total VOC concentrations measured at LSE-04 are well in excess of 100 ug/l as compared to a model prediction of approximately 30 ug/l. Also important is the observation that the rate of yearly reduction of VOC concentrations at LSE-04 shows distinct evidence of slowing down. This "tailing effect" has been observed in VOC groundwater monitoring programs at other hazardous waste sites. It generally indicates a slowdown in the rate that groundwater contaminants are being flushed or removed from the wastewater system. At the Springfield site, this type of tailing effect will potentially have the effect of significantly prolonging (by years) the time required for total VOC concentrations at LSE-04 to decrease permanently to less than 5 ug/l.

EPA also wishes to point certain additional weaknesses in the PRPs' application of the desorption model to Waste Area 2 at the Springfield site.

First, the PRPs' model relies heavily on the results of one January 1985 sampling event at LSE-04 to calculate initial waste area solid phase VOC concentrations and subsequent model-predicted changes in groundwater VOC concentrations. A review of available data indicates total VOC concentrations measured at LSE-04 in December 1985 were almost an order of magnitude lower than the values measured in the January 1985 event. These results and the subsequent 1986-1990 leachate data strongly suggest that the January 1985 total VOC concentration value may have been anomalously high. As indicated in the Supplemental RI (Ebasco, 1988), this value might have resulted from a singular (one time) event, such as the rupture of a drum within the waste area and the release of a pulse of contaminated groundwater or non-aqueous phase liquid.

The inclusion of this potentially anomalous sampling point in the PRPs' desorption model has the effect of making predictions of the times required to reduce total VOC concentrations at LSE-04 to less than 5 ug/l appear to be considerably more rapid than would otherwise be projected.

An examination of the accompanying Table A demonstrates recent trends in the measured concentrations of some of the contaminants which have been detected at LSE-04. This table includes results from the sampling rounds conducted since January 1985. The data presented in Table A demonstrate both the yearly variability in measured concentrations of many of the contaminants detected at LSE-04 and the slow rate at which contaminant reductions may be occurring. For both trichloroethene and tetrachloroethene values measured in 1990 are similar to values measured in 1985 with concentrations measured during intervening years being generally higher. Concentrations of xylene (a monocyclic aromatic compound) demonstrate the extent of variability that may be encountered in contaminant concentrations at landfill leachate seeps. A concentration of 400 ug/l was detected in 1985. Xylene was not detected in 1987 or 1989, but was again detected at 89 ug/l in 1990. It should be noted that these variations in measured xylene concentrations are a significant contributing factor to the decrease in total measured VOC concentrations presented in the PRPs' data.

Finally, with respect to LSE-04, EPA does believe that the high total VOC concentrations observed in January 1985 demonstrate the potential variability in groundwater contaminant concentrations which may be measured in landfill leachate seeps. The Agency also believes that similar, although perhaps not as dramatic, abrupt fluctuations in groundwater contaminant concentrations may occur in the future at LSE-04. Also, with respect to the PRPs' desorption model, EPA wishes to point out that the use of trichloroethene (TCE) as a representative "chlorinated ethene" contaminant is not necessarily conservative with respect to desorption model time predictions for LSE-04. Tetrachloroethene (PCE) also present in groundwater at LSE-04 (in consistently higher concentrations than TCE) is much less water soluble (solubility -200 mg/l) and has a significantly higher K_{oc} value (364 ml/g) than does trichloroethene (water solubility - 1100 mg/l and K_{oc} - 126 ml/g (EPA, 1986)). This decreased water solubility and increased K_{oc} value indicates that PCE will be more strongly adsorbed (retarded) by soils and more slowly flushed out of Waste Area 2 than TCE. Therefore, the incorporation of tetrachloroethene in the desorption model would likely result in significantly increased time projections for total VOC contaminant reductions through flushing to 5 ug/l.

EPA also wishes to acknowledge that, as assumed in the PRPs' model, biodegradation of "chlorinated ethenes" can occur, although the rates of such degradation are highly uncertain on a site specific basis and site specific information on Waste Area 2 is lacking. However, it should be emphasized that one of the potential degradation products of the more chlorinated ethenes is vinyl chloride which is considered one of the more toxic of the chlorinated ethenes and which possesses a relatively low MCL (2 ug/l). Therefore, even desorption model predictions of reductions in total VOC concentrations to 5 ug/l do not insure future attainment of MCLs or risk based target levels.

TABLE A
VOC CONCENTRATIONS AT LSE-04 (ug/l)

PARAMETERS	12/85	10/86	9/87	9/87	8/89	4/90
VINYL CHLORIDE	2	8	10	--	--	--
DICHLOROETHENE	4	5	5	2	--	--
TRICHLOROETHENE	4	7	8	7	--	3
TETRACHLOROETHENE	6	17	--*	27	12	6
1,1,1-TRICHLOROETHANE	78	64	16	15	7	22
TOTAL XYLENES	400	24	--	--	--	89
TOTAL VOCs (APPROXIMATE)	617	179		54	19	140

NOTE: ONLY SELECTED CONTAMINANTS ARE LISTED, THEREFORE TOTAL VOC CONCENTRATIONS MAY EXCEED THE SUM OF THE LISTED PARAMETERS.

-- NOT DETECTED.

* HIGH LABORATORY DETECTION LIMIT -- COMPOUND PROBABLY PRESENT.

APPENDIX F

ADMINISTRATIVE RECORD INDEX

FOR

OLD SPRINGFIELD LANDFILL

Old Springfield Landfill

NPL Site Administrative Record

(Operable Unit II - Source Control)

Index

Compiled: July 12, 1990
ROD Signed: September 28, 1990

Prepared for

Region I
Waste Management Division
U.S. Environmental Protection Agency

With Assistance from

AMERICAN MANAGEMENT SYSTEMS, INC.
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This document was prepared under EPA's TES 6 prime contract (#68-W9-0003) for EPA Region I. American Management Systems, Inc. prepared the document under a subcontract (#1-635-999-AMS) with Alliance Technologies Corporation.

Introduction

This document is the Index to the Administrative Record for the Old Springfield Landfill National Priorities List (NPL) site (Operable Unit II - Source Control). 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.

The Administrative Record is available for public review at EPA Region I's Office in Boston, Massachusetts, and at Springfield Town Library, 43 Main Street, Springfield, Vermont 05156. *This Administrative Record includes, by reference only, all documents included in the September 22, 1988 Administrative Record for this NPL site.* 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).

Section I

Site-Specific Documents

ADMINISTRATIVE RECORD INDEX

for the

Old Springfield Landfill NPL Site

(Operable Unit II - Source Control)

4.0 Feasibility Study (FS)

4.1 Correspondence

1. Letter from Frank J. Ciavattieri, EPA Region I to John A. George, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (March 16, 1989). Concerning designation of Project Coordinators.
2. Letter from Scott J. McDougall, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. to Paula Lia Fitzsimmons, EPA Region I (April 7, 1989). Concerning transmittal of Draft Focused Feasibility Study Work Plan.
3. Memorandum from Peter R. Kahn, EPA Region I to Paula Lia Fitzsimmons, EPA Region I (August 17, 1989). Concerning review of attached "Revised Air Monitoring and Sampling Plan," REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (August 14, 1989).
4. Letter from Robert S. Markwell for John A. George, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. to Edward M. Hathaway, EPA Region I (October 19, 1989). Concerning transmittal of validated organic analytical results for residential wells/surface sediment.
5. Letter from Scott J. McDougall and John A. George, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. to Barry L. Malter, Swidler & Berlin (Attorney for Emhart Industries, Inc.) and Daniel H. Squire, Skadden, Arps, Slate, Meagher & Flom (Attorney for Textron Inc.) (October 27, 1989). Concerning summary of schedule delays relating to Focused Feasibility Study.
6. Letter from Robert S. Markwell, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. to Edward M. Hathaway, EPA Region I (November 7, 1989). Concerning transmittal of validated metals results for surface water sediments/residential wells.
7. Letter from John A. George, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. to Edward M. Hathaway, EPA Region I (April 13, 1990). Concerning transmittal of analytical data reports of residential wells and streambed sediment analyses.
8. Letter from John A. George, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. to Edward M. Hathaway, EPA Region I (May 25, 1990). Concerning notification that roll-off boxes are pending waste acceptance.
9. Letter from John A. George, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. to Edward M. Hathaway, EPA Region I (June 7, 1990). Concerning transmittal of the June 7, 1990 "Draft Final Focused Feasibility Study Report," REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc.
10. Letter from Daniel H. Squire, Skadden, Arps, Slate, Meagher & Flom (Attorney for Textron Inc.) to Timothy M. Conway, EPA Region I (June 8, 1990). Concerning transmittal of the June 7, 1990 "Draft Final Focused Feasibility Study Report," REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc.
11. Letter from Edward M. Hathaway, EPA Region I to John A. George, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (July 19, 1990). Concerning request by local residents to relocate command post/decontamination facility.

4.2 Sampling and Analysis Data

1. Residential Sampling Results - Round I, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (August 22, 1989 through September 1, 1989) including:
   A. Case Narrative
   B. Summary of Metals Analyses Results
   C. Inorganics Analyses
   D. Metals Analyses
2. Residential Sampling Results - Round II, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (February 15, 1990 through February 22, 1990) including:
   A. Metals Analyses
   B. Volatile Organics Analyses
3. Well Sampling Data, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (May 1, 1990).
4. Letter Report from Lewis M. Horzempa, EBASCO Services Incorporated to Edward M. Hathaway, EPA Region I (May 2, 1990). Concerning draft split sample data comparison.

The remaining Sampling and Analysis Data for the Feasibility Study (FS) may be reviewed, by appointment only, at EPA Region I, Boston, Massachusetts.

4.4 Interim Deliverables

Reports

1. "Proposed Scope of Work for Aquifer Pumping Tests," REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (December 13, 1989).

Comments

2. Comments Dated January 2, 1990 from Edward M. Hathaway, EPA Region I on the December 13, 1989 "Proposed Scope of Work for Aquifer Pumping Tests," REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc.

4.5 Applicable or Relevant and Appropriate Requirements (ARARs)

1. Letter from John A. George, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. to Thomas C. Moye, State of Vermont Agency of Natural Resources Department of Environmental Conservation (February 13, 1990). Concerning request for definition of potential state applicable or relevant and appropriate requirements for the Focused Feasibility Study.
2. Letter from Thomas C. Moye, State of Vermont Agency of Natural Resources Department of Environmental Conservation to John A. George, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (February 15, 1990). Concerning potential state applicable or relevant and appropriate requirements for the Focused Feasibility Study.

4.6 Feasibility Study (FS) Reports

Reports

1. Letter from Lewis M. Horzempa, EBASCO Services Incorporated to Edward M. Hathaway, EPA Region I (May 23, 1990). Concerning content and transmittal of attached "Technical Oversight Memorandum - Old Springfield Landfill Site - Evaluation of Soil Vapor Extraction Technology," EBASCO Services Incorporated (May 23, 1990).
2. "Draft Final Supplemental Feasibility Study Evaluation," EBASCO Services Incorporated (July 1990).
3. Memorandum from Edward M. Hathaway, EPA Region I to File (July 1990). Concerning detailed evaluation and comparative analysis of alternatives.

The records cited in entries number 4 through 6 are drafts which have not received final acceptance from the U.S. Environmental Protection Agency or the State of Vermont Agency of Natural Resources Department of Environmental Conservation. The opinions, findings, and conclusions expressed are those of the authors and not those of the U.S. Environmental Protection Agency or the State of Vermont Agency of Natural Resources Department of Environmental Conservation.

4. "Draft Focused Feasibility Study Report - Volume I - Text," REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (April 1990).
5. "Draft Focused Feasibility Study Report - Volume II - Appendices," REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (April 1990).
6. "Draft Final Focused Feasibility Study Report - Volume I - Text," REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (June 7, 1990).

Comments

7. Comments Dated May 10, 1990 from Michael Jasinski for David M. Webster, EPA Region I on the April 1990 "Draft Focused Feasibility Study Report," REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc.

Responses to Comments

8. Response Dated May 18, 1990 from Barry L. Malter, Swidler & Berlin (Attorney for Emhart Industries, Inc.) to the May 10, 1990 Comments from Michael Jasinski for David M. Webster, EPA Region I.
9. Response Dated May 30, 1990 from Michael Jasinski for David M. Webster, EPA Region I to the May 18, 1990 Response from Barry L. Malter, Swidler & Berlin (Attorney for Emhart Industries, Inc.).

4.7 Work Plans and Progress Reports

Work Plans

1. "Draft Focused Feasibility Study Work Plan," REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (July 1989).
2. "Summary of Recent Modifications to Focused Feasibility Field Studies," REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (September 7, 1989).
3. "Formal Notification of Accepted Modifications in Field Activities - Focused Feasibility Study," REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (September 22, 1989).

4.7 Work Plans and Progress Reports (cont'd.)

Work Plans

4. "Summary of Recent Modifications to Focused Feasibility Study," REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (October 6, 1989).

Comments

5. Comments Dated August 3, 1989 from David M. Webster, EPA Region I on the July 1989 "Draft Focused Feasibility Study Site Work Plan," REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc.
6. Comments Dated August 18, 1989 from David M. Webster, EPA Region I on the July 1989 "Draft Focused Feasibility Study Site Work Plan," REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc.

Responses to Comments

7. Response Dated August 16, 1989 from John A. George for Scott J. McDougall, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. to the August 3, 1989 Comments from David M. Webster, EPA Region I.

Progress Reports

8. Progress Report No. 1, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (March 30, 1989).
9. Progress Report No. 2, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (May 1, 1989).
10. Progress Report No. 3, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (May 30, 1989).
11. Progress Report No. 4, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (July 10, 1989).
12. Progress Report No. 6, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (September 6, 1989).
13. Progress Report No. 7, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (October 5, 1989).
14. Progress Report No. 8, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (November 2, 1989).
15. Progress Report No. 9, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (December 6, 1989).
16. Progress Report No. 10, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (January 15, 1990).
17. Progress Report No. 11, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (January 31, 1990).
18. Progress Report No. 12, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (March 2, 1990).
19. Progress Report No. 13, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (April 4, 1990).
20. Progress Report No. 14, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (May 10, 1990).
21. Progress Report No. 15, REMCOR, Inc. for Emhart Industries, Inc. and Textron Inc. (June 4, 1990).

4.9 Proposed Plans for Selected Remedial Action

Reports

1. "EPA Proposes Source Control Cleanup Plan for the Old Springfield Landfill Site," EPA Region I (July 1990).

Comments

Comments on the Proposed Plan received by EPA Region I during the formal public comment period are filed and cited in 5.3 Responsiveness Summaries.

5.0 Record of Decision

5.1 Correspondence

1. Memorandum from Don R. Clay, EPA Headquarters to Regional Administrators, Regions I-X (January 29, 1990). Concerning the delegation of remedy authority to Regional Administrators for Superfund Records of Decision for the attached list of NPL sites.

5.3 Responsiveness Summaries

1. Cross-Reference: Responsiveness Summary, EPA Region I (September 28, 1990) [Filed and included as Appendix E in entry number 1 in 5.4 Record of Decision (ROD)].

The following citations indicate documents received by EPA Region I during the formal public comment period.

2. Cross-Reference: Transcript, EPA Region I Public Hearing to Receive Comment on Proposed Plan for Second Record of Decision for the Old Springfield Landfill Site (August 2, 1990) [Filed and included as Attachment C to Appendix E in entry number 1 in 5.4 Record of Decision (ROD)].
3. Comments Dated August 25, 1990 from David J. Wills on the July 1990 "EPA Proposes Source Control Cleanup Plan for the Old Springfield Landfill Site," EPA Region I.
4. Comments Dated September 7, 1990 from Everett T. Hammond on the July 1990 "EPA Proposes Source Control Cleanup Plan for the Old Springfield Landfill Site," EPA Region I.
5. Comments Dated September 10, 1990 from Barry L. Malter, Swidler & Berlin (Attorney for Emhart Industries, Inc.) and Daniel H. Squire, Skadden, Arps, Slate, Meagher & Flom (Attorney for Textron Inc.) on the July 1990 "EPA Proposes Source Control Cleanup Plan for the Old Springfield Landfill Site," EPA Region I.
6. Comments Dated September 10, 1990 from William Steele, Town of Springfield on the July 1990 "EPA Proposes Source Control Cleanup Plan for the Old Springfield Landfill Site," EPA Region I.

5.4 Record of Decision

1. Record of Decision, EPA Region I (September 28, 1990).

9.0 State Coordination

9.1 Correspondence

1. Letter from Gerald M. Levy, EPA Region I to Patrick A. Parenteau, State of Vermont Agency of Natural Resources Department of Environmental Conservation (June 15, 1988). Concerning response to proposed remedial plan.
2. Letter from Merrill S. Hohman, EPA Region I to Patrick A. Parenteau, State of Vermont Agency of Natural Resources Department of Environmental Conservation (July 19, 1988). Concerning letter of concurrence with the proposed plan.
3. Letter from Sam Silverman for Merrill S. Hohman, EPA Region I to Patrick A. Parenteau, State of Vermont Agency of Natural Resources Department of Environmental Conservation (August 12, 1988). Concerning attached briefing document outlining recent events regarding the remedy selection process.
4. Letter from Patrick A. Parenteau, State of Vermont Agency of Natural Resources Department of Environmental Conservation to Merrill S. Hohman, EPA Region I (August 26, 1988). Concerning state concurrence with the proposed plan.
5. Letter from Patrick A. Parenteau, State of Vermont Agency of Natural Resources Department of Environmental Conservation to Merrill S. Hohman, EPA Region I (September 2, 1988). Concerning response to issues relating to proposed remedy.
6. Letter from Paula Lia Fitzsimmons, EPA Region I to Thomas C. Moye, State of Vermont Agency of Natural Resources Department of Environmental Conservation (September 27, 1988). Concerning transmittal of the September 22, 1988 Record of Decision for the site.
7. Letter from Timothy J. Burke, State of Vermont Agency of Natural Resources Department of Environmental Conservation to Merrill S. Hohman, EPA Region I (June 29, 1990). Concerning review of proposed remedial plan.

10.0 Enforcement

10.7 EPA Administrative Orders

1. Administrative Order by Consent, *In the Matter of The Old Springfield Landfill, Springfield, Vermont*, Emhart Industries, Inc. and Textron Inc., Respondents, Docket No. I-89-1019 (March 10, 1989).
2. Letter from Jerome C. Muys Jr., Swidler & Berlin (Attorney for Emhart Industries, Inc.) to Paula Lia Fitzsimmons, EPA Region I (March 21, 1989). Concerning receipt of the March 10, 1989 Administrative Order by Consent.

11.0 Potentially Responsible Party (PRP)

11.9 PRP-Specific Correspondence

1. Letter from Paula Lia Fitzsimmons, EPA Region I to Daniel H. Squire, Skadden, Arps, Slate, Meagher & Flom (Attorney for Textron Inc.) (September 23, 1988). Concerning transmittal of the September 22, 1988 Record of Decision for the site.
2. Letter from Merrill S. Hohman, EPA Region I to Mr. and Mrs. Harold Millay (November 7, 1988). Concerning notice of potential liability.
3. Letter from Merrill S. Hohman, EPA Region I to President or General Manager, Bryant Computer (November 7, 1988). Concerning notice of potential liability.

11.9 PRP-Specific Correspondence (cont'd.)

4. Letter from Merrill S. Hohman, EPA Region I to Robert L. Gulley, Browning-Ferris Industries, Inc. (January 17, 1989). Concerning notice of potential liability.
5. Letter from William Walsh-Rogalski, EPA Region I to John Parker, Parker, Lamb & Ankuda (Attorney for Town of Springfield) (February 13, 1989). Concerning environmental and public health threat remaining at the site after implementation of the September 22, 1988 Record of Decision with attached:
   A. Letter from John Parker, Parker, Lamb & Ankuda (Attorney for Town of Springfield) to William Walsh-Rogalski, EPA Region I (February 6, 1989). Concerning transmittal of attached letters (B, C, and D) with the suggestion that they be included in the Administrative Record.
   B. Letter from John Parker, Parker, Lamb & Ankuda (Attorney for Town of Springfield) to Conrad Smith, State of Vermont (January 24, 1989). Concerning possible solutions to the public health threat from contaminated ground water at the site.
   C. Letter from Richard A. Valentinetti, State of Vermont Agency of Environmental Conservation Department of Water Resources and Environmental Engineering to Edgar May, Member of the State of Vermont Senate (April 26, 1983). Concerning implementation of remedial action to clean up drinking water supplies at the site.
   D. Letter from Edgar May, Member of the State of Vermont Senate to Nancy Z. Piligian, EPA Region I (August 29, 1983). Concerning comments on the July 1983 "Remedial Action Master Plan," NUS Corporation.
6. Letter from William Walsh-Rogalski, EPA Region I to Barry Malter, Swidler & Berlin (Attorney for Emhart Industries, Inc.) (March 10, 1989). Concerning response to arguments that EPA failed to respond adequately to PRP comments on the September 22, 1988 Record of Decision for the site.
7. Letter from Merrill S. Hohman, EPA Region I to John Adams, Vermont Research (May 17, 1989). Concerning special notice of potential liability for first operable unit remedial design/remedial action.
8. Letter from Merrill S. Hohman, EPA Region I to Linda Biagioni, Emhart Industries, Inc. (May 17, 1989). Concerning special notice of potential liability for first operable unit remedial design/remedial action.
9. Letter from Merrill S. Hohman, EPA Region I to John Curtin (May 17, 1989). Concerning special notice of potential liability for first operable unit remedial design/remedial action.
10. Letter from Merrill S. Hohman, EPA Region I to Paul Duff, Textron Inc. (May 17, 1989). Concerning special notice of potential liability for first operable unit remedial design/remedial action.
11. Letter from Merrill S. Hohman, EPA Region I to Robert L. Gulley, Browning-Ferris Industries, Inc. (May 17, 1989). Concerning special notice of potential liability for first operable unit remedial design/remedial action.
12. Letter from Merrill S. Hohman, EPA Region I to Harold Millay (May 17, 1989). Concerning special notice of potential liability for first operable unit remedial design/remedial action.
13. Letter from Merrill S. Hohman, EPA Region I to President or General Manager, Bryant Computer (May 17, 1989). Concerning special notice of potential liability for first operable unit remedial design/remedial action.
14. Letter from Merrill S. Hohman, EPA Region I to President or General Manager, Bryant Grinder Corporation (May 17, 1989). Concerning special notice of potential liability for first operable unit remedial design/remedial action.
15. Letter from Merrill S. Hohman, EPA Region I to President or General Manager, Fellows Gear Shaper (May 17, 1989). Concerning special notice of potential liability for first operable unit remedial design/remedial action.

11.9 PRP-Specific Correspondence (cont'd.)

16. Letter from Merrill S. Hohman, EPA Region I to President or General Manager, Jones and Lamson (May 17, 1989). Concerning special notice of potential liability for first operable unit remedial design/remedial action.
17. Letter from Merrill S. Hohman, EPA Region I to President or General Manager, Lovejoy Tool Company, Inc. (May 17, 1989). Concerning special notice of potential liability for first operable unit remedial design/remedial action.
18. Letter from Merrill S. Hohman, EPA Region I to Harry Shephard (May 17, 1989). Concerning special notice of potential liability for first operable unit remedial design/remedial action.
19. Letter from Merrill S. Hohman, EPA Region I to William Steele, Town of Springfield (May 17, 1989). Concerning special notice of potential liability for first operable unit remedial design/remedial action.
20. Letter from Merrill S. Hohman, EPA Region I to Emma Watkins (May 17, 1989). Concerning special notice of potential liability for first operable unit remedial design/remedial action.
21. Letter from Timothy M. Conway, EPA Region I to Harold Millay (October 5, 1989). Concerning need to obtain further information relating to Mr. Millay's status as a PRP.
22. Letter from David M. Webster, EPA Region I to Daniel H. Squire, Skadden, Arps, Slate, Meagher & Flom (Attorney for Textron Inc.) (January 16, 1990). Concerning progress of the Focused Feasibility Study.
23. Letter from Barry Malter, Swidler & Berlin (Attorney for Emhart Industries, Inc.) to Timothy M. Conway and Edward M. Hathaway, EPA Region I (July 26, 1990). Concerning request for extension to the public comment period.
24. Letter from John Parker, Parker, Lamb & Ankuda (Attorney for Town of Springfield) to Timothy M. Conway and Edward M. Hathaway, EPA Region I (July 26, 1990). Concerning request for extension to the public comment period.

13.0 Community Relations

13.1 Correspondence

1. Letter from Paula Lia Fitzsimmons, EPA Region I to John Bond (September 13, 1988). Concerning return of the remedial project manager to Town of Springfield to hold an informal discussion session with members of the community.
2. Letter from Paula Lia Fitzsimmons, EPA Region I to John Bond (September 28, 1988). Concerning transmittal of the September 22, 1988 Record of Decision for the site.
3. Letter from Paula Lia Fitzsimmons, EPA Region I to William Steele, Town of Springfield (September 28, 1988). Concerning transmittal of the September 22, 1988 Record of Decision for the site.
4. Letter from Paula Lia Fitzsimmons, EPA Region I to Maury Levin, Palmer and Dodge (December 8, 1988). Concerning transmittal of Summary Endangerment Assessment and Proposed Plan for the site.
5. Letter from Paula Lia Fitzsimmons, EPA Region I to John Bond (December 9, 1988). Concerning transmittal of "Superfund Law."
6. Letter from Paula Lia Fitzsimmons, EPA Region I to Mr. and Mrs. Harold Millay (December 14, 1988). Concerning transmittal of "Superfund Law."
7. Letter from Paula Lia Fitzsimmons, EPA Region I to John Bond (December 22, 1988). Concerning impact of the site and extraction wells on adjacent property.

13.1 Correspondence (cont'd.)

8. Letter from Paula Lia Fitzsimmons, EPA Region I to Wayne Golec (March 29, 1989). Concerning transmittal of the March 10, 1989 Administrative Order for the site.
9. Letter from Paula Lia Fitzsimmons, EPA Region I to Russell Moore, Springfield Town Library (March 29, 1989). Concerning transmittal of the March 10, 1989 Administrative Order for the site.
10. Letter from Paula Lia Fitzsimmons, EPA Region I to John Bond (May 31, 1989). Concerning transmittal of the special notice letters and attachments.
11. Letter from John Bond to Edward M. Hathaway, EPA Region I (November 20, 1989). Concerning negative effects of pumping at the site on private well and pond.
12. Letter from Edward M. Hathaway, EPA Region I to John Bond (November 20, 1989). Concerning response to November 20, 1989 letter.
13. Letter from Edward M. Hathaway, EPA Region I to Edward Battle (January 12, 1990). Concerning content and transmittal of attached August 1989 residential well water sample results.
14. Letter from Edward M. Hathaway, EPA Region I to John Bond (January 12, 1990). Concerning content and transmittal of attached August 1989 residential well water sample results.
15. Letter from Edward M. Hathaway, EPA Region I to Doris M. Clark (January 12, 1990). Concerning content and transmittal of attached August 1989 residential well water sample results.
16. Letter from Edward M. Hathaway, EPA Region I to Richard and Sally Cofrancesco (January 12, 1990). Concerning content and transmittal of attached August 1989 residential well water sample results.
17. Letter from Edward M. Hathaway, EPA Region I to Flora Gallagher (January 12, 1990). Concerning content and transmittal of attached August 1989 residential well water sample results.
18. Letter from Edward M. Hathaway, EPA Region I to Vincent Grochowik (January 12, 1990). Concerning content and transmittal of attached August 1989 residential well water sample results.
19. Letter from Edward M. Hathaway, EPA Region I to Paul Laflamme (January 12, 1990). Concerning content and transmittal of attached August 1989 residential well water sample results.
20. Letter from Edward M. Hathaway, EPA Region I to Harold Maxwell (January 12, 1990). Concerning content and transmittal of attached August 1989 residential well water sample results.
21. Letter from Edward M. Hathaway, EPA Region I to Frances Mumford (January 12, 1990). Concerning content and transmittal of attached August 1989 residential well water sample results.
22. Letter from Edward M. Hathaway, EPA Region I to Richard Stevens (January 12, 1990). Concerning content and transmittal of attached August 1989 residential well water sample results.
23. Letter from Edward M. Hathaway, EPA Region I to Mr. and Mrs. John Bond (June 19, 1990). Concerning content and transmittal of attached February 1990 residential well water sample results.
24. Letter from Edward M. Hathaway, EPA Region I to Flora Gallagher (June 19, 1990). Concerning content and transmittal of attached February 1990 residential well water sample results.
25. Letter from Edward M. Hathaway, EPA Region I to Mr. and Mrs.Vincent Grochowik (June 19, 1990). Concerning content and transmittal of attached February 1990 residential well water sample results.

13.1 Correspondence (cont'd.)

26. Letter from Edward M. Hathaway, EPA Region I to Harold Maxwell (June 19, 1990). Concerning content and transmittal of attached February 1990 residential well water sample results.
27. Letter from Edward M. Hathaway, EPA Region I to Frances Mumford (June 19, 1990). Concerning content and transmittal of attached February 1990 residential well water sample results.
28. Letter from Edward M. Hathaway, EPA Region I to Richard Stevens (June 19, 1990). Concerning content and transmittal of attached February 1990 residential well water sample results.
29. Letter from Edward M. Hathaway, EPA Region I to Richard and Sally Cofrancesco (June 25, 1990). Concerning content and transmittal of attached February 1990 residential well water sample results.
30. Letter from Edward M. Hathaway, EPA Region I to Paul Laflamme (June 25, 1990). Concerning content and transmittal of attached February 1990 residential well water sample results.
31. Letter from Edward M. Hathaway, EPA Region I to Wayne Golec (July 20, 1990). Concerning request by local residents to relocate command post/decontamination facility.
32. Letter from David M. Webster, EPA Region I to Bill Newman (July 24, 1990). Concerning discussions on bioremediation technologies at the July 12, 1990 Public Meeting.

13.2 Community Relations Plans

1. "Final Revised Community Relations Plan for the Old Springfield Landfill Site," EBASCO Services Incorporated (May 4, 1990).

13.3 News Clippings/Press Releases

1. "Environmental News - EPA to Hold Press Conference Regarding Possible Relocation of Residents at Old Springfield Superfund Site," EPA Region I (June 1988).
2. "Environmental News - EPA to Propose Permanent Relocation of Residents from Old Springfield Superfund Site," EPA Region I (June 23, 1988).
3. "Environmental News - EPA to Hold Public Information Meeting on Old Springfield Superfund Site," EPA Region I (June 30, 1988).
4. "Environmental News - EPA Announces Extended Comment Period for Old Springfield Superfund Site," EPA Region I (August 2, 1988).
5. "Environmental News - EPA Announces Cleanup Plan for Old Springfield Superfund Site," EPA Region I (September 23, 1988).
6. "Environmental News - Public Meeting to Describe Selected Remedy at the Old Springfield Landfill Superfund Site Announced," EPA Region I (October 20, 1988).
7. "Environmental News - Potentially Responsible Parties to Conduct Study at Old Springfield Landfill Site," EPA Region I (March 10, 1989).
8. "Environmental News - EPA to Hold Public Meeting to Discuss Work Plan at Old Springfield Superfund Site," EPA Region I (August 4, 1989).
9. "Environmental News - EPA to Install Temporary Fence Around Portion of the Old Springfield Landfill Superfund Site," EPA Region I (August 25, 1989).
10. "Environmental News - EPA to Hold Meeting on Springfield Cleanup Plan," EPA Region I (June 28, 1990).
11. "Environmental News - EPA Extends Comment Period on Springfield Cleanup Plan," EPA Region I (August 3, 1990).

13.3 News Clippings/Press Releases (cont'd.)

12. "Environmental News - EPA Selects Cleanup Plan for Old Springfield Landfill Superfund Site," EPA Region I (September 28, 1990).

13.4 Public Meetings

1. EPA Region I Meeting Summary, Focused Feasibility Study Work Plan Public Meeting for the Old Springfield Site, EPA Region I (August 15, 1989) with attached:
   A. EPA Region I Meeting Agenda, Public Meeting for the Old Springfield Site (August 15, 1989). Concerning the Focused Feasibility Study Work Plan.
   B. "Environmental News - EPA to Hold Public Meeting to Discuss Work Plan at Old Springfield Superfund Site," EPA Region I (August 4, 1989).
   C. EPA Region I Attendance List, Focused Feasibility Study Work Plan Public Meeting for the Old Springfield Site (August 15, 1989).
   D. "EPA Commitments/Promises," EPA Region I (August 15, 1989).
2. EPA Region I Final Public Meeting Summary, Public Meeting for the Old Springfield Landfill Site (July 12, 1990). Concerning findings of the Focused Feasibility Study and release of the proposed source control cleanup plan.
3. Cross-Reference: Transcript, EPA Region I Public Hearing to Receive Comment on Proposed Plan for Second Record of Decision for the Old Springfield Landfill Site (August 2, 1990) [Filed and included as Attachment C to Appendix E in entry number 1 in 5.4 Record of Decision (ROD)].

13.5 Fact Sheets

1. "Superfund Program Cleanup Plan," EPA Region I (October 1988). Concerning selection of cleanup plan for Old Springfield Landfill NPL Site.
2. "Superfund Program Fact Sheet," EPA Region I (May 1990). Concerning current status of the cleanup at the site.

14.0 Congressional Relations

14.1 Correspondence

1. Letter from Paula Lia Fitzsimmons, EPA Region I to Edgar May, Member of the State of Vermont Senate (September 28, 1988). Concerning transmittal of the September 22, 1988 Record of Decision for the site.
2. Letter from Paul G. Keough, EPA Region I to Peter Smith, Member of the State of Vermont House of Representatives (December 22, 1989). Concerning response to citizen's inquiry relating to EPA's activities at the site.

17.0 Site Management Records

17.2 Access Records

1. Letter from Merrill S. Hohman, EPA Region I to Arthur Becker and Edward Emerson, Tamarac Hill Farm (March 21, 1989). Concerning request for government access to Lot 58 on Map 10.
2. Letter from Paula Lia Fitzsimmons, EPA Region I to Wayne Golec (April 6, 1989). Concerning government access to property for additional testing.

Section II

Guidance Documents

GUIDANCE DOCUMENTS

EPA guidance documents may be reviewed at EPA Region I, Boston, Massachusetts.

General EPA Guidance Documents

1. U.S. Environmental Protection Agency. Draft RCRA (Resource Conservation and Recovery Act) Guidance Document - Surface Impoundments, Linear Systems, Final Cover and Freeboard Control, July 1982.

2. U.S. Environmental Protection Agency. Office of Research and Development and Office of Emergency and Remedial Response. Case Studies 1-23: Remedial Response at Hazardous Waste Sites (EPA 540/2-84/002b), March 1984.

3. U.S. Environmental Protection Agency. Office of Waste Programs Enforcement. Endangerment Assessment Handbook, August 1985.

4. U.S. Environmental Protection Agency. Chemical, Physical, and Biological Properties of Compounds Present at Hazardous Waste Sites (OSWER Directive 9850.3), September 27, 1985.

5. U.S. Environmental Protection Agency. Hazardous Waste Engineering Research Laboratory and Office of Emergency and Remedial Response. Handbook: Remedial Action at Waste Disposal Sites (EPA 625/6-85/006), October 1985.

6. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Superfund Remedial Design and Remedial Action Guidance (OSWER Directive 9355.0-4A), June 1986.

7. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Draft Guidance on Remedial Actions for Contaminated Groundwater at Superfund Sites (OSWER Directive 9283.1-2), October 1986.

8. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Test Methods for Evaluating Solid Waste: Laboratory Manual Physical/Chemical Methods, Third Edition (Volumes IA, IB, IC, and II) (SW-846), November 1986.

9. "Hazardous Waste Management Systems; Land Disposal Restrictions; Final Rule," Federal Register (Vol. 51, No. 216), November 7, 1986.

10. Memorandum from J. Winston Porter, U.S. Environmental Protection Agency Office of Solid Waste and Emergency Response to Regional Administrators, Regions I-X; Regional Counsels, Regions I-X, Director, Waste Management Division, Regions I, IV, V, VII, and VIII; Director, Emergency and Remedial Response Division, Region II; Director, Hazardous Waste Management Division, Regions III and VI; Director, Toxics and Waste Management Division, Region IX; Director, Hazardous and Waste Division, Region X; Environmental Services Division Directors, Regions I, VI, and VII (OSWER Directive 9355.0-19), December 24, 1986 (discussing interim guidance on Superfund selection of remedy).

11. "Estimated Soil Ingestion Rates for Use in Risk Assessment," Risk Analysis (Vol. 7, No. 3), 1987.

12. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Data Quality Objectives for Remedial Response Activities: Development Process (EPA/540/G-87/003, OSWER Directive 9355.0-7B), March 1987.

13. U.S. Environmental Protection Agency. Office of Waste Programs Enforcement. Data Quality Objectives for Remedial Response Activities - Example Scenario: RI/FS Activities at a Site with Contaminated Soils and Groundwater (EPA/540/G-87/004, OSWER Directive 9355.0-7B), March 1987.

14. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. A Compendium of Superfund Field Operations Methods (EPA/540/P-87/001, OSWER Directive 9355.0-14), December 1987.

15. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Superfund Exposure Assessment Manual (EPA/540/1-88/001, OSWER Directive 9285.5-1), April 1988.

16. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Community Relations in Superfund: A Handbook (Interim Version) (EPA/540/G-88/002, OSWER Directive 9230.0-3A), June 1988.

17. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Catalog of Superfund Program Directives (Interim Version) (OSWER Directive 9200.7-01), July 1988.

18. U.S. Environmental Protection Agency. Hazardous Site Evaluation Division. Laboratory Data Validation Functional Guidelines for Evaluating Inorganics, July 1, 1988.

19. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) Compliance with Other Laws Manual (EPA/540/G-89/006, OSWER Directive 9234.1-01), August 1988.

20. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Technology Screening Guide for Treatment of CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) Soils and Sludges (EPA 540/2-88/004), September 1988.

21. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) (Interim Final) (EPA/540/G-89/004, OSWER Directive 9355.3-01), October 1988.

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

23. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites (EPA/540/G-88/003, OSWER Directive 9283.1-2), December 1988.

24. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. User's Guide to the Contract Laboratory Program (OSWER Directive 9240.0-1), December 1988.

25. U.S. Environmental Protection Agency. Office of Research and Development. Requirements for Hazardous Waste Landfill Design, Construction, and Closure (EPA/625/4-89/022), April 1989.

26. "National Primary and Secondary Drinking Water Regulations; Proposed Rule," Federal Register (Vol. 54, No. 97), May 22, 1989.

27. U.S. Environmental Protection Agency. Risk Assessment Work Group, Region I. Supplemental Risk Assessment Guidance for the Superfund Program (Draft Final) (EPA/901/5-89/001), June 1989.

28. "RCRA Regulations," Code of Federal Regulations (Title 40, Part 264), July 1989.

29. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Interim Final Guidance on Preparing Superfund Decision Documents (OSWER Directive 9355.3-02), July 1989.

30. U.S. Environmental Protection Agency. Office of Research and Development. Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments (EPA/530-SW-89-047), July 1989.

31. Memorandum from Louis F. Gitto, U.S. Environmental Protection Agency Air, Pesticides, and Toxic Management Division, Region I to Merrill S. Hohman, Waste Management Division, Region I (OSWER Directive 9355.0-28), July 12, 1989 (discussing air stripper control guidance).

32. CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) Compliance with Other Laws Manual - Part II: Clean Air Act and Other Environmental Statutes and State Requirements (EPA/540/G-89/009, OSWER Directive 9234.1-02), August 1989.

33. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. The Feasibility Study: Development and Screening of Remedial Action Alternatives (OSWER Directive 9355.3-01FS3), November 1989.

34. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Getting Ready Scoping the RI/FS (OSWER Directive 9355.3-01FS1), November 1989.

35. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. The Remedial Investigation: Site Characterization and Treatability Studies (OSWER Directive 9355.3-01FS2), November 1989.

36. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Risk Assessment Guidance for Superfund - Volume I: Human Health Evaluation Manual (Part A - Interim Final) (EPA/540/1-89/002), December 1989.

37. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. The Feasibility Study: Detailed Analysis of Remedial Action Alternatives (OSWER Directive 9355.3-01FS4), March 1990.

38. "National Oil and Hazardous Substances Pollution Contingency Plan," Federal Register (Vol. 55, No. 46), March 8, 1990, p. 8666.

39. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. ROD Annual Report: FY 1989 (EPA/540/8-90/006), April 1990.

40. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Superfund Automated Records of Decision System (ROD) (Database Printout), 1990.

41. EPA Guide for Identifying Cleanup Alternatives at Hazardous Waste Sites and Spills: Biological Treatment (EPA/600/3-83/063).

42. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Personnel Protection and Safety.

43. U.S. Environmental Protection Agency. Impact of the RCRA Land Disposal Restrictions of Superfund Response Actions in Superfund.