SUPERFUND RECORDS CTR
Site: Burgess Brothers
Break: 5.4
Other:

DECLARATION FOR THE RECORD OF DECISION

BURGESS BROTHERS SUPERFUND SITE
Bennington and Woodford, Vermont

Statement of Purpose

This Decision Document presents the selected remedial action for the Burgess Brothers Superfund Site in Bennington and Woodford, Vermont, developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended, 42 U.S.C. §§ 9601 et. seq., and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) as amended, 40 C.F.R. Part 300. The Administrator for EPA-New England has delegated the authority to approve this Record of Decision (ROD) to the Director of the Office of Site Remediation and Restoration (OSRR).

The State of Vermont has concurred with the selected remedy.

Statement of Basis

This decision is based on the Administrative Record which has been developed in accordance with Section 113(k) of CERCLA and which is available for public review at the Bennington Free Library, Bennington, Vermont, and at the EPA - New England Office of Site Remediation and Restoration Records Center in Boston, Massachusetts. The Administrative Record Index (Appendix D to the ROD) identifies each of the items comprising 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 the public health or welfare or to the environment.

Description of the Selected Remedy

This ROD sets forth the selected remedy for the Burgess Brothers Superfund Site which addresses both the source control and the management of migration of contaminants from the Site. The remedial measures described in this ROD will minimize further migration of contamination into the groundwater and surface water, will eliminate the potential for direct contact and/or incidental ingestion of the material within the landfill, will control landfill gas and prevent exposure to landfill gas containing hazardous substances, and will replace any portion of wetlands destroyed as a result of implementing the selected remedy.

The selected remedy consists of operating and maintaining controls to prevent exposure to contaminated soil and to achieve the restoration of groundwater and the protection of surface

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water. The major components of the selected remedy include:

- A multi-barrier (or "composite barrier") cap over the Landfill Area. The need for a gas collection and treatment system will be evaluated during design.

- A cap over the soils in the Marshy Area. Any wetlands impacted by the installation of the cap will be restored or replaced, preferably on-site. Cap specifications will be determined during design.

- Hot spot remediation of the Former Lagoon Cells within the Landfill Area using soil-vapor extraction (SVE) and air sparging.

- Natural attenuation of contaminated groundwater beyond the area of influence of the SVE and air sparging system.

- The establishment of institutional controls to protect the capped areas and to prevent the use of groundwater potentially impacted by the Site, and to inform future purchasers of the groundwater restrictions associated with the property. Restrictions on the use of groundwater will include the current contaminant plume area and an associated buffer zone.

- Long-term monitoring of the groundwater, surface water, and sediments to evaluate the overall effectiveness of the remedy.

- A review of the Site every five years after the initiation of the remedial action to assure that the remedial action continues to protect human health and the environment.

Declaration

The selected remedy is protective of human health and the environment, attains federal and state requirements that are applicable or relevant and appropriate for this remedial action, and is cost-effective. This remedy satisfies the statutory preference for remedies that utilize treatment as a principal element to reduce the toxicity, mobility, or volume of hazardous substances. The selected remedy is equally protective and more cost effective and implementable than the alternatives evaluated. This remedy also utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

As this remedy will result in hazardous substances remaining onsite above health-based levels, a review will be conducted 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.

9/25/98
DATE

Patricia L. Meaney
Director, Office of Site Remediation and Restoration
U.S. EPA - New England Region

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION I - NEW ENGLAND

RECORD OF DECISION

for the

BURGESS BROTHERS SUPERFUND SITE
BENNINGTON AND WOODFORD, VERMONT

September 1998

BURGESS BROTHERS SUPERFUND SITE

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ROD DECISION SUMMARY
September 1998

I. SITE NAME, LOCATION AND DESCRIPTION

A. General Description

The Burgess Brothers Superfund Site (the "Site") is located in the towns of Woodford and Bennington, Bennington County, Vermont, between Burgess Road and the Walloomsac Brook. (Appendix A, Figure 1). Access to the Site is through the Burgess Brothers Construction Company's facility on Burgess Road, approximately 1.1 miles southeast of the junction of Burgess Road and State Highway 9. The Green Mountain National Forest borders the Site to the north. The latitude of the Site is 42°52'40" and the longitude is 73°09'00". The Site consists of approximately three acres located in the northeastern section of a 60-acre parcel which is owned by Clyde Burgess, Jr.

The Site includes the following six areas (see Appendix A, Figure 5):

- Landfill Area - which is the waste disposal area.
- Lagoon Area - former lagoon cells which are located within the Landfill Area. This area consists of two former waste disposal cells where solvent and reserve energizer battery waste were reportedly disposed.
- Soil Staging Area - located north of the Landfill Area.
- Area West of Landfill - includes the areas to the west of the Landfill Area, downslope of the landfill, and in the vicinity of a temporary access Landfill Road.
- Marshy Area - located south and southeast downslope of the landfill and consists of several small wetland areas.
- Hillside Area - includes areas upslope and to the east of the Marshy Area and Landfill Area on Harmon Hill.

As stated above, the Site consists of approximately three acres. The Landfill Area occupies approximately two acres which includes the two former Lagoon Cells. The Lagoon Area occupies approximately 4,000 square feet (0.09 acres) of the landfill. The Marshy Area and area impacted by the contaminated groundwater plume occupy approximately one acre beyond the Landfill Area. Both the landfill and lagoon cells have been covered with clean soils from the

Burgess Brothers property.

The primary land use in the vicinity of the site is undeveloped forest. Industrial, commercial, and residential properties are located along Burgess Road, approximately one mile southwest of the Site. Although Bennington, Vermont contains many historic structures, no cultural resources have been identified in the immediate vicinity of the Site.

Two municipal water supply systems, Ryder Spring and Morgan Spring, are located within one mile of the Site. These systems are operated by the Bennington Water Department. Two private drinking water wells have been identified within one mile of the Site.

A new housing development is being constructed just north of the Site. This construction is not expected to impact environmental conditions at the Site as the development will be connected to town water and sewerage (Publicly Owned Treatment Works (POTW)).

Several drainage swales flow down from the Hillside Area into the Marshy Area, then southwesterly into an unnamed stream. The unnamed stream flows southwesterly into Barney Brook which empties into the Walloomsac River. Both Barney Brook and the Walloomsac River are classified by the State of Vermont as Class B waters, which are defined as waters of a quality that consistently exhibit good aesthetic value and provide high quality habitat for aquatic biota, fish, and wildlife. The uses of Class B waters are public water supply (with filtration and disinfection), irrigation and other agricultural uses, swimming, and recreation.

The groundwater at the Site is classified by the State of Vermont as Class III, defined as suitable for individual domestic drinking water, irrigation, agricultural, and industrial/commercial use. Class I and II waters are aquifers that are currently in use, or have probability of use, as a public drinking water supply.

A more complete description of the Site can be found in Section 1 of the July 1996 Remedial Investigation Report.

B. Geology and Hydrology

Site geology consists of an unconsolidated overburden comprised of a kame sand and ablation glacial till, underlain by a lodgement till, underlain by bedrock (Appendix A, Figure 2). Combined, the kame sand and ablation glacial till are up to 35 feet thick. The lodgement till, which separates the kame sand and ablation glacial till from the bedrock, is approximately 35 to 90 feet thick. Bedrock consists of shallow weathered bedrock, deep weathered bedrock, and competent bedrock. The weathered bedrock consists of weathered schist and gneiss. The competent bedrock, found at upwards of 400 feet in depth, consists of massive to thickly bedded

quartzite with frequent high angle fractures.

The Site contains two groundwater flow paths. Shallow groundwater flow in the kame sand and ablation glacial till is generally from the landfill to the south-southeastward into the Marshy Area. The shallow groundwater in the Marshy Area discharges to a drainage swale (Swale 2) (Appendix A, Figure 3). Deep groundwater flow in the weathered and competent bedrock is towards the west-southwest, generally following the hill slope topography.

Groundwater elevation data indicate generally upward gradients in the kame sand and ablation glacial till in the Marshy Area, with groundwater discharging to surface water. Vertical gradients in the Landfill Area also appear to be slightly upward.

Additional information about the site geology and hydrology can be found in Section 2 of the July 1996 Remedial Investigation Report.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

A. Land Use and Response History

Activities at the Site began as sand and gravel mining operations in the 1940s. Starting in the early 1950's the Site was used as a metal salvage facility and as a disposal area. Metals, sludges, and rejected small appliance and military speciality batteries were also disposed at the Site. The two Lagoon Cells (unlined pits) received liquid wastes and sludge from approximately 1967 to 1976. These wastes consisted of lead sludges, lead contaminated wastewater, spent solvents (primarily PCE and TCE), and battery waste. Manganese dioxide cells (containing zinc and mercury) were also disposed. Approximately 2,371,100 gallons of liquid waste and 241,090 pounds of solid or semi-solid wastes were disposed of at the Site from 1971-1976. An unknown quantity of waste, primarily lead sludge, was also disposed of at the Site from the 1960's through 1971.

Numerous investigations have been performed at the Site to evaluate the environmental impact of the disposal operation which occurred in the Landfill Area and former Lagoon Cells. A listing of previous site investigation activities is provided in Appendix A, Table 1.

The Vermont Department of Environmental Conservation (VTDEC) (then Vermont Agency of Environmental Conservation (VTAEC)) conducted a Preliminary Assessment in 1985 and EPA proposed the Site for listing on the National Priorities List (NPL) on June 24, 1988. On March 31, 1989 the Site was added to the NPL.

A Remedial Investigation/Feasibility Study (RI/FS) was begun at the Site in 1991 and completed

in 1998. The EPA completed a Baseline Risk Assessment in 1997. A more detailed discussion of the findings of the investigations is provided in the July 1996 Remedial Investigation Report and the February 1997 Supplemental Remedial Investigation Report.

B. Enforcement History

VTAEC inspected the Site several times during the late 1960's and 1970's to evaluate disposal practices and environmental impacts. In August 1976, VTAEC disallowed disposal operations at the Site.

From 1984 - 1989, preliminary investigations and periodic monitoring of soil, surface water, groundwater, and leachate were performed by the State, EPA, and Union Carbide Corporation, as identified in Appendix A, Table 1.

On May 10, 1991, EPA notified five parties of their potential liability with respect to the Site. These parties either owned or operated the facility, generated wastes that were shipped to the facility, arranged for the disposal of wastes at the facility, or transported wastes to the facility. These parties consisted of Clyde Howe, owner, Clyde Burgess, Jr., operator, Union Carbide Corporation, Inc., generator, Eveready Battery Company, Inc., generator, and Burgess Brothers Construction Company, Inc., generator and transporter. Negotiations commenced with these potentially responsible parties (PRPs) regarding performance of a Remedial Investigation/ Feasibility Study (RI/FS).

On August 13, 1991, EPA entered into an Administrative Order by Consent, U.S. EPA Region I CERCLA Docket No. I-90-1100, with Clyde Burgess, Jr., Burgess Brothers Construction Company, Inc., and Eveready Battery Company, Inc. for the performance of an RI/FS. These three PRPs also agreed to reimburse EPA and the State of Vermont for a portion of past costs under a separate Administrative Order by Consent, U.S. EPA Region I CERCLA Docket No. I -90-1101.

Pursuant to the Administrative Order by Consent, the settling PRPs retained a contractor and conducted the RI/FS under EPA oversight.

III. COMMUNITY PARTICIPATION

Throughout the Site's history, community concern and involvement has been fairly low. EPA has kept the community and other interested parties apprised of the Site activities through informational fact sheets, press releases, and public meetings. On June 10, 1998, EPA issued a Proposed Plan for the cleanup of the site.

On June 11, 1998, EPA published a notice and brief analysis of the Proposed Plan in the Bennington Banner . On June 15, 1998 EPA made the Proposed Plan and Administrative Record available to the public by placing a copy in the Bennington Free Library, Bennington, Vermont, and at EPA's office in Boston. On June 23, 1998, EPA held an informational meeting/public hearing at the Bennington Free Library to discuss the results of the Remedial Investigation and the cleanup alternatives presented in the Feasibility Study. During this meeting EPA presented the Proposed Plan and accepted oral comments. The public comment period ran from June 15 through July 15, 1998. A transcript of this meeting, the comments EPA received, and EPA's responses to the those comments are included in the responsiveness summary in Appendix E.

IV. SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

The entire site has been addressed as a single operable unit, addressing both source control and management of migration to obtain a comprehensive approach for Site remediation. The selected remedy was developed by combining various components of different source control and management of migration alternatives. In summary, the remedy provides for the following actions which will address the principal threats to human health and the environment posed by the Site:

- A multi-barrier (or "composite barrier") cap over the Landfill Area. The need for a gas collection and treatment system will be evaluated during design.
- A cap over the soils in the Marshy Area. Any wetlands impacted by the installation of the cap will be restored or replaced, preferably on-site. Cap specifications will be determined during design.
- Hot spot remediation of the Former Lagoon Cells within the Landfill Area using soil-vapor extraction (SVE) and air sparging.
- Natural attenuation of contaminated groundwater beyond the area of influence of the SVE and air sparging system.
- The establishment of institutional controls to protect the capped areas and to prevent the use of groundwater potentially impacted by the Site, and to inform future purchasers of the groundwater restrictions associated with the property. Restrictions on the use of groundwater will include the current contaminant plume and a buffer zone.
- Long-term monitoring of the groundwater, surface water, and sediments to evaluate the overall effectiveness of the remedy.

- A review of the Site every five years after the initiation of the remedial action to assure that the remedial action continues to protect human health and the environment.

Remedial activities at the Site are comprehensive and intended to be a final remedy.

V. SUMMARY OF SITE CHARACTERISTICS

Sections 2.4 and 2.5 of the Feasibility Study Report contain an overview of the Remedial Investigation. The significant findings of the Remedial Investigation are summarized below.

A. Source Area (Landfill and Lagoon Cells)

The source of contamination at the Site is a two acre landfill. From the 1950's into the 1970's, the landfill received municipal type refuse, such as wood, newspaper, steel, cardboard, and cinders. Starting in the 1960's, the landfill also received small appliance batteries and lead sludge from the manufacture of batteries. The landfilled materials are located within a kame sand deposit primarily above the groundwater table, however, groundwater contamination does occur through snow melt and rain percolating through the waste material then into the groundwater table. The primary contaminants are volatile organic compounds (VOCs) and metals. The surface area of the landfill is approximately 60,000 square feet (1.4 acres) and the depth of the landfill ranges from 8 to 14 feet. The landfill's estimated volume is approximately 27,000 cubic yards.

Within the landfill are two former Lagoon Cells. These former Lagoon Cells consist of two unlined pits that received wastes such as lead plater sludge, reserve energizer battery processing waste, and spent solvents. The Lagoon Cells are considered a "hot spot" within the landfill due to significantly elevated levels of VOCs, semi-VOCs , and metals. Contaminants from the landfill, and specifically the Lagoon Cells, have impacted the soil and groundwater within the Marshy Area which is located downslope and down gradient. The areas of former Lagoon Cells 1 and 2 are estimated to be 960 square feet (0.02 acres) and 3,170 square feet (0.07 acres), respectively, and the average depth of each lagoon is 15 feet. The Lagoon Cells combined estimated volume is approximately 2,300 cubic yards.

B. Soil

As stated above, elevated levels of VOCs, semi-VOCs, and metals are found within the landfill and, more specifically, within the Lagoon Cells which are considered a "hot spot". To determine treatment viability, a soil vapor extraction (SVE) pilot study was completed during October and November 1996 to treat the soils within and surrounding the Lagoon Cells. The results of the

pilot study indicate that SVE would be a successful technology for removing contaminants within the unsaturated soils. The volume of impacted soils from the former Lagoon Cells 1 and 2 is approximately 530 cubic yards and 1760 cubic yards, respectively.

Outside the source area, the primary area of impacted soils is within the Marshy Area located downslope and down gradient of the landfill (See Appendix A, Figure 5). Significantly elevated levels of VOCs, semi-VOCs, and metals are all found within the Marshy Area. The Marshy Area soils appear to have been impacted from historical disposal practices in the landfill and, specifically, in the Lagoon Cells. Liquid wastes that were placed into the lagoon cells seeped through the landfill, into the Marshy Area soils, and into Swale 2.

Small quantities of pesticides and PCBs were detected in surface and subsurface soils, primarily in the former Lagoon Cell areas. The small quantities of pesticides and PCBs detected do not indicate the presence of a pesticide or PCB source area that would pose a risk in groundwater, surface water, or sediments.

C. Groundwater

Groundwater Contamination

Water which percolates through the landfill enters the overburden groundwater system, which is groundwater above bedrock. Groundwater flow in this strata is generally from the Landfill Area to the south-southeastward into the Marshy Area. Shallow groundwater in the Marshy Area discharges to Drainage Swale 2. Topography and current groundwater flow patterns result in groundwater from the landfill and Harmon Hill converging in the vicinity of Swale 2 (see Appendix A, Figure 4).

Elevated levels of VOCs are found in the overburden groundwater in the Landfill Area, Lagoon Cells, Marshy Area, and downgradient of the landfill southwesterly towards well cluster W-09. The highest concentrations of VOCs and metals are found within the Lagoon Cells and Marshy Area. The primary source of VOCs and metals in shallow groundwater is the Landfill Area, and in particular, the former Lagoon Cells. Overall, the shallow groundwater contaminant plume is located within the kame sand/ablation glacial till and has an areal extent of approximately 700 feet by 300 feet. The southeastern edge of the plume is slightly east of Drainage Swale 2. The plume also extends slightly south of the W-09 well cluster. The western limit of the contaminant plume is between a temporary well access road and well W-26T (see Appendix A, Figure 5).

Vertical flow paths indicate generally upward gradients in the kame sand and ablation glacial till in the Marshy Area, with groundwater discharging to surface water. Available data on vertical gradients in the Landfill Area also indicate a slightly upward gradient. A dense lodgement till

separates the kame sand/ablation glacial till from the deeper bedrock. This dense till along with generally upward groundwater gradients suggests that dissolved phase contaminant migration from the kame sand/ablation glacial till into the bedrock is not expected. Sampling has confirmed this as the bedrock groundwater does not appear to be impacted by site related contaminants.

Two residential drinking water wells and two public water supplies, Ryder Spring and Morgan Spring were sampled during this remedial investigation. No site related contaminants were detected in any of these drinking water supplies.

Potential for DNAPL

There is a potential for a dense, non-aqueous phase liquid (DNAPL) to be present at the Site. Concentrations of trichloroethylene (TCE) were detected in the Lagoon Cell sludges above the solubility limit for TCE, suggesting the potential for a DNAPL. Concentrations of VOCs were detected in groundwater at up to 14% of their solubility which may be indicative of a DNAPL, however, it was not observed at any well locations.

Concentrations of VOCs were up to two orders of magnitude lower in the ablation glacial till than in the upper strata of kame sand and were significantly lower than the solubility limit. The lower levels of VOCs detected in the ablation glacial till indicate that if a DNAPL is present, it is limited to the upper layer of kame sand. Based on the distribution of VOCs, the potential for DNAPL appears to be localized within the immediate vicinity of the former Lagoon Cells and the northeast portion of the Landfill Area near well SBW-21. (Appendix A, Figure 5)

Contaminant Migration

VOC migration in groundwater is primarily through dissolved phase transport. The primary direction of VOC contaminant migration is from the Landfill Area towards the south-southeast into the Marshy Area. The extent of the groundwater VOC plume in the south-southeast direction appears to be constrained by discharge of contaminated groundwater to surface water in Marshy Area sediments. Limited migration of VOCs is observed towards the west, which is likely associated with dispersion because groundwater flow is generally towards the south-southeast.

As stated above, the concentrations of VOCs detected in groundwater indicate the potential of DNAPL. If present, DNAPL migration in the kame sand would be downward under gravity. Lateral dispersion and adsorption of DNAPL, in conjunction with downward migration, would continue until the ablation glacial till is encountered, which would serve as a confining layer. Based on till contour maps (see Appendix A, Figure 6) a DNAPL in the Landfill Area or former Lagoon Cells would be directed towards the Marshy Area.

The source of metals in shallow groundwater is the landfill, primarily the Lagoon Cell areas.

Low flow groundwater sampling indicates that metals in soils, with the exception of iron, manganese and thallium, are generally insoluble and immobile in groundwater. The groundwater metals plume, with the exception of iron, manganese, and thallium, is limited to the immediate vicinity of the landfill.

The dense lodgement till layer between the overburden material and bedrock is likely a barrier to vertical migration of contaminants. In addition, vertical gradients in the kame sand and ablation glacial till appear to be upward. Therefore, migration of dissolved phase contaminants into the shallow and deep weathered bedrock and competent bedrock is not expected.

D. Surface Water/Sediments

Surface Water

Elevated levels of VOCs were found in the surface water in Swale 2 next to the Landfill Area and Marshy Area. VOC concentrations decreased downstream in Swale 2 and the Unnamed Stream. VOCs were not detected in Barney Brook above State and Federal water quality standards.

Metal concentrations above State and Federal water quality standards were highest in Swale 2 next to the Landfill Area and Marshy Area. Metal concentrations also decreased downstream in Swale 2, the Unnamed Stream, and Barney Brook. Concentrations of lead, mercury, nickel, and zinc were detected above the National Oceanic and Atmospheric Administration (NOAA) Effects Range Low (ER-L) concentrations in surface water samples next to the Landfill Area and Marshy Area. The impacts to surface water quality is reduced, however, as the stream flows toward Barney Brook.

The source of VOCs and metals in surface water is from landfill leachate seeps and groundwater discharge to surface water.

Sediments

VOCs were also detected in sediments with concentrations being the highest next to the Landfill Area and Marshy Area and decreasing downstream. The concentrations of VOCs detected in groundwater and surface water were generally higher than those detected in sediment suggesting that the VOCs detected in sediment samples are likely associated with groundwater entrained in soil particles.

Metal concentrations have been compared with NOAA ER-Ls. Metals were not detected in the downstream sample locations above these levels, indicating that the extent of impacts to sediment is limited to within the Marshy Area downslope and downgradient of the landfill. The likely source of metals in sediment is from landfill leachate seeps and from surface transport of

soils downslope from the landfill via surface water runoff.

Contaminant Migration

VOCs in surface water likely volatilize to the atmosphere or undergo biodegradation or photodegradation. The downstream edge of the VOC plume in surface water is between sampling locations SW-15 and SW-04 in the unnamed stream. Because VOCs in surface water tend to volatilize rapidly, they are not likely to partition to sediments.

The concentrations of metals in surface water were highest in the Landfill Area and decrease downstream in Swale 2 and the Unnamed Stream and Barney Brook. A similar suite of metals were detected in soil samples from the Landfill Area and former Lagoon Cells, and Marshy Area soils. This trend suggests that the impact to surface water quality originates in the Landfill Area and is reduced as the stream flows toward Barney Brook. However, some metals, including antimony, lead and silver are present at all locations at similar concentrations. A contributing source of these metals may be natural and not related to impacts from the landfill.

VOCs were detected in sediment samples from drainage Swale 2, however, they are likely associated with groundwater entrained in the soil particles. Concentrations of lead, mercury, nickel, and zinc were detected above NOAA ER-L concentrations in stream sediments from the Landfill Area. Metals were not detected in downstream sampling locations above NOAA ER-L levels, indicating that these metals are relatively immobile. The source of metals is likely from leachate seeps in the landfill.

A complete discussion of Site characteristics can be found in the July 1996 Remedial Investigation Report in Sections 2, 3, 4, and 5 and in the February 1997 Supplemental Remedial Investigation Report, Sections 3, 4, and 5.

E. Air

An air quality assessment was performed as part of the RI. This included the use of field instruments to provide an initial screening of potential gas emissions on December 30, 1991 and a quantitative analysis of ambient air using an eight hour sampling device on October 14, 1992. These air studies confirmed that no significant concentrations of site-related residues were being transported from the Site via air transport at concentrations that would impact public health.

F. Leachate

VOCs and metals were detected in leachate above State and Federal water quality standards. These VOCs and metals were also detected in the Landfill Area and particularly in the Lagoon

Area soils and groundwater samples. The highest concentrations were at a location immediately downslope and down gradient of the former Lagoon Cells at leachate seep LS-03. (see Appendix A, Figure 5). The source of VOCs and metals in leachate is the Landfill Area, and particularly the former Lagoon Cells.

G. Wetlands

Ecological studies at the Site included a cover type analysis, wildlife receptor and habitat evaluation, wetland delineation, a water quality survey, and a bioassessment of benthic macroinvertebrates. Habitats at the Burgess Brothers Site consist of mixed deciduous forest with limited shrub cover, palustrine forested wetlands, and streams.

Several shallow intermittent drainage swales are present along the steep upgradient areas of the Hillside Area to the east of the Site. These swales flow towards the eastern edge of the landfill then southerly to the unnamed stream. One of the drainage swales, Swale 2, had deposits of orange oxides evident where landfill leachate enters the swale. The swales converge in a low lying area to create several small wetland areas.

The wetlands are primarily mixed deciduous/conifer forest but with a more open canopy and associated shrub cover than found in the forested area surrounding the site. The wetlands and swales flow into a perennial unnamed stream, then into Barney Brook.

Significant natural communities or threatened and endangered species are not known to be present at the Burgess Brothers Site or in nearby Barney Brook.

A complete discussion of Site characteristics can be found in the Remedial Investigation Report in Sections 2, 3, 4, and 5.

VI. SUMMARY OF SITE RISKS

EPA performed both a human health and ecological baseline Risk Assessment to estimate the probability and magnitude of potential adverse human health and ecological effects from exposure to contaminants associated with the Site. The human health risk assessment followed a four step process: 1) contaminant identification, which identified those hazardous substances which, given the specifics of the Site, were of significant concern; 2) exposure assessment, which identified actual or potential exposure pathways, characterized the potentially exposed populations, and determined the extent of possible exposure; 3) toxicity assessment, which considered the types and magnitude of adverse health effects associated with exposure to hazardous substances; and 4) risk characterization, which integrated the three earlier steps to

summarize the potential and actual risks posed by hazardous substances at the Site, including carcinogenic and non-carcinogenic risks. The results of the human health risk assessment for the Burgess Brothers Site are discussed below followed by the conclusions of the ecological risk assessment.

A. Human Health Risk Assessment

The 79 Contaminants of Concern (COCs) presented in Table 2, Appendix A, constitute a representative subset of all the contaminants identified at the Site during the Remedial Investigation (RI). These include 11 surface soil, 14 subsurface soil, 16 shallow groundwater, 4 deep groundwater, 7 sediment, 13 surface water, 11 leachate, and 3 ambient air COCs. The COCs were selected to represent potential Site related hazards based on toxicity, concentration, frequency of detection, and mobility and persistence in the environment. A summary of the health effects of each COC is located in Appendix C of the Final Risk Assessment Report (April 1997).

Potential human health effects associated with exposure to the COCs were estimated quantitatively or qualitatively through the development of several hypothetical exposure pathways. These pathways were developed to reflect the potential for exposure to hazardous substances based on present uses, potential future uses, and the location of the Site. At present, the site consists of a landfill that includes two former waste lagoons. Sand and gravel mining and metal salvage operations are conducted on an area abutting the Site. The Site is also used by hunters of small game as it abuts a state forest and access is not restricted. Consequently, current exposure to site contaminants is believed to be to site trespassers, hunters, and site employees. These receptor populations are thought to have occasional contact with surface soils, sediments and surface water. Quantitative assessments of exposure via incidental ingestion of surface soils and sediments were performed whereas qualitative assessments were performed for dermal contact with surface soils, sediments, and incidental ingestion and dermal contact with surface water. Incidental ingestion by site workers of sub-surface soils was also evaluated quantitatively in the risk assessment.

Although future site use is not expected to change, portions of the site may support residential development in the future (areas beyond the landfill and wetlands). Thus, surface soils at the site (beyond the landfill and wetlands) were also considered as sources of potential exposure via incidental ingestion by a young child (0-6 yrs) and quantitatively evaluated in the risk assessment.

While groundwater is used as a potable water supply by residents in the area, sampling of private wells to date has not indicated that site contaminants are currently impacting nearby water supplies. Since the potential exists for site contaminants to impact drinking water supplies in the future, ingestion of contaminated groundwater was considered as a future potential exposure and

quantitatively evaluated in the risk assessment. Dermal contact and inhalation of VOCs from domestic use of contaminated groundwater were also evaluated as a future potential exposure pathway but only qualitatively in the risk assessment.

Qualitative evaluations of exposure were performed for dermal exposure to soils and sediments, inhalation of VOCs and SVOCs from soils and surface water, and exposures to leachate because of the lack of an EPA endorsed approach to measure such exposure or the highly intermittent nature of the exposure.

For each exposure pathway quantitatively 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. Complete exposure pathway assumptions can be found in Tables 3-3 through 3-8 of the Final Risk Assessment Report.

Excess lifetime cancer risks were determined for each exposure pathway by multiplying the exposure level with the chemical-specific cancer potency factor. Cancer potency factors have been developed by EPA from epidemiological or animal studies to reflect a conservative "upper bound" of the risk posed by potentially carcinogenic compounds. That is, the true risk is 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 that an average 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 to the compound at the stated concentration. Current EPA practice considers carcinogenic risks to be additive when assessing exposure to a mixture of hazardous substances.

A hazard quotient (HQ) was also calculated for each pathway as EPA's measure of the potential for non-carcinogenic health effects. A hazard quotient is calculated by dividing the exposure level by the reference dose (RfD) or other suitable benchmark for non-carcinogenic health effects for an individual compound. Reference doses have been developed by EPA to protect sensitive individuals over the course of a lifetime and they reflect a daily exposure level that is likely to be without an appreciable risk of an adverse health effect. RfDs are derived from epidemiological or animal studies and incorporate uncertainty factors to help ensure that adverse health effects will not occur. The hazard quotient is often expressed as a single value (e.g. 0.3) indicating the ratio of the stated exposure as defined to the reference dose value (in this example, the exposure as characterized is approximately one third of an acceptable exposure level for the given compound). The hazard quotient is only considered additive for compounds that have the same or similar toxic endpoint and the sum is referred to as the hazard index (HI). (For example: The hazard quotient for a compound known to produce liver damage should not be added to a second whose toxic endpoint is kidney damage).

Risk estimates developed in the Risk Assessment were considered by EPA in light of the

Agency's mission to protect public health and the environment. EPA generally considers cancer risks in excess of 10^{-4} and noncarcinogenic hazards in excess of unity in determining the need for remedial action at a Site. Tables 3 & 4 (in Appendix A) depict the carcinogenic and noncarcinogenic hazard summary for the contaminants of concern, the mediums evaluated, and the present and potential future exposure pathways corresponding to the average and the Reasonable Maximum Exposure (RME) scenarios. Appendix B of the Final Risk Assessment report presents the chemical-specific risk estimates for each exposure pathway.

The greatest risks were projected for the future ingestion of shallow groundwater at the Site. Both average ($1x10^{-3}$) and maximum ($7x10^{-2}$) cancer risk estimates exceed EPA's benchmark of 10^{-4}. Vinyl chloride, tetrachloroethene, trichloroethene, and 1,1-dichloroethene are some of the key contributors to these risk estimates.

The highest noncarcinogenic hazard potential (HI=300) was also projected with the ingestion of maximum concentrations of shallow groundwater from wells at the Site. Both average (HI=20) and maximum (HI=300) noncancer hazard estimates exceed EPA's benchmark of unity. Trichloroethene, 1,2-dichloroethene (total), benzene, and tetrachloroethene as some of the key contributors to these risk estimates.

Inhalation of VOCs from domestic use of contaminated shallow groundwater would increase any risk associated with residential groundwater use. Although no established toxicity value is available for lead, a National Interim Primary Drinking Water Regulation (NIPDWR) is available (15 ug/l) and was used as a comparison for risk evaluation purposes. Both average (30ug/l) and maximum (72 ug/l) shallow groundwater concentrations of lead exceeded the NIPDWR.

All carcinogenic and noncarcinogenic risk values estimated for consumption of groundwater from deeper aquifers were below 10^{-4} or a HI<1 and were not determined to warrant a remedial action. Exposure to surface and subsurface soils outside of the landfill boundary were below 10^{-4} or a HI<1 and were not determined to warrant a remedial action. All carcinogenic and noncarcinogenic risk values estimated for exposure to stream sediments and surface water were also below 10^{-4} or a HI<1. Low levels of VOCs were measured in the air at the Site during invasive activities. Limited sampling precluded reliable estimates of risks to receptor populations. Due to the isolated and inaccessible location and intermittent nature of leachate areas, exposure of receptor populations to leachate was estimated qualitatively and was determined to be within an acceptable risk range.

B. Baseline Ecological Risk Assessment

An ecological risk assessment was also produced as part of the Burgess Brothers risk assessment, beginning on page 4-1 of the Final Risk Assessment Report.

The ecological assessment analyzed potential risks associated with exposure of Site biota to contaminants in four mediums of concern: surface waters of the swales and unnamed stream, leachate, stream sediments, and surface soils. Available criteria and guidelines were reviewed for use as benchmark values for evaluating chemical toxicity to ecological receptors. These guidelines include EPA Ambient Water Quality Criteria (AWQC) and the Ontario Ministry of the Environment (MOE) sediment guidelines for comparison to Site surface waters and sediment contaminant concentrations. Surface soil risk was evaluated by comparing estimated exposure doses received by selected indicator species with applicable wildlife chronic no observable effect level (NOEL) toxicity values.

Surface water and leachate COCs for which no criteria exist were evaluated by searching the Aquatic Information Retrieval (AQUIRE) database for applicable toxicity information. In the absence of a MOE sediment guideline for a particular organic contaminant, a sediment quality value was calculated using the equilibrium partitioning method. Inorganics lacking MOE sediment guidelines were assessed by comparing detected concentrations with the National Oceanic and Atmospheric Administration (NOAA) sediment guidelines. Surface soils were evaluated by estimating exposure doses received by indicator species (meadow vole, short-tailed shrew, and American robin). These doses were then compared with toxicity data obtained in the scientific literature.

Overall evaluation of potential risk to ecological receptors is estimated in the ecological risk assessment through the calculation of risk indexes. If the total risk index is greater than one, this indicates that exposure to all COCs within that medium may pose a risk to organisms. The risk indexes for the four mediums can be found in Tables 4-9 through 4-14 of the Final Risk Assessment Report.

The conclusions of the ecological risk assessment were as follows. Surface water quality in the unnamed stream is impacted by elevated concentrations of silver and antimony, however, neither of these inorganics were found at elevated levels near the disposal area and may not be site related. Elevated levels of organics (TCE and PCE) were found at a leachate seep. Sediment concentrations of nickel, cadmium, manganese, and lead are elevated resulting in a slightly elevated risk (mean HI=7, max HI=22). Concentrations of iron were also elevated in sediments, however, it appears that these levels may be naturally occurring.

Risks to terrestrial species exposed to contaminants in surface soil was assessed by modeling exposure to three indicator species. Concentrations of metals in the surface soils from outside the landfill area may have a slight impact on shrews (insectivores) (HI=29) and meadow vole (herbivores) (HI=9). Higher trophic levels (American robin) (HI=130) were found to have greater risks associated with soil contaminants at the Site.

C. Risk Assessment Conclusions

In summary, the human health and ecological risk assessments indicate that 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 the public health, welfare, or the environment. Specifically, the human health risk assessment identified future ingestion of shallow groundwater as posing probable health risks exceeding EPA risk management criteria. In addition, exposure to contaminants in surface soils outside of the landfill boundary may impact some wildlife species foraging in those areas.

The response action selected in this ROD addresses the risks at the Site by minimizing the potential for transfer of hazardous substances from the soil and solid waste into the groundwater, surface water, and sediment; preventing direct contact with hazardous substances in the soil or solid waste; preventing further migration of contaminated groundwater; restoring contaminated groundwater to drinking water standards; and preventing ingestion of contaminated groundwater.

VII. DEVELOPMENT AND SCREENING OF ALTERNATIVES

A. Statutory Requirements/Response Objectives

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

Landfill:

- Prevent, to the extent practicable, the potential for water to contact or infiltrate through the debris mass and lagoon.

- Prevent, to the extent practicable, the generation of landfill seeps and the migration of landfill impacted surface water into the unnamed streams adjacent to the landfill (Marshy Area).

- Control landfill gas emissions so methane gas does not present an explosion hazard; prevent, to the extent practicable, the inhalation of landfill gas containing hazardous substances, pollutants or contaminants; and meet state and federal air standards.

- Prevent, to the extent practicable, the migration of contaminated groundwater/leachate beyond the points of compliance by controlling the source of the contamination.

- Minimize the potential for slope failure of the debris mass associated with the landfill cap.

- Prevent, to the extent practicable, direct contact with and ingestion of soil/debris within the landfill and beneath the landfill.

- Control, to the extent practicable, surface water runoff to minimize erosion.

- Prevent, to the extent practicable, the migration of contamination from the lagoon area.

- Prevent, to the extent practicable, the saturation of the landfill debris mass from upgradient groundwater.

Groundwater:

- Prevent, to the extent practicable, the ingestion of landfill impacted bedrock groundwater exceeding MCLs, Vermont Primary Groundwater Quality Standards, or in their absence, the more stringent of an excess cancer risk of 1×10^{-6} for each compound or a hazard quotient of unity for each noncarcinogenic compound by any individual who may use the bedrock groundwater or within an area that the groundwater could become

impacted as a result of pumping activities.

- Restore the bedrock groundwater at the edge of the Waste Management Unit to: MCLs, Vermont Primary Groundwater Quality Standards, or in their absence, the more stringent of an excess cancer risk of 1×10^{-6} for each compound or a hazard quotient of unity for each noncarcinogenic compound.

Surface Water:

- Protect off-site surface water by preventing the occurrence of landfill impacted seeps.
- Prevent, to the extent practicable, ecological impacts from contaminants in the Marshy Area.
- Meet federal and state applicable or relevant and appropriate requirements (ARARs) for any surface water discharge.

Ecological:

- Protect surface water, to the extent practicable, from exceedances of the Ambient Water Quality Criteria (AWQC) Acute and Chronic Standards.
- Protect sediments, to the extent practicable, from exceedances of the Aquatic Sediment Quality Guidelines of the Ontario Ministry of the Environment.

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 Site.

EPA has established the concept of a presumptive remedy as a mechanism to streamline Site studies and cleanup actions. The objective of the presumptive remedies approach is to use cleanup techniques shown to be effective in the past at similar sites. Presumptive remedies are expected to be used at all appropriate sites except under unusual circumstances. EPA's "Presumptive Remedy for CERCLA Municipal Landfill Sites" establishes containment as the presumptive remedy for CERCLA municipal landfills and this guidance was evaluated during

the screening of alternatives for this Site.

Because the Site does not fall into the definition of a municipal landfill, the Feasibility Study included an evaluation of excavation/disposal as well as containment as potential remedies for the landfill. Excavation/disposal was considered due to the relatively small size of the landfill (approximately 27,000 yd^3), however, this alternative was eliminated in the initial screening process due to high costs and short term hazards. The containment alternative was carried throughout the Feasibility Study. The two lagoons, which accepted principally industrial wastes, were determined to be hot spots that require additional remedial responses to reduce the toxicity, mobility, or volume of hazardous substances.

As discussed in Section 4 of the Feasibility Study, the RI/FS identified, assessed, and screened technologies based on implementability, effectiveness, and cost. These technologies were combined into remedial alternatives which included source control and management of migration components. 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. Section 5 of the Feasibility Study presented the remedial alternatives developed by combining the technologies identified in the previous screening process in the categories identified in Section 300.430(e)(3) of the NCP.

In summary, the various source control and management of migration remedial alternatives presented and screened in Section 5 of the Feasibility Study were combined to obtain four comprehensive alternatives for detailed analysis. Section 6 of the Feasibility Study Report presents the detailed analysis of these four alternatives.

VIII. DESCRIPTION OF ALTERNATIVES

This Section provides a narrative summary of each alternative evaluated. A detailed assessment of each alternative can be found in Section 6.0 of the Feasibility Study Repot.

The remedial alternatives that underwent detailed analysis for the Site are the following:

Alternative 1 - No Action
- Groundwater, surface water and leachate monitoring

Alternative 2 - Capping and Lagoon Treatment/Natural Attenuation
- Groundwater, surface water and sediment monitoring
- Institutional controls, such as a deed notice
- Capping and Lagoon Treatment
- Natural Attenuation

Alternative 3 - Capping and Lagoon Treatment/Pump and Treat

- Groundwater, surface water and sediment monitoring
- Institutional controls, such as a deed notice
- Capping and Lagoon Treatment
- Pump and Treat

Alternative 4 - Capping and Lagoon Treatment/Treatment Wall

- Groundwater, surface water and sediment monitoring
- Institutional controls, such as a deed notice
- Capping and Lagoon Treatment
- Treatment Wall

All of the alternatives include long-term environmental monitoring and five-year reviews. All of the alternatives, except for Alternative 1 (No Action), include institutional controls to prevent the use of contaminated groundwater and to protect the containment system.

Alternative 1: No Action

The no action alternative was evaluated in detail in the Feasibility Study to serve as a baseline for evaluating other remedial alternatives under consideration. Under this alternative, no treatment or containment of the landfill, lagoons, or wetland areas would occur and no effort would be made to treat or prevent the further migration of contaminated groundwater. There would also be no access restrictions or institutional controls to prevent the use of contaminated groundwater. Groundwater, surface water, and leachate would be periodically monitored at the Site for a period of 30 years and would undergo an evaluation of data every five years.

Estimated Time for Design and Construction:	*Not Applicable*
Estimated Capital Cost:	*$0*
Estimated Operation and Maintenance Cost (net present worth)[1]:	*$930,000*
Estimated Total Cost (net present worth):	*$930,000*

[1]Note: Estimated costs for each alternative are based on 30 years of operation and a 7% interest rate.

Alternative 2 - Capping and Lagoon Treatment/Natural Attenuation

Alternative 2 would consist of the following components:

- Construction and maintenance of a multi-barrier cap over the Landfill Area.
- Construction and maintenance of a cap over soils in the Marshy Area.
- Implementation of SVE/air sparging in the former Lagoon Cells.
- Institutional controls, such as a deed notice and the installation of a perimeter industrial fence.
- Natural Attenuation: modeling and evaluation of contaminant degradation rates and pathways.

Each component is discussed below:

Multi-barrier Cap Over the Landfill Area

The multi-barrier cap would consist of covering the landfill and lagoons (approximately 2 acres) with multi-layer caps, consistent with the RCRA Subtitle C requirements listed in 40 CFR (Part 264). A typical multi-layer cap, as would be required at this Site, would consist of (from top to bottom):

- six inches of topsoil to support a vegetative cover.
- 30 inches of soil fill to provide a root zone and protection for the underlying components or 18 inches of soil if using sand for drainage.
- a nonwoven geotextile filter fabric to minimize fill material from clogging the drainage layer.
- a geonet/geotextile drainage layer or 12 inches of sand to prevent ponding of water over the synthetic barrier.
- a 60 mil very low density polyethylene (VLDPE) or equivalent to act as the main barrier that prevents water from infiltrating into the landfill.
- a low hydraulic conductivity geosynthetic clay liner to minimize potential leakage throughout the low hydraulic conductivity geomembrane into the landfill.
- a base layer of six inches of silt or silty sand to establish a base grade for the landfill cap.

The above cap would be utilized for all areas having slopes of less than or equal to 5%. For all side slope areas, designed with a 3:1 slope, a minor variation of the base liner design would be implemented. From top to bottom, the side slope cap would consist of:

- six inches of topsoil to support a vegetative cover.
- 30 inches of soil fill to provide a root zone and protection for the underlying

components or 18 inches of soil if using sand for drainage.

- a nonwoven geotextile filter fabric to minimize fill material from clogging the drainage layer.
- a geonet/geotextile drainage layer or 12 inches of sand to prevent ponding of water over the synthetic barrier.
- a textured geomembrane, 60 mil very low density polyethylene (VLDPE) or equivalent to act as the main barrier which prevents water infiltration from entering the landfill.
- a base layer of six inches of silt or silty sand to establish a base grade for the landfill and enhance side slope stability.

Landfill gas system requirements for the landfill have been evaluated in accordance with USEPA's New Source Performance Standards (NSPS) for Municipal Solid Waste (MSW) Landfills (40 CFR Part 60 Subpart WWW). Although not directly applicable, the NSPS test method was employed as a preliminary screen to evaluate whether a passive or an active gas system should be used.

Emission rates of three compounds versus the VTDEC action levels were evaluated using the NSPS method and soil gas data collected as part of the RI. These compounds were TCE, PCE, and toluene. The highest concentration detected in soil gas within the landfill, but outside of the former Lagoon Cells, were used as parameters. Data collected from within the former Lagoon Cells was excluded because the SVE system would collect and treat all soil gas generated in this area.

The preliminary screening found emission rates for the three compounds were a minimum of three orders of magnitude below the action levels for each compound. If confirmed, a passive gas management system would likely be a component of the multi-barrier cap. Further evaluation of landfill gas generation will determine the need for a passive or an active landfill gas management system. Post-construction sampling pursuant to a Demonstration of Compliance Plan, to be prepared during the remedial design, will determine whether treatment of landfill gas will be required.

Capping of the Soils in the Marshy Area

The cap over the marshy area soils would be constructed using either an impermeable or permeable barrier. For costing purposes, the evaluation of the single-barrier cap was performed based on the following cross-section (from top to bottom) described below. The specific type of cap would be determined during design.

- Approximately four inches of topsoil
- Approximately twelve inches of drainage sand
- 40 mil HDPE geomembrane
- Geocomposite drainage material
- Approximately two feet of soil as a subbase

Again, the type of cap would be determined during design. Factors such as constructability, maintenance, and ability to achieve remedial action objectives would be used in the selection process.

The cap would cover approximately one-half acre area of wetlands, eliminating the potential for direct contact and providing a barrier against animals burrowing into the Marshy Area soils. To stabilize the topsoil cover, the area would be completed with approximately 4-inches of topsoil and hydroseeded. To promote positive drainage from the area, existing soils would be shaped to achieve a minimum 3% grade toward drainage swales that would be constructed as part of the multi-layer landfill cap.

All wetlands required to be capped would be replicated. The wetlands would be constructed on the Burgess Brothers property, if feasible. The exact location and construction of wetlands replication would be determined during design under a site specific Wetlands Mitigation Plan.

SVE and Air Sparging in Lagoon Cells

An SVE system, in conjunction with an air sparging system, would be used to remediate soils in the Lagoon Cells. The air sparging system would remediate saturated zone soils by forcing air into the groundwater beneath the lagoons. The induced air flow produced by the air sparging system would accelerate the volatilization of the VOCs in the saturated zone, pushing the VOCs upwards into the soils in the unsaturated zone.

Air extraction wells would then be used to remove VOCs from the unsaturated zone as part of the SVE system. VOCs would be removed by inducing an air flow in the subsurface, producing, in effect, a subsurface vacuum. VOCs contained within the unsaturated zone would be pulled into the air extraction wells where they would be removed from the subsurface for treatment.

An SVE pilot study was performed at the site in 1996 which consisted of six extraction wells and two vapor extraction units. The off-gas treatment was activated carbon which proved to be sufficient. While the type of off-gas treatment for the SVE/air sparging system would be selected during design, for costing purposes it was assumed to be activated carbon.

It is anticipated that it would be necessary to operate the SVE/air sparging system continuously

for a period of six months to two years, then periodically over a period of perhaps several years to remove the estimated quantity of VOCs from the former Lagoon Cells. Once contaminant levels were adequately reduced, the system would be shut down for a period of time, then restarted to ensure contaminant levels had not increased. This shutting down and restarting process would be done several times over a period of time to ensure contaminant levels were not increasing during periods of shut down. Over time, contaminant levels would be expected to decrease to levels where the SVE/air sparging system could be discontinued. If DNAPL is determined to be present, however, the SVE/air sparging may not completely remove the VOC source and an alternate treatment approach would be evaluated.

Institutional Controls

A deed notice or other institutional controls would be used to ensure future site uses are consistent with potential risks, do not endanger the integrity of the remedy, and restrict impacted groundwater from being used as a drinking water source until the remedial action objectives have been met. Access to the Site would also be restricted, reducing potential risks from contact with the landfill and to protect the cap from damage that could be caused by unauthorized vehicles traveling over the landfill.

Natural Attenuation: Modeling and Evaluation of Contaminant Degradation Rates and Pathways

Natural attenuation is the naturally occurring processes in the environment which act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants. These in situ processes include biodegradation, dispersion, dilution, sorption, volatilization, and/or chemical and biological stabilization or destruction of contaminants. All of these processes play an integral role in natural attenuation.

The natural attenuation portion of this alternative includes a quantitative evaluation to estimate the time frame for achieving the remedial action objectives. Three-dimensional modeling was performed to simulate how contaminants in groundwater would react to source control activities. Future groundwater monitoring data would be used to recalibrate the model as necessary. The modeling effort used to evaluate natural attenuation is presented in Appendix A of the Feasibility Study Report.

The results of the model simulations indicate that remedial action objectives would be achieved within seven years of instituting source control measures. If DNAPLs are present, however, the time frame for achieving the remedial action objectives could be longer.

Groundwater, surface water, and sediment would be periodically monitored at the Site for a period of 30 years and would undergo an evaluation of data every five years.

Estimated Time for Design and Construction	*1 year*
Estimated Capital Cost:	*$1,633,000*
Estimated Operation and Maintenance Cost (net present worth):	*$1,941,000*
Estimated Total Cost (net present worth):	*$3,600,000*

Alternative 3 - Capping and Lagoon Treatment/Pump and Treat

Alternative 3 would include a multi-barrier cap over the landfill, a cap over the soils in the Marshy Area, an SVE/air sparging system for the Lagoon Area soils, institutional controls, and the installation and operation of a system to extract and treat contaminated groundwater from the landfill area. The groundwater treatment system would prevent further migration of contaminants and allow for the restoration of downgradient aquifers to federal and state drinking water standards.

The source control measures consisting of a multi-barrier cap over the landfill, cap over the soils in the Marshy Area, SVE/air sparging system for the Lagoon Area soils, and institutional controls are the same as those described under Alternative 2. The management of migration measures for this Alternative, however, would be different. Alternative 3's groundwater treatment system, pump and treat, would include a collection trench, pretreatment for inorganics, treatment for organics, and discharge to surface water. These elements are described below.

Collection trench

Groundwater would be collected using a collection trench. The trench would be constructed to the depth of the lodgement till (approximately 10-30 feet). Piping along with filter fabric, impermeable barriers, and groundwater collection structures (i.e., manholes) would be installed through a biodegradable slurry placed into the trench to maintain the trench walls. Once installed, the trench would be backfilled with crushed stone, displacing the majority of the biodegradable slurry. Due to the high water table in the Marshy Area traditional trench construction would not be feasible. Biopolymer trenching techniques would be used which would eliminate the need for shoring and dewatering, along with associated groundwater treatment.

Pretreatment for Inorganics

Groundwater from the collection trench would first be treated for the removal of inorganics to improve system efficiency as well as to satisfy discharge limits for metals. Groundwater would be pumped into an equalization/settling tank then pass through a particle filter to remove large suspended solids (See Figure 7, Appendix A). Inorganics would precipitate in a sludge that would be processed, characterized, and appropriately disposed off-site.

Treatment for Organics (VOCs)

After inorganic treatment, organics would be treated using an air stripper. Groundwater would be pumped to the top of an air stripper and a blower would be used to force ambient air counter to the water flow. The water would then be pumped through liquid-phase carbon to reduce the concentrations of residual VOCs as well as inorganics.

The ambient air forced through the treated groundwater would be treated prior to discharge. The type of off-gas treatment would be selected during pre-design. For costing purposes, it was assumed that activated carbon would be used to treat the off-gas.

Discharge to Surface Water

Treated groundwater would be discharged to the unnamed stream. The exact point of surface water discharge would be determined during the design phase. For cost estimating purposes, a discharge point located 100 feet from the treatment plant was assumed.

Modeling indicates that the groundwater remedial objectives would be achieved in approximately seven years. The treatment system was, therefore, anticipated to operate for seven years or less. During that time, residual VOCs and inorganics in groundwater would be treated to prevent migration beyond the compliance boundary. However, if DNAPLs are present, the groundwater pump and treat system could need to be operated indefinitely to achieve the remedial action objectives.

Groundwater, surface water, and sediment would be periodically monitored at the Site for a period of 30 years and would undergo an evaluation of data every five years.

Estimated Time for Design and Construction	*2 years*
Estimated Capital Cost:	*$3,112,000*
Estimated Operation and Maintenance Cost (net present worth):	*$2,838,000*
Estimated Total Cost (net present worth):	*$6,000,000*

Alternative 4 - Capping and Lagoon Treatment/Treatment Wall

Alternative 4 would include a multi-barrier cap over the landfill, a cap over the soils in the Marshy Area, an SVE/air sparging system for the Lagoon Area soils, institutional controls, and the installation of a treatment wall to treat contaminated groundwater from the Landfill Area. The groundwater treatment system would prevent migration of contaminants from the Landfill Area and allow for the restoration of down gradient aquifers to federal and state drinking water standards.

The multi-barrier cap over the landfill, cap over the soils in the Marshy Area, SVE/air sparging system for the Lagoon Area soils, and institutional controls are all the same as those described under Alternative 2. This Alternative differs from the others in that the groundwater treatment system, a treatment wall, would include the construction and maintenance of a subsurface permeable treatment wall for the passive treatment of groundwater using in-situ iron materials to degrade VOCs.

Treatment Wall

A treatment wall is an innovative technology consisting of a permeable granular iron material installed across the groundwater flow path. As groundwater flows through the treatment wall, the granular iron would degrade halogenated organics into nontoxic by-products, such as hydrogen gas, ethenes, ethane, and chloride in solution. The degradation would occur under natural groundwater flow conditions and would not have any associated mechanical components.

The treatment wall would be constructed to the depth of the lodgement till (approximately 10-30 feet) and would be approximately 150 foot-wide and three feet thick. An additional 100 feet of slurry wall would be installed at each end of the treatment wall to provide an "funnel and gate" effect (see Figure 8, Appendix A). The actual dimensions would be determined during design.

Modeling indicates that after seven years the treatment wall would no longer be necessary to maintain because the remedial action objectives will have been achieved upgradient of the treatment wall. If additional time is required to obtain remedial action objectives, however, the effectiveness of the treatment wall may diminish. If this occurs, the granular iron would be replaced in order maintain effective groundwater treatment. If DNAPLs are present, the treatment wall would need to be maintained indefinitely to achieve remedial action objectives.

Groundwater, surface water, and sediment would be periodically monitored at the Site for a period of 30 years and would undergo an evaluation of data every five years.

Estimated Time for Design and Construction	*2 years*
Estimated Capital Cost:	*$3,962,000*
Estimated Operation and Maintenance Cost (net present worth):	*$1,875,000*
Estimated Total Cost (net present worth):	*$5,800,000*

IX. SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

A. Evaluation Criteria

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 are summarized 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 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.

Modifying Criteria

The modifying criteria are used in 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 report.

A detailed tabular assessment of each alternative according to the nine criteria can be found in Appendix A, Table 5 of this Record of Decision.

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. This comparative analysis can be found in Section 6.0 of the Feasibility Study Report.

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

B. Summary of the Comparative Analysis of Alternatives

1. Overall Protection of Human Health and the Environment

EPA's "Presumptive Remedy for CERCLA Municipal Landfill Sites" establishes containment as the presumptive remedy for CERCLA municipal landfills. Although the Burgess Brothers landfill is not primarily a municipal landfill, it did receive municipal type waste co-disposed with industrial waste. While the FS evaluated other alternatives, it was found that containment would be the only practical alternative for addressing the landfill.

All of the alternatives, except for the No Action Alternative, provide a similar level of protection for human health and the environment concerning the potential for direct contact with soil, sediments, and solid waste. Consistent with the Presumptive Remedy, all of the action alternatives include the construction of caps and institutional controls to protect the integrity of the caps. The caps would prevent ingestion and dermal contact of soil or solid waste. Capping would also prevent further transport of contaminants into stream sediments. The No Action Alternative would not be protective of human health or the environment because it would allow a continued release of contaminants and a possible spreading of contamination to currently uncontaminated areas.

Capping would effectively reduce infiltration and thereby halt the leaching of contaminants from the soil and solid waste into shallow groundwater and surface waters. This would ultimately result in an improvement of down gradient groundwater quality and a reduction of the risks to human health associated with future ingestion of shallow groundwater.

Installation and operation of an air sparging/soil vapor extraction system within the Lagoon Area (Alternatives 2, 3, and 4) would significantly contribute to the protection of human health risks, since the system would reduce the toxicity, mobility, or volume of hazardous substances within the landfill that could impact groundwater.

With respect to exposure to contaminated groundwater, all of the alternatives, except for the No Action Alternative, would provide overall protection to human health and the environment as long as institutional controls are in place. In the long-term, alternatives that address the contaminants within the Landfill Area and Lagoon Area (Alternatives 2, 3, and 4) would be protective of human health by preventing further migration of contaminants beyond the compliance boundary and allowing for the restoration of the downgradient aquifer.

The expected timeframes for all action alternatives to achieve the chemical-specific groundwater remedial objectives at the compliance boundary are similar. Alternative 2 (natural attenuation) would take approximately 7 years to meet remedial action objectives (RAOs). Alternatives 3 (pump and treat) and 4 (treatment wall) would take approximately 2

years to meet RAOs, however, the treatment systems in both alternatives would have to be operated for an additional 5 years (for a total of 7 years) before RAOs were maintained without the aid of continued ground water treatment. (See Figure 9, Appendix A) The difference in these expected timeframes of Alternatives 2, 3, and 4 are not considered significant. If DNAPLs are present, however, the time frame for achieving the remedial action objectives for all alternatives would be longer.

In summary, all of the alternatives, except for the No Action Alternative, would provide similar levels of protection of human health and the environment. Alternative 3 (pump and treat) and 4 (treatment wall) would be slightly more protective than Alternative 2 (natural attenuation) because the remedial action objectives would be achieved in a slightly shorter time frame.

2. Compliance with ARARs

Tables 6-1 through 6-4 of the Feasibility Study Report provide a listing of all chemical-specific, action-specific, and location-specific ARARs for each alternative. Contained within Appendix B of this Record of Decision is a table (Table 6-2) of all chemical-specific, action-specific, and location-specific ARARs for EPA's selected alternative.

Alternative 1 (No Action) would not comply with federal and state hazardous waste regulations and federal and state drinking water standards. The landfill would not be capped in accordance with RCRA requirements and groundwater impacts would continue indefinitely beyond the compliance boundary.

All of the alternatives, except for No Action, would meet the federal and state hazardous waste regulations by complying with the closure and post-closure requirements for hazardous waste facilities within the 30 year evaluation period. These alternatives will also meet federal and state wetlands ARARs by minimizing adverse effects to wetlands and mitigating any unavoidable impacts.

Each of the action alternatives would lead to compliance with the chemical-specific groundwater remedial objectives in a reasonable time frame. As stated in the previous section, the time to achieve the chemical-specific groundwater remedial action objectives is similar, varying from two to seven years, depending on the alternative selected.

3. Long-Term Effectiveness and Permanence

The No Action Alternative would not be effective or permanent in reducing long-term risk;

soil and solid waste would continue to be available for exposure to human and ecological receptors and contaminants would continue to leach into groundwater and migrate beyond the compliance boundary.

The residual risk following the completion of remedial actions for Alternatives 2, 3, and 4 would be equal. Each alternative, therefore, would be equally effective and reliable in the long term as the remedial action objectives would be achieved under all three alternatives. The risks associated with the landfill material would be the same because all three alternatives have the same source control measures (SVE/air sparging, and capping). Although the management of migration remedial activities for the three action alternatives vary, they would have similar long-term effectiveness.

In summary, Alternatives 2, 3, and 4 would be equally effective and reliable in the long term in preventing exposure to contaminated soil, solid waste, and sediment.

4. Reduction of Toxicity, Mobility and Volume through Treatment

Alternative 1 (No Action) would not provide a reduction in contaminant toxicity, mobility, or volume because it provides only for continued monitoring of site contaminants without any remedial activities.

All of the action alternatives (Alternatives 2 (natural attenuation), 3 (pump and treat), and 4 (treatment wall)) provide for an SVE/air sparging system in the Lagoon Area combined with ground water remediation. Each of these three alternatives meet the remedial action objectives and offer a similar amount of reduction in mobility, toxicity, and volume of contaminants through treatment. Alternative 3 would transfer toxicity to residual materials from the treatment processes, such as sludge and carbon filters, which would be disposed at an appropriate facility or recycled. Alternative 4 may require the replacement and disposal of the granular iron in the treatment wall over time as efficiency decreases. Alternative 2 would not create any wastes for disposal and would reduce the toxicity and volume of the contaminants through naturally occurring treatment processes, such as biodegradation. An exception to this may be the potential for biotransformation of chlorinated compounds such as TCE and PCE to vinyl chloride which is more toxic. However, the effects of this are expected to be minor due to source control, dilution, dispersion, and sorption, all of which would reduce concentrations of vinyl chloride.

If DNAPL is found to be present, however, the degree to which the toxicity and volume would be reduced under all alternatives is uncertain.

5. Short-Term Effectiveness

Alternative 1 (No Action) would pose the lowest risks to Site workers during implementation since there is no construction involved, however, short-term protection of human health and the environment would not be achieved since exposure to contaminated soil, solid waste, or groundwater would not be prevented. Potential short-term risks associated with implementing and installing the SVE/air sparging systems and caps (Alternatives 2, 3 and 4) would be relatively small. Site workers would be potentially exposed to contaminants during implementation and installation of the SVE/air sparging system, regrading, and construction of the caps, however, these exposures can be controlled through routine monitoring and implementing health and safety measures.

Alternative 2 would have fewer short-term risks than the other two action alternatives since construction for ground water treatment would not be required. All action alternatives would achieve similar short-term protection of human health and the environment through capping and institutional controls to prevent the use of contaminated groundwater.

6. Implementability

All of the Alternatives evaluated are implementable. Alternative 1 (No Action) would be the easiest to implement as it does not involve any construction. Alternative 2 would also be easy to implement as construction would include only the SVE/air sparging system and caps which would utilize standard materials and construction techniques. Alternatives 3 and 4 would be the most difficult to implement as the ground water treatment systems would require speciality contractors and construction techniques.

Alternative 3 (pump and treat) would be the most difficult to implement. It would require speciality contractors to install a collection trench which, because of a high ground water table, could not be constructed conventionally. Biopolymer trenching techniques would be necessary which would include the introduction of a biodegradeable slurry during excavation. The installation of piping, filter fabric, impermeable barriers, and ground water collection structures would take place through the slurry itself. Alternative 3 would also require the construction of a water treatment system, installation of electric and other utilities, and meeting effluent standards for a surface water discharge which may be difficult to attain for inorganics, even with pretreatment. While this alternative is implementable, it would be the most difficult to implement.

Alternative 4 (treatment wall) would be more difficult to implement than Alternative 1 and 2 as it would require construction of a treatment wall that would have to be installed by speciality contractors. Only a few contractors have installation experience with the technology as very few full scale systems have been installed. The depth of the treatment

wall is estimated at 30 feet which would require speciality shoring during installation.

Alternative 2 would be the easiest of the action alternatives to implement as the construction of a ground water treatment system would not be required.

7. Cost

A table summarizing the present worth costs of each of the alternatives is provided below.

Summary of Estimated Remedial Costs

Alternative	Total Projected Cost
1 - No Action	$930,000
2 - Capping and Lagoon Treatment/Natural Attenuation	$3,600,000
3 - Capping and Lagoon Treatment/Pump and Treat	$6,000,000
4 - Capping and Lagoon Treatment/Treatment Wall	$5,800,000

Note: Costs include construction and operation and maintenance costs over the 30 year evaluation period, using a 7% discount rate.

As listed above, Alternative 1 (No Action) would be the least costly alternative. The only associated costs would be the semi-annual monitoring of site conditions.

Alternative 2 (Natural Attenuation) is the least costly of the action alternatives. Associated costs for the construction and maintenance of caps over the Landfill Area and Marshy Area are roughly equal to those associated with the operation and maintenance of the SVE/air sparge system. After the SVE/air sparging is complete, the only associated costs would be semi-annual monitoring of site conditions and periodic re-evaluation of the groundwater modeling results.

Costs associated with Alternatives 3 (Pump and Treat) and Alternative 4 (Treatment Wall) are on the same order of magnitude with each other. However, if a longer O&M period is required than the estimated seven year period to meet remedial action objectives, the costs associated with Alternative 3 would increase at a faster rate than Alternative 4.

8. State Acceptance

The Vermont Department of Environmental Conservation (VT DEC) has been involved with the study and oversight of the Burgess Brothers Superfund Site since the mid-1980s. The VT DEC has reviewed the Remedial Investigation, Feasibility Study, and Risk Assessment reports. The public comment period, and the EPA's responses to their comments are summarized in the Responsiveness Summary in Appendix E to this Record of Decision.

In general, the state has supported the preferred alternative set forth in the Proposed Plan. The State's declaration of concurrence with this Record of Decision is attached as Appendix C.

9. Community Acceptance

The comments received from the community on the RI/FS and the Proposed Plan during the public comment period, and EPA's responses to the comments, are summarized in the Responsiveness Summary in Appendix E of this document. Although very few comments were received, there was overall support of EPA's selected remedy. The focus of the comments included access restrictions, impacts to the community during construction activities, and overall environmental impacts. EPA's responses can be found in Appendix E.

X. THE SELECTED REMEDY

The remedy selected to address contamination at the Burgess Brothers Superfund Site is Alternative 2, which includes construction of a multi-barrier cap on the Landfill Area, construction of a cap over the soils in the Marshy Area, SVE/air sparging in the former lagoon cells, institutional controls, natural attenuation, long-term monitoring, and five-year reviews. This remedy addresses all of the contamination at the Site. A detailed description of the cleanup levels and the selected remedy is presented below.

A. Interim Groundwater Cleanup Levels

Interim cleanup levels have been established in groundwater for all contaminants of concern identified in the Baseline Risk Assessment found to pose an unacceptable risk to either human health or the environment. Interim cleanup levels have been set based on the ARARs (e.g., non-zero Federal Drinking Water Maximum Contaminant Level Goals (MCLGs) and MCLs, and Vermont Primary Groundwater Quality Standards (VPGQS)) as available, or other suitable criteria described below. 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.

At the time that Interim Groundwater Cleanup Levels identified in this ROD, newly promulgated ARARs, and modified ARARs have been achieved and have not been exceeded for a period of three consecutive years, a risk assessment shall be performed on the residual groundwater contamination to determine whether the remedial action is protective. This risk assessment of the residual groundwater contamination shall follow EPA procedures and will assess the cumulative carcinogenic and non-carcinogenic risks posed by ingestion of groundwater and inhalation of VOCs from domestic water usage.

If, after review of the risk assessment, the remedial action is not determined to be protective by EPA, the remedial action shall continue or be modified until either protective levels are achieved and are not exceeded for a period of three consecutive years, or until a remedy is otherwise deemed protective. Once the remedy is deemed protective, the levels achieved shall constitute the final cleanup levels for this Record of Decision and shall be considered performance standards for this Site.

Because the aquifer at and beyond the compliance boundary for the Landfill is a potential source of drinking water, MCLs and non-zero MCLGs established under the Safe Drinking Water Act are ARARs. The State of Vermont has classified the aquifer under and beyond the compliance boundary for the Landfill as Class III, suitable as a source of water for individual domestic drinking water supply, irrigation, agricultural use, and general industrial and commercial use. Vermont Primary Groundwater Quality Standards established under the Groundwater Protection Rule and Strategy are also ARARs.

Interim cleanup levels for known, probable, and possible carcinogenic compounds (Classes A, B, and C, respectively) have been established to protect against potential carcinogenic effects and to conform with ARARs. Because the MCLGs for Class A & B compounds are set at zero and are thus not suitable for use as interim cleanup levels, MCLs have been selected as the interim cleanup levels for these Classes of compounds. Because the MCLGs for the Class C compounds are greater than zero, and can readily be confirmed, MCLGs have been selected as the interim cleanup levels for Class C compounds.

Interim cleanup levels for Class D and E compounds (not classified, and no evidence of carcinogenicity) have been established to protect against potential non-carcinogenic effects and to conform with ARARs. Because the MCLGs for these Classes are greater than zero and can readily be confirmed, MCLGs have been selected as the interim cleanup levels for these classes of compounds.

In situations where a promulgated State standard is more stringent than values established under the Safe Drinking Water Act, the State standard was used as the interim cleanup level. In the absence of an MCLG, an MCL, a proposed MCLG, proposed MCL, State standard, or other suitable criteria to be considered (i.e., health advisory, state guideline), an interim cleanup level was derived for each compound having carcinogenic potential (Classes A, B, and C compounds) based on a 10^{-6} excess cancer risk level per compound considering the ingestion of groundwater

from domestic water usage.

In the absence of the above standards and criteria, interim cleanup levels for all other compounds (Classes D and E) were established based on a level that represent an acceptable exposure level to which the human population including sensitive subgroups may be exposed without adverse affect during a lifetime or part of a lifetime, incorporating an adequate margin of safety (hazard quotient = 1) considering the ingestion of groundwater from domestic water usage. If a value described by any of the above methods was not capable of being detected with good precision and accuracy, or was below what was deemed to be the background value, then the practical quantification limit or background value was used as appropriate for the Interim Groundwater Cleanup Level.

Table 1 below summarizes the Interim Cleanup Levels for carcinogenic and non-carcinogenic contaminants of concern identified in groundwater.

TABLE 1: INTERIM GROUNDWATER CLEANUP LEVELS

Carcinogenic Contaminants

Carcinogenic Contaminants of Concern (Class)	Interim Cleanup Level (µg/l)	Basis	Level of Risk *1
1,1-Dichloroethene (C)	7	MCLG	$7x10^{-5}$
1,2-Dichloroethane (B2)	5	MCL	$8x10^{-6}$
Benzene (A)	5	MCL	$3x10^{-6}$
Chloroform (B2)	6	MCL	$6x10^{-7}$
Methylene Chloride (B2)	5	MCL	$7x10^{-7}$
Tetrachloroethene (B2-C)	5	MCL	$5x10^{-6}$ *2
Trichloroethene (B2-C)	5	MCL	$1x10^{-6}$ *2
Vinyl Chloride (A)	2	MCL	$7x10^{-5}$ *2
1,4-Dichlorobenzene (C)	75	MCLG	$3x10^{-5}$ *2
Bis(2-Ethylhexyl)Phthalate (B2)	6	MCL	$1x10^{-6}$
Arsenic (A)	50	MCL	$9x10^{-4}$
Lead (B2)	15	NIPDWR*5	-
TOTAL:			**$1x10^{-3}$**

TABLE 1: INTERIM GROUNDWATER CLEANUP LEVELS - Continued

Noncarcinogenic Contaminants

Noncarcinogenic Contaminants of Concern (Class)	Interim Cleanup Level (µg/l)	Basis	Target Endpoint of Toxicity	Hazard Quotient *1
1,1-Dichloroethene (C)	7	MCL	liver	0.02
1,2-Dichloroethane (B2)	5	MCL	-	no data
1,2-Dichloroethene - cis (D)	70	MCLG	blood	0.19*2
1,2-Dichloroethene - trans (D)	100	MCLG	blood	0.14
Benzene (A)	5	MCL	-	no data
Chlorobenzene (D)	100	VPGQS*3	liver	0.14
Chloroform (B2)	6	VPGQS*3	liver	0.02
Methylene Chloride (B2)	5	MCL	liver	0.002
Tetrachloroethene (B2-C)	5	MCL	liver	0.01
Trichloroethene (B2-C)	5	MCL	liver	0.02*2
Vinyl Chloride (A)	2	MCL	-	no data
1,4-Dichlorobenzene (C)	75	MCL	liver	0.01*2
Bis(2-Ethylhexyl)Phthalate (B2)	6	MCL	liver	0.008
Arsenic (A)	50	MCL	skin	4.5
Lead (B2)	15	NIPDWR*5	CNS	no data
Manganese (D)	840	Hazard Potential	CNS	1.0
Thallium (D)	2	MCL	blood	0.7*4

TOTAL HAZARD INDEX:	**Liver**	**0.4**
	Blood	**1.0**
	CNS	**1.0**
	Skin	**4.5**

TABLE 1 FOOTNOTES:

*1 Based on consumption of 2 liters water/day, 350 days/year, for 30 years. Risk attributed to inhalation of VOCs from domestic use of contaminated water are estimated to be no more than risks attributed to their direct ingestion.

*2 Provisional risk estimates as compound undergoing toxicological review at time of ROD.

*3 Vermont Primary Groundwater Quality Standard - Enforcement Standard, Vermont Groundwater Protection Rule and Strategy, Subchapter 7, 12-702

*4 Based on reference dose for thallium sulfate

*5 National Interim Primary Drinking Water Regulation (NIPDWR)

While these interim cleanup levels are consistent with ARARs or suitable to be considered (TBC) criteria for groundwater, a cumulative risk that could be posed by these compounds may exceed EPA's goals for remedial action. Consequently, these levels are considered to be interim cleanup levels for groundwater until a final determination of protectiveness is made. The final determination of protectiveness will be based on the Interim Groundwater Cleanup Levels identified in the ROD, newly promulgated ARARs and modified ARARs which call into question the protectiveness of the remedy, and a risk assessment of residual contamination. A determination of protectiveness must be obtained at the completion of the remedial action at the points of compliance. The points of compliance are identified in Figure 10 (in Appendix A) and defined by monitoring wells W-05, W-03, W-03T, W-04S, W-04D, W-04T, W-25S1, W-25SI, W-25B and any new monitoring wells installed in this area.

B. Performance Levels for Surface Water and Sediment

Groundwater from the Landfill Area and former Lagoon Area discharges directly to the surface water and sediments. To evaluate the effectiveness of both the source control and groundwater cleanup measures, "performance levels" have been established for contaminants detected in surface water and sediments. These performance levels are based on State and Federal regulatory standards and/or utilized guidelines.

The Baseline Risk Assessment concluded that surface water and sediments may pose an unacceptable risk to some forms of wildlife. Therefore, the performance levels will also be used to determine if further action, at a later time, may be necessary to address any risks from surface

water and sediments.

Contaminants for which performance levels have been set include VOCs and metals. The cleanup and performance levels set for contaminants in surface water and sediments are listed in Tables 2 and 3, respectively.

TABLE 2: SURFACE WATER PERFORMANCE LEVELS

Contaminant of Concern	Performance Level (ppb)	Basis
1,1-Dichloroethlene	0.057	AWQC*1
Dichlorobromomethane	0.27	AWQC*1
Tetrachloroethene	0.8	AWQC*1
Trichloroethene	2.7	AWQC*1
Vinyl Chloride	2	AWQC*1
Aluminum	87	AWQC*1
Antimony	14	AWQC*1
Arsenic	0.018	AWQC*1
Cobalt	10	Risk Based*3
Copper	8	VTWQS*2
Cyanide	5.2	AWQC*1
Iron	1000	VTWQS*2
Lead	1.5	VTWQS*2
Manganese	4100	Risk Based*3
Mercury	0.012	AWQC*1
Nickel	108	VTWQS*2
Selenium	5	AWQC*1
Silver	1.2	AWQC*1
Thallium	1.7	AWQC*1
Zinc	58.9	VTWQS*2

FOOTNOTES FOR TABLE 2:

*1 Federal Clean Water Act - Ambient Water Quality Criteria (AWQC)
*2 State of Vermont Water Quality Standards (VTWQS), effective April 21, 1997
*3 Biesinger & Christensen, 1972

TABLE 3: SEDIMENTS PERFORMANCE LEVELS

Contaminant of Concern	Performance Level (ppm)	Basis*1
Arsenic	6	MOE
Cadmium	0.6	MOE
Chromium	26	MOE
Copper	16	MOE
Iron	20000	MOE
Lead	31	MOE
Manganese	460	MOE
Mercury	0.2	MOE
Nickel	16	MOE
Zinc	120	MOE

FOOTNOTES FOR TABLE 3:

*1 Ontario Ministry of the Environment (MOE) Sediment Quality Guidelines

C. Description of Remedial Components

The selected remedy for the site includes construction and maintenance of a multi-barrier cap over the Landfill Area, construction and maintenance of a cap over the soils in the Marshy Area, SVE/air sparging in the former Lagoon Area, institutional controls such as a deed notice, long term monitoring, operation and maintenance, and a review of the Site conditions every five years.

1. Multi-Barrier Cap Over the Landfill Area

Capping of the Landfill: The top slope of the Landfill Area will be graded at approximately three percent and the side slopes will be graded at three horizontal to one vertical (3:1) or flatter. No side slope will be graded more steeply than 3:1. Prior to any intrusive activity, erosion and sedimentation controls will be implemented to protect the swales, unnamed stream, and wetlands adjacent to and south of the Landfill Area. These controls will be inspected on a routine basis and maintained until soil stabilization is established.

Grading of the Landfill Area will take into account the adjacent swales, unnamed stream, and wetlands and minimize adverse effects to these areas. As grading of the landfill will require the loss of some wetlands, these wetlands will be replicated. The adjacent swales will be re-routed through a conduit beneath or adjacent to the landfill and Marshy Area cap. The exact approach will be determined during remedial design.

A continuous multi-layer (or "composite barrier") cap will be constructed over the Landfill Area. The cap will be designed, constructed, operated, and maintained to meet the performance requirements of the Resource Conservation and Recovery Act ("RCRA") Subtitle C regulations specified in ARARs Table 6-2 of Appendix B. The cap shall also be designed to meet the requirements of the following EPA technical guidance documents: "Final Covers on Hazardous Waste Landfills and Surface Impoundments" (EPA/530-SW-89-047, July 1989); "Construction Quality Management for Remedial Action and Remedial Design Waste Containment Systems" (EPA/540/R-92/073, October 1992); "QA and QC for Waste Containment Facilities" (EPA/600/R-93/182, September 1993) and Alternative Cap Design Guidance for Unlined Hazardous Waste Landfills, EPA Region I, September 30, 1997. The multi-barrier cap, from bottom to top, will achieve the following minimum requirements:

a. The base layer will be comprised of fill material. This material will be used to establish the base grade of the Landfill. Given the steep eastern slope of the Landfill, the base grade of this slope is expected to be a maximum of 3:1 (horizontal:vertical). This layer will be a minimum of six inches on the top slopes and a minimum of 6 inches on the 3:1 side slopes.

b. The bottom low hydraulic conductivity layer will be installed to minimize potential leakage through the low hydraulic conductivity geomembrane into the Landfill. This layer will act as a safeguard to the geomembrane, and will consist of compacted clay or a reinforced geosynthetic clay liner (GCL). This layer will have a hydraulic conductivity no greater than 1×10^{-7} cm/sec. Because the interface frictional resistance between the GCL and the geomembrane can be very low, particularly when the GCL becomes hydrated, this layer will only be utilized on areas having slopes less than 6:1 to ensure cap slope stability. On slopes greater than 6:1, a silty sand or sandy silt layer will be

placed beneath the geomembrane to enhance side slope stability. This soil is anticipated to be at least 12 inches in thickness and will have a hydraulic conductivity no greater than 1×10^{-4} cm/sec.

3. The top low hydraulic conductivity layer will be a synthetic barrier. This will be the main barrier which prevents water infiltration from entering the Landfill. This synthetic barrier will be a type of flexible geomembrane, 60 mil linear low density polyethylene (LLDPE) or equivalent, selected to prevent infiltration. The geomembrane on the slopes greater than 6:1 must be textured to minimize the potential for sliding.

d. A drainage layer will be installed above the synthetic barrier to prevent the ponding of water over the synthetic barrier. This layer will be composed of either 12 inches of sand or gravel with a minimum hydraulic conductivity of 1×10^{-1} cm/sec, or a geocomposite drainage material with an equivalent transmissivity of at least 3×10^{-4} m^2/sec.

e. The filter layer will be composed of nonwoven geotextile filter fabric to minimize fill material from clogging the granular drainage layer. A filter layer may not be required if the drainage layer is a geocomposite.

f. The top layer will be the vegetative cover. This layer will: (1) provide frost protection; (2) provide adequate water-holding capacity to attenuate rainfall infiltration to the drainage layer and to sustain vegetation through dry periods; and (3) provide sufficient thickness to allow for expected long-term erosion losses. The side slope will be terraced to minimize erosion of the multi-layer caps so that no more than 2 tons per acre per year of soil loss occurs. The thickness of the top layer is anticipated to be a minimum of 36 inches and will be based on local maximum frost depth penetrations. No deep-rooted plants will be allowed to become established on the capped area.

Air: A landfill gas management system will be implemented to insure that landfill gas does not build up beneath the caps or migrate laterally. In addition, a collection system may be needed to ensure that gases containing VOCs are properly treated prior to venting. The appropriate gas management system for the Landfill Area will be determined during design and will be based on the compliance criteria discussed below.

The point of compliance for air, consistent with the NCP, shall be the point(s) of the maximum exposed individual, considering reasonable expected use of the Site and surrounding area. The maximum exposed individuals include: (1) adjacent residents; (2) operation and maintenance personnel; and (3) individuals working at the Burgess Brothers facility. The gas collection system shall prevent an unacceptable risk of exposure to the maximum exposed individuals by controlling the release of landfill gas and treating collected

landfill gas, if necessary. Any gas collection and treatment system shall also comply with the federal and state air ARARs.

Surface Water/Wetlands: Surface water drainage controls will be constructed to minimize erosion of the caps. As determined by the final design, drainage channels will be installed in certain areas on the top and perimeter of the Landfill Area to control runoff. The Landfill Area will also be revegetated and the vegetation maintained to prevent erosion. Stormwater runoff from the Landfill will be managed in accordance with Vermont Water Quality Standards. The drainage system of the caps must be capable of handling a 25 year, 24 hour storm event.

Mitigation for wetlands impacts, which will be unavoidable due to necessary grading for the cap over the Landfill Area, will be accomplished consistent with State and Federal laws and guidance. Potential successful mitigation sites will be identified on the basis of topographic location, water source and transport, hydrodynamics, and site morphometry and soils. On-site and in-kind mitigation is preferable where achievable. Creation of any wetlands will need to take into account buffer zones and upland transition zones. A reference wetland may be identified and used to monitor and evaluate the impact of natural fluctuations on the mitigation success.

Long-term monitoring: Long-term monitoring of the surface water, shallow and deep groundwater, sediments, and residential water supplies will be performed. This monitoring will focus on establishing long-term trends in each media and confirming the restoration of the media. The Long-Term Monitoring Program will develop a method for tracking the restoration of the groundwater to confirm that the cleanup model was accurate. The Long-Term Monitoring Plan will also include goals to evaluate the effectiveness of the selected remedy.

Operation and Maintenance: The integrity of the cap, the gas collection system, surface water controls, and wetlands replication will also be monitored regularly and maintained to meet the objectives set forth in this ROD. Access to the capped areas will be controlled by the installation and maintenance of an industrial fence.

2. Cap Over the Soils in the Marshy Area

A cap over the marshy area soils will be constructed using either an impermeable or permeable barrier. The type of barrier will be based on factors such as constructability, maintenance, and ability to achieve remedial action objectives. The specific type of cap will be determined during design.

The cap will have the following cross-section, at a minimum, from top to bottom:

- A top layer of 24 inches that includes a minimum of four inches of topsoil
- An impermeable or permeable barrier
- A geocomposite drainage material, if necessary
- Two feet of soil as a subbase, if necessary

The cap will cover the approximately one-half acre area, minimizing potential contact with and providing a barrier against burrowing animals into the Marshy Area soils. To stabilize the topsoil cover, the area will be completed with approximately 4 inches of topsoil and hydroseed. To promote positive drainage from the area, existing soils will be shaped to achieve a minimum 3% grade toward drainage swales that will be constructed as part of the multi-barrier cap over the Landfill Area.

Requirements for landfill gas generation, surface water drainage, mitigation for wetlands impacted by the capping of the Marshy Area, and long-term maintenance will be the same as those requirements required for the capping of the Landfill Area.

3. SVE/Air Sparging in the Former Lagoon Area

An SVE system, in conjunction with an air sparging system, will be used to remediate soils in the Lagoon Area. The air sparging system will remediate saturated zone soils by forcing air into the groundwater beneath the lagoon area. This induced air flow will accelerate the volatilization of VOCs in the saturated zone, forcing them upwards into the soils in the unsaturated zone.

The SVE system will include air extraction wells to remove VOCs from the vadose zone soils. The VOCs will be removed by pulling air through the extraction wells producing a vacuum in the subsurface. VOCs contained within the vadose zone will migrate toward the air extraction wells, where they will be removed from the subsurface for treatment. Any condensate collected from system operation will be characterized and treated off-site, as appropriate.

Based on the results of a pilot study that was performed at the site, an SVE system consisting of six extraction wells and two vapor extraction units will be used to remediate the lagoon soils. The type of off-gas treatment for the SVE/air sparging system will be selected during pre-design. Installation and start-up of the system will be performed in such a way as to prevent, to the extent practicable, mobilization of DNAPL if it is present. Specific actions to address potential DNAPL will be defined during design.

It is anticipated that it would be necessary to operate the SVE/air sparging system continuously for a period of six months to two years, then periodically over a period of perhaps several years

to remove sufficient quantities of VOCs from the former Lagoon Cells. Once contaminant levels are adequately reduced, the system will be shut down for a period of time, then restarted to ensure contaminant levels do not increase. This shutting down and restarting process will be done several times over a period of time to ensure contaminant levels do not increase during periods of shut down. Over time, contaminant levels are expected to decrease to levels where the SVE/air sparging system can be discontinued. If DNAPL is determined to be present, however, the SVE/air sparging may not sufficiently remove the VOC source and an alternate treatment approach may be evaluated.

During operation, the system's performance will be monitored on a regular basis and adjusted as warranted by the performance data collected during operation.

4. Institutional Controls

Institutional controls will be established to protect the capped areas, to prevent the use of groundwater potentially impacted by the Site, and to inform future purchasers of the groundwater restrictions associated with the property. These institutional controls will consist of deed restrictions which are enforceable and reliable for long-term protection. Restrictions to protect the Landfill Area and Marshy Area caps will include controlling access to these areas and prohibiting excavation or other disturbances which may adversely affect the integrity of the caps.

The restrictions on use of groundwater will extend from the upgradient perimeter of the Landfill Area to at least all down gradient boundaries of the contaminant plume in both overburden and bedrock. The restrictions will also include a buffer zone around the contaminated area adequate to insure that new private or public water supply wells in the vicinity would not induce movement of the contaminants into uncontaminated areas or interfere with any remedial action at the Site. Groundwater use restrictions beyond the point of compliance will remain in effect until contaminant levels reach and maintain groundwater cleanup levels in both the downgradient bedrock and overburden aquifers. Groundwater use restrictions for the area upgradient of the point of compliance, including the Landfill Area, will remain in effect until contaminant levels reach and maintain groundwater cleanup levels in both the downgradient bedrock and overburden aquifers

5. Long-Term Monitoring

An environmental monitoring program will be implemented to evaluate the overall effectiveness of the remedy. The monitoring program will include selected groundwater monitoring wells, and surface water and sediment from the adjacent wetlands. In addition, groundwater in overburden and bedrock monitoring wells immediately downgradient of the Landfill Area will be monitored

on a regular basis to insure that the contaminant plume is not spreading into previously uncontaminated areas.

6. Operations and Maintenance

Operations and maintenance (O&M) activities will be conducted to insure the proper operation of the remedy. O&M will include periodic monitoring and necessary maintenance of the capped areas, maintenance of perimeter fence, landfill gas collection system and treatment system, if necessary, and any wetland replication areas associated with the remedy.

7. Five-Year Review

To the extent required by law, EPA will review the Site at least once every five years after initiation of the remedial action at the Site since hazardous substances, pollutants or contaminants will remain at the Site to assure that the remedial action continues to protect human health and the environment. EPA will also review the Site before the Site is proposed for deletion from the National Priorities List (NPL).

D. Contingency for Alternate Response Action

EPA has estimated that interim ground water cleanup levels will be obtained within 7 years after initiation of the source control components. Modeling of the contaminant source and plume to confirm the effectiveness of the selected remedy and to refine the predicted timeframe for achieving remedial action objectives will be done, at a minimum, two years after the initiation of the source control components and again prior to any five year review. If, at any time, EPA determines that the selected remedy is not effective and that remedial action objectives will not be attained within an acceptable timeframe, an alternate remedial action will be evaluated and implemented.

XI. STATUTORY DETERMINATIONS

The remedial action selected for implementation at the Burgess Brothers Superfund 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 and is cost effective. The selected remedy also partially satisfies the statutory preference for treatment which permanently and significantly reduces the mobility, toxicity or volume of hazardous substances as a principal element. Additionally, the selected remedy utilizes alternate treatment technologies or resource recovery technologies to the maximum extent practicable.

A. 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 ecological receptors through treatment, engineering controls, and institutional controls; more specifically, the SVE/air sparging system will treat and reduce the volume of hazardous substances at the Site. The installation of Landfill and Marshy Area caps will prevent ingestion and dermal contact of soil or solid waste. Capping will also prevent further transport of contaminants into the wetland and swales and unnamed stream sediments. Capping will effectively eliminate infiltration and thereby halt the leaching of contaminants from the soil and solid waste into groundwater. This will ultimately result in an improvement of downgradient groundwater quality and a reduction of the risks to human health associated with ingestion of contaminated groundwater. Institutional controls will be implemented to prevent the use of contaminated groundwater until cleanup goals have been met. Long-term monitoring will insure that the remedy remains protective of human health and the environment.

Moreover, the selected remedy will achieve potential human health risk levels that attain the 10^{-4} to 10^{-6} incremental cancer risk range and a level protective of noncarcinogenic endpoints, and will comply with ARARs. At the time that the Interim Groundwater Cleanup Levels identified in the ROD and newly promulgated ARARs and modified ARARs which call into question the protectiveness of the remedy have been achieved and have not been exceeded for a period of three consecutive years, a risk assessment shall be performed on the residual groundwater contamination to determine whether the remedial action is protective. This risk assessment of the residual groundwater contamination shall follow EPA procedures and will assess the cumulative carcinogenic and non-carcinogenic risks posed by ingestion of groundwater and inhalation of VOCs from domestic water usage. If, after review of the risk assessment, the remedial action is not determined to be protective by EPA, the remedial action shall continue or be modified until protective levels are achieved and have not been exceeded for a period of three consecutive years, or until the remedy is otherwise deemed protective. Once the remedy is deemed protective, the levels achieved shall constitute the final cleanup levels for this Record of Decision and shall be considered performance standards for this Site.

B. The Selected Remedy Attains ARARs

This remedy will meet or attain all applicable or relevant and appropriate federal and state environmental requirements that apply to the Site. A detailed listing of the specific ARARs can be found in Appendix B of this ROD. These tables give a brief synopsis of the ARARs and an explanation of the actions necessary to meet the relevant and appropriate actions at the Site. In addition to ARARs, the tables describe standards that are not ARARs but are To-Be-Considered (TBC) with respect to remedial actions. The specific ARARs include the following:

Chemical-Specific

Medium	Requirements	Status
Groundwater	Vermont Groundwater Protection Regulations (EPR 12-702)	Applicable, for Enforcement Standards
	Vermont Health Advisories	To Be Considered
	Federal Safe Drinking Water Act - Maximum Contaminated Levels (MCLs) for Organic and Inorganic Chemicals (40 CFR 141 Subparts B, G and I)	Relevant and Appropriate
	Federal Safe Drinking Water Act - Maximum Contaminant Level Goals (MCLGs) for Organic and Inorganic Chemicals (40 CFR 151 Subpart F)	Relevant and Appropriate if non-zero
	EPA Reference Doses (RfDs) and EPA Carcinogen Assessment Group Potency Factors	To Be Considered
	EPA Health Advisories	To Be Considered

Action-Specific

Medium	Requirements	Status
Air	Vermont Air Pollution Control Regulations (10 VSA Section 551 et. seq.; EPR 5-101, 5-211, 5-231 to 5-252, 5-253.20, 5-261, 5-301 to 5-311, 5-501 to 5-502, and 5-1010)	Applicable
	Federal RCRA Air Emission Standards for Equipment Leaks, 40 CFR Part 264, Subpart BB	Applicable, if threshold limits are exceeded
	Federal RCRA Air Emission Standards for Process Vents, 40 CFR Part 264, Subpart AA	Applicable, if threshold limits are exceeded
	Federal Clean Air Act - Non-Methane Organic Compounds (40 CFR Part 60 Subpart WWW)	Relevant and appropriate, if threshold limits are exceeded

Action-Specific (continued)

Groundwater	Vermont Groundwater Protection Regulations (10 VSA Chapter 48; EPR 12-704 and 12-705)	Applicable
Surface Water	Vermont Water Quality Standards (10 VSA Chapter 47; EPR Sections 1 - 04, 2-01, 2-02, 2-03, 2-05, 3-01, 3-03, 3-04, and Appendix C and D)	Relevant and Appropriate
	Federal Clean Water Act - Ambient Water Quality Criteria	Relevant and Appropriate
Sediment	Ontario Ministry of the Environment Sediment Quality Guidelines	To Be Considered
Landfill Material	Federal RCRA Subtitle C, Regulations, 40 CFR Part 264 Subpart N - Landfills, Section 264.310*	Relevant and Appropriate
	Federal RCRA Subtitle C Regulations, 40 CFR Part 264 Subpart B - General Facility Standards, Section 264.19*	Relevant and Appropriate
	Federal RCRA Subtitle C Regulations, 40 CFR Part 264 Subpart F - Releases from Solid Waste Management Units, Sections 264.95, 264.96(a) and (c), 264.97, 264.98 and 264.99*	Relevant and Appropriate
	Federal RCRA Subtitle C Regulations, 40 CFR Part 264 Subpart G - Closure and Post Closure, Sections 264.111, 264.114, and 264.177*	Applicable
	USEPA Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments (EPA/530-SW-89-047)	To Be Considered
	USEPA Technical Guidance Document: Construction Quality Management for Remedial Action and Remedial Design Waste Containment Systems (EPA/540/R-92/073, October 1992)	To Be Considered
	USEPA Technical Guidance Document: QA and QC for Waste Containment Facilities (EPA/600/R-93/182, September 1993)	To Be Considered
	USEPA Technical Guidance Document: Alternative Cap Design Guidance for Unlined Hazardous Waste Landfills, EPA Region I, September 30, 1997.	To Be Considered

Notes: * RCRA requirements are made effective by the Vermont Hazardous Waste Regulations (EPR7-502).

Location-Specific

Medium	Requirements	Status
Wetlands	Federal Executive Order on Protection of Wetlands (E.O. 11990, 40 CFR Part 6, Appendix A)	Applicable
	Federal Fish and Wildlife Coordination Act (16 USC 661 et seq.) 40 CFR Part 6	Applicable
	Federal Clean Water Act (33 USC 1344), US Army Corps of Engineers Nationwide Permit Program (33 CFR Part 330), and Federal Guidelines for Specification of Disposal Sites" (40 CFR Part 230)	Applicable

Principal Hazardous Waste ARARs

RCRA regulations and the current State of Vermont Hazardous Waste Regulations are ARARs for this remedy. In those limited instances where these regulations may conflict, the more stringent regulation will be followed.

Principal ARARs for Groundwater Protection

It has been determined by EPA that the groundwater in the overburden and bedrock aquifers beyond the points of compliance is a potential future drinking water source. While Maximum Contaminant Levels (MCLs) and non-zero Maximum Contaminant Level Goals (MCLGs) promulgated under the federal Safe Drinking Water Act are not applicable to groundwater, they are relevant and appropriate to groundwater cleanup because the groundwater may be used in the future as a drinking water source. The NCP requires that usable groundwaters be restored to their beneficial uses whenever practicable. See 40 CFR 300.430(a)(iii)(F).

Primary Enforcement Groundwater Standards, contained in the State of Vermont Groundwater Protection Act Regulations are applicable. The aquifer is classified by the State of Vermont as a Class III aquifer, suitable as a source of water for individual domestic drinking water supply, irrigation, agricultural use and industrial/commercial use. A management objective for Class III groundwaters is compliance with the Vermont Groundwater Standards.

Principal ARARs/TBCs for Wetland Protection

The federal Clean Water Act and Executive Order 11990 (Protection of Wetlands) are ARARs for the portion of the remedy constructed in or affecting the wetlands at the Site. These rules (i) prohibit activity that adversely affects wetlands unless there is no practicable alternative to such adverse effect, and (ii) require that all practicable measures be taken to minimize harm to wetlands. Because of the landfill's proximity to the wetlands and because soils within the Marshy Area are contaminated, it will be necessary to cap a portion of the wetlands that are adjacent to the Landfill Area. The capping and the resulting filling of the wetlands are required for source control for all alternatives considered. The No Action alternative does not require the filling of wetlands, but that alternative is not protective of human health and the environment. Alternatives to the filling – such as excavating the wetlands, replacing the excavated area with clean soil, then restoring the wetland – were considered and rejected. The RI included a delineation and assessment of the wetlands. The FS contains more detail regarding the necessity of filling the Marshy Area wetland and alternatives considered.

Construction will be conducted to avoid or minimize any damage to flora and fauna within the portions of the wetland that will not be capped. Measures will also be taken in constructing the cap to control erosion and runoff. Any wetlands lost will be replaced through replication efforts, either off-site or on-site. EPA will coordinate any wetlands replication with U.S. Fish and Wildlife and with the Vermont DEC. The wetlands in the Marshy Area are Class III wetlands and are not protected by State regulations.

Accordingly, EPA has determined that there is no practicable alternative to filling wetlands in a portion of the Marshy Area and that the selected remedy includes all practicable measures to minimize harm to wetlands. EPA notified the public of the wetlands impacts in a Progress Update in April 1998 and in the Proposed Plan. EPA did not receive any comments regarding wetlands during the public comment period.

Principal ARARs for Air Quality Protection

State Air Pollution Control Regulations establish air quality standards and allowable discharges, list hazardous contaminants, and set Hazard Limiting Values and Action Limits. RCRA requirements for air emissions from process vents and equipment leaks are also included as potential ARARs. The remedy, specifically the VOC emissions from the SVE/air sparging system, will attain these ARARs. Federal air regulations also require the collection, control, and monitoring of Non-Methane Organic Compounds (NMOCs) such as benzene and ethane from landfills. The landfill gas venting system will be designed to satisfy these performance standards, if threshold limits are exceeded. Landfill construction will address State requirements

regarding particulates and odors through engineering controls.

Principal ARARs for Surface Water Protection

Several different ARARs address the protection of surface water bodies (including wetlands which are addressed separately in this section). ARARs include the Vermont Water Quality Standards and the Ambient Water Quality Criteria (AWQC) pursuant to the Clean Water Act. Source control measures will control erosion, runoff, and contaminant migration and thereby improve surface water quality over time. Water quality standards will be used to measure the effectiveness of source control measures.

C. The Selected Remedial Action is Cost-Effective

In the Agency's judgment, the selected remedy (Alternative 2) is cost effective, i.e., the remedy affords overall effectiveness proportional to its costs. In selecting this remedy, once the alternatives were identified that are protective of human health and the environment and that attain 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. The relationship of the overall effectiveness of the selected remedial alternative was determined to be proportional to its costs.

The present worth costs of this remedial alternative, as presented in the Proposed Plan, are:

Estimated Capital Cost	*$1,633,000*
Estimated Operations and Maintenance Cost:	*$1,941,000*
Estimated Total Cost:	*$3,600,000*

For comparison, the estimated total costs for the other alternatives that meet the threshold criteria for protection of human health and the environment and compliance with ARARs are:

Alternative 3	$6,000,000
Alternative 4	$5,800,000

The selected remedy (Alternative 2) is the least expensive of those alternatives that meet the threshold criteria. The additional costs for Alternative 3 are related to extraction and treatment of groundwater down gradient of the landfill. Because extraction and treatment of the down gradient plume would not appreciably reduce the time for groundwater restoration to drinking

water standards, EPA believes that these additional costs are not justified.

Alternative 4 includes the construction of a treatment wall to restrict contaminant transport into the shallow groundwater aquifer. Restricting contaminant transport, however, will primarily be accomplished through the source control components included for all Alternatives, specifically, capping the landfill and by performing SVE/air sparging in the former Lagoon Area. The treatment wall would not provide significant additional benefits in restricting contaminant transport beyond these source control measures. The treatment wall would also not appreciably reduce the time required for groundwater restoration to drinking water standards. For these reasons, EPA believes that additional costs for the construction of a treatment wall are not justified.

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

Once the Agency reviewed those alternatives that attain ARARs and that are protective of human health and the environment, EPA identified which alternatives utilize 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.

In evaluating the alternatives, the presumptive remedy for municipal landfills, which acknowledges removal of the landfill contents as an impractical alternative, was used as a guidance document. Consistent with the presumptive remedy guidance document, containment was identified as the presumptive approach for source control. Treatment options for areas other than hot spots were determined not to be cost effective as only insignificant risk reduction could be obtained from significant increases in remediation costs.

All of the alternatives (except the No Action Alternative) have the same approach for treatment of the contaminant source. They all provide long-term effectiveness and permanence by capping the Landfill Area and Marshy Area to prevent exposure to contaminated soil and solid waste and by performing SVE/air sparging in the Lagoon Area soils to treat the hot spot. Both capping and SVE/air sparging will prevent continued migration of contaminants to groundwater, surface

water, and sediments in the long-term. The differences in the alternatives, and what has been evaluated in the balancing test, is the way groundwater would be remediated.

The selected remedy (Alternative 2) utilizes natural attenuation for groundwater remediation which offers the same degree of long-term effectiveness and permanence as the other alternatives. Natural attenuation also offers a similar level of reduction of toxicity, mobility and volume of contaminants. The short-term effectiveness of achieving drinking water standards of the selected remedy (7 years) is relatively equal to that of the other alternatives (2 years) and EPA considers these time frames to be reasonably similar. Of all the alternatives, the selected remedy is the easiest to implement and has the lowest costs.

Both the community and the State of Vermont support Alternative 2 (natural attenuation) as the selected remedy.

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

All of the alternatives offer a similar degree of reduction of toxicity, mobility or volume through treatment within a reasonably similar time frame. Alternative 2 will achieve drinking water standards within 7 years, Alternatives 3 and 4 achieve drinking water standards within 2 years. Both Alternatives 3 and 4, however, would create additional wastes. Alternative 3 would generate sludge as a by-product of the water treatment process and Alternative 4 would require replacement and disposal of the granular iron contents of the treatment wall once metal precipitation and biofouling affected performance.

As stated previously, the Burgess Brothers landfill is not primarily a municipal landfill, however, it did receive municipal type waste co-disposed with industrial waste and is characteristically similar. Because of this, EPA's guidances on CERCLA Municipal Landfill Sites have been considered in determining the selection of a remedy.

CERCLA and the NCP set forth the process by which remedial actions are evaluated and selected. Because many CERCLA municipal landfill sites share similar characteristics, they lend themselves to remediation by similar technologies. EPA has established a number of expectations as to the types of technologies that should be considered and alternatives that should be developed; they are listed in the National Contingency Plan (40 CFR 300.430 (a) (1) and the EPA guidance document for municipal landfill sites "Conducting Remedial Investigation/Feasibility Studies for CERCLA Municipal Landfill Sites" EPA/540/P-91/001).

For CERCLA municipal landfill sites, it is expected that:

1. The principal threats posed by a site will be treated wherever practical, such as in the case of remediation of a hot spot.

2. Engineering controls such as containment will be used for waste that poses a relatively low long-term threat or where treatment is impractical.

3. A combination of methods will be used as appropriate to achieve protection of human health and the environment. An example of combined methods for municipal landfill sites would be treatment of hot spots in conjunction with containment of the landfill contents.

4. Institutional controls such as deed restrictions will be used to supplement engineering controls, as appropriate, to prevent exposure to hazardous wastes.

5. Innovative technologies will be considered when such technologies offer the potential for superior treatment performance or lower costs for performance similar to that of demonstrated technologies.

6. Groundwater will be returned to beneficial uses whenever practical, within a reasonable time, given the particular circumstances of the site.

The remedy selected in this ROD partially satisfies the preference set forth in CERCLA and the NCP for treatment. Potential exposure to and ingestion of contaminated groundwater is the principal threat posed by the site. The selected remedy is a containment remedy which includes the treatment of hot spots as well as engineering controls supplemented by institutional controls. EPA has determined that capping, hot spot remediation, and natural attenuation will be effective in the restoration of groundwater and that a more aggressive groundwater treatment strategy would not provide additional benefits at this site.

The selected remedy partially satisfies the statutory preference for treatment as a principal element by treating the soils in the Lagoon Area which result in the removal of contaminants. This action will reduce the toxicity, mobility, and volume of the contaminants in the source area. The remaining contents of the landfill will be contained under the multi-layer cap.

XII. DOCUMENTATION OF SIGNIFICANT CHANGES

EPA presented a Proposed Plan that described the preferred alternative for remediation of the Site on June 15, 1998. EPA did not receive any significant comments on the proposed remedy.

EPA has changed performance levels for some constituents in surface water from those presented in the Proposed Plan. Specifically, copper, lead, nickel, and zinc have performance levels of 6.5, 1.3, 87.7, and 58.9 ppb, respectively. These values are specified in Table 2 of this ROD and have been changed based on an assumed water hardness of 50 mg/l $CaCO_3$.

The performance level for silver has also changed to 1.2 ppb. This value is based on EPA's Ambient Water Quality Criteria.

The selected remedy in this ROD is consistent with the proposed plan.

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, Baseline Risk Assessment and Feasibility Study Report 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 Burgess Brothers Superfund Site. A copy of the declaration of concurrence is attached as Appendix C.

APPENDIX A

TABLES AND FIGURES

TABLE 1

Summary of Previous Investigation Activities

Date	Lead Organization	Purpose/Activity
6/1976	VTAEC	Site inspection; collected three surface water samples and one leachate sample.
1984	VTAEC	Sampled surface water, leachate, and private drinking water supplies.
1985	VTAEC	Completed Preliminary Assessment and Site Investigation (PASI).
1985	Eveready	Installed groundwater monitoring wells and test pits to characterize the shallow subsurface conditions. Sampled groundwater, soil, and surface water.
2/89	EPA	Site inspection; sampled surface water.
3/89	EPA	Site listed on NPL.
3/89	Eveready	Sampled existing monitoring wells, collected surface water, and soil samples
4/89	EPA	Conducted soil gas survey, soil sampling in lagoon and marshy areas, and surface water sampling.
5/91	VTDEC	Sampling of private drinking water supplies.
12/91-1/92	Settling Parties	Conducted Limited Field Investigation consisting of records review, ground-penetrating radar, air sampling and soil vapor screening.
9/92-8/94	Settling Parties	Conducted Phase 1A and 1B RI consisting of seismic refraction survey, soil gas sampling, installation of test pits, air monitoring, installation of monitoring wells and an ecological assessment. In addition, sampled and analyzed soils, surface water, sediments, leachate/seeps and groundwater.
11/94-11/96	Settling Parties	Long Term Monitoring Program (LTMP) sampling of groundwater, surface water, and leachate sampling. Groundwater sampling conducted using conventional purging and sampling techniques.
6/96-2/97	Settling Parties	Supplemental RI conducted to re-evaluate groundwater sampling results found during the RI and LTMP sampling.
3/1998	Settling Parties	Completed Feasibility Study for the Site.

TABLE 2

CONTAMINANTS OF POTENTIAL CONCERN FOR EACH MEDIUM AT THE BURGESS BROTHERS SUPERFUND SITE

VOCs	Shallow Ground Water	Deep Ground Water	Surface Soils	Surface and Subsurface Soils	Surface Water	Sediments	Leachate	Air
Benzene	X							
2-Butanone				X				
Carbon Disulfide					X			
Carbon tetrachloride								X
Chlorobenzene	X							
Chloroform	X	X						
1,4-Dichlorobenzene	X						X	
1,2-Dichloroethane	X							
1,1-Dichloroethene	X				X			
1,2-Dichloroethene (total)	X				X		X	
Methylene Chloride	X							
4-Methyl-2-pentanone				X	X			
Tetrachloroethene	X				X		X	X
Trichloroethene	X				X		X	X
ayl Chloride	X		X	X	X	X		
BN								
Acenaphthylene				X				
Benzo(a)anthracene			X	X				
Benzo(a)pyrene			X	X				
Benzo(b)fluoranthene			X	X				
Bis(2-ethylhexyl)phthalate	X	X						
Indeno(1,2,3-cd)pyrene			X	X				
Phenanthrene			X	X				
Metals								
Aluminum					X	X	X	
Antimony					X		X	
Arsenic	X		X	X	X	X		
Barium							X	
Beryllium			X	X		X	X	
Iron	X	X	X	X	X	X	X	
Lead			X	X	X	X	X	
Manganese	X	X	X	X	X	X	X	
Thallium	X							

SUMMARY OF CARCINOGENIC RISK ESTIMATED FOR THE BURGESS BROTHERS SITE

Scenario	Receptor	Present/ Future		Total Risk Average (Central Tendency)	Reasonable Maximum
SHALLOW GROUND WATER					
Ingestion	Adjacent Resident	F		1E-03*	7E-02*
DEEP GROUND WATER					
Ingestion	Adjacent Resident	F		2E-07	1E-06
SURFACE SOILS					
Ingestion	Youth Trespasser	P/F		5E-07	2E-06
Dermal Contact	Youth Trespasser	P/F		NC[1]	NC[1]
			Total	5E-07	2E-06
Ingestion	Adjacent Resident	F		2E-05	1E-04
Dermal Contact	Adjacent Resident	F		NC[1]	NC[1]
			Total	2E-05	1E-04
SURFACE AND SUBSURFACE SOILS					
Inge	Excavation Worker	F		2E-07	1E-06
Derm... Contact	Excavation Worker	F		NC[1]	NC[1]
			Total	2E-07	1E-06
SURFACE WATER					
Ingestion	Youth Trespasser	P/F		NC[2]	NC[2]
Dermal Contact	Youth Trespasser	P/F		2E-07	2E-06
			Total	2E-07	2E-06
SEDIMENTS					
Ingestion	Youth Trespasser	P/F		7E-08	2E-07
Dermal Contact	Youth Trespasser	P/F		NC[1]	NC[1]
			Total	7E-08	2E-07

*Exceeds 10^{-4} risk

NC[1] - Not calculated. EPA guidance calls for assessment of dermal exposure of cadmium, PCBs, and dioxins only, none of which are soil COCs at the Burgess Brother's Site.

NC[2] - Not calculated because drainage swale surface water bodies are too shallow for swimming, thus limiting the likelihood of incidental ingestion

TABLE 4

SUMMARY OF NONCARCINOGENIC HAZARD INDICES (HIs) ESTIMATED FOR THE BURGESS BROTHERS SITE

Scenario	Receptor	Present/ Future	Chronic HI Average (Central Tendency)	Reasonable Maximum
SHALLOW GROUND WATER				
Ingestion	Adjacent Resident	F	2E+01*	3E+02
DEEP GROUND WATER				
Ingestion	Adjacent Resident	F	6E-02	4E-01
SURFACE SOILS				
Ingestion	Youth Trespasser	P/F	2E-03	1E-02
Dermal Contact	Youth Trespasser	P/F	NC[1]	NC[1]
		Total	2E-03	1E-02
Ingestion	Adjacent Resident (child)	F	6E-01	6E-01
	Adjacent Resident (adult)	F	2E-02	7E-02
Dermal Contact	Adjacent Resident (child)		NC[1]	NC[1]
	Adjacent Resident (adult)		NC[1]	NC[1]
SURFACE AND SUBSURFACE SOILS				
Ingestion	Excavation Worker	F	5E-02	2E-01
Dermal Contact	Excavation Worker	F	NC[1]	NC[1]
		Total	5E-02	2E-01
SURFACE WATER				
Ingestion	Youth Trespasser	P/F	NC[2]	NC[2]
Dermal Contact	Youth Trespasser	P/F	2E-03	3E-02
		Total	2E-03	3E-02
SEDIMENTS				
Ingestion	Youth Trespasser	P/F	1E-03	3E-03
Dermal Contact	Youth Trespasser	P/F	NC[1]	NC[1]
		Total	1E-03	3E-03

*HI and/or HQ exceeds one (1)

NC[1] - Not calculated. EPA guidance calls for assessment of dermal exposure of cadmium, PCBs, and dioxins only.

NC[2] - Not calculated because drainage swale surface water bodies are too shallow for swimming, thus precluding incidental ingestion.

BLE 5

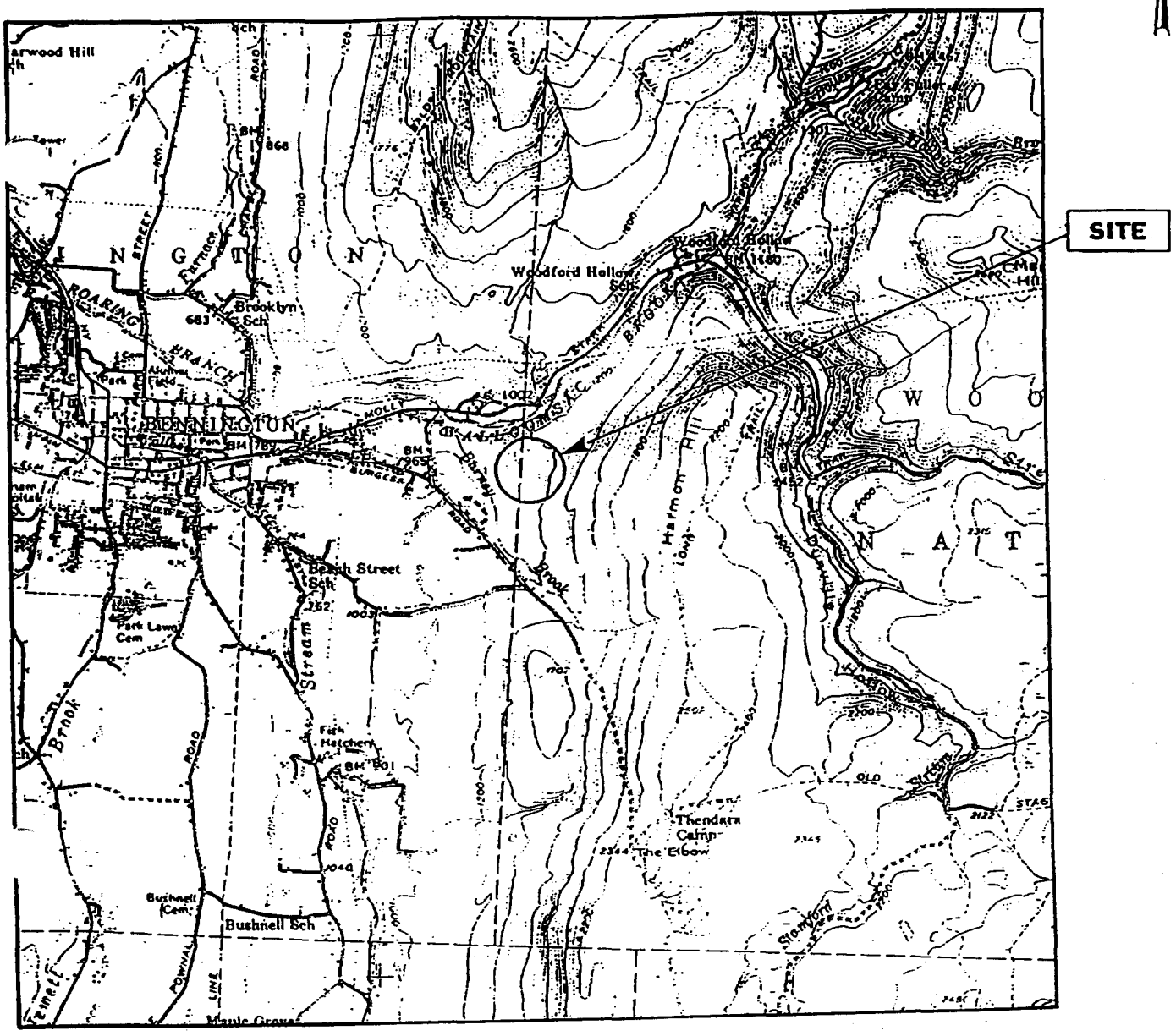
BURGESS BROTHERS SUPERFUND SITE
COMPARATIVE ANALYSIS SUMMARY

Alternative	Overall Protectiveness	Compliance with ARARs	Long-Term Effectiveness & Permanence
1. No Action	Human Health: No reduction of risks associated with direct contact with soil and ingestion of groundwater. Ecological: No reduction of risks associated with leachate or marshy area soils.	Will not achieve Federal or State groundwater ARARS. Will not achieve State hazardous waste management ARARs. Will not achieve Federal or State wetlands ARARs.	Residual risks unchanged. No long-term effectiveness.
2. Capping and Lagoon Treatment/Natural Attenuation	Human Health: Reduces risks associated with direct contact with soil and ingestion of groundwater. Institutional controls reduce risks associated with ingestion of groundwater. Ecological: Reduces risks of contact with Marshy Area soils and leachate.	Will achieve Federal and State groundwater ARARS. Will achieve State hazardous waste management ARARs. Will achieve Federal and State wetlands ARARs.	Residual risks reduced. Capping and groundwater extraction reliable and effective for long term control. SVE/air sparging and provide permanence by reducing source. Long term improvement of ground water quality.
3. Capping and Lagoon Treatment/Pump and Treat	Human Health: Reduces risks associated with direct contact with soil and ingestion of groundwater. Institutional controls reduce risks associated with ingestion of groundwater. Ecological: Reduces risks of contact with Marshy Area soils and leachate	Will achieve Federal and State groundwater ARARS. Will achieve State hazardous waste management ARARs. Will achieve Federal and State wetlands ARARs.	Residual risks reduced. Capping and groundwater extraction reliable and effective for long term control. SVE/air sparging and provide permanence by reducing source. Long term improvement of ground water quality.
4. Capping and Lagoon Treatment/Treatment Wall	Human Health: Reduces risks associated with direct contact with soil and ingestion of groundwater. Institutional controls reduce risks associated with ingestion of groundwater. Ecological: Reduces risks of contact with Marshy Area soils and leachate	Will achieve Federal and State groundwater ARARS. Will achieve State hazardous waste management ARARs. Will achieve Federal and State wetlands ARARs.	Residual risks reduced. Capping and groundwater extraction reliable and effective for long term control. SVE/air sparging and provide permanence by reducing source. Long term improvement of ground water quality.

TABLE 5

BURGESS BR[illegible]ERS SUPERFUND SITE
COMPARAT[illegible] ANALYSIS SUMMARY

Alternative	Reduction of Toxicity, Mobility, and Volume (TMV) through Treatment	Short-Term Effectiveness	Implementability	Estimated Costs
1. No Action	No reduction of TMV through treatment.	Lowest potential risk to community and workers. No impact to wetlands. No short term exposure protection Minimal implementation time.	Easiest to implement.	$930,000
2. Capping and Lagoon Treatment/Natural Attenuation	Reduction of toxicity of lagoon soils through treatment. Reduction of mobility through capping. Reduction of TMV of groundwater through treatment. Groundwater treatment does not generate any additional wastes.	Minimal short-term risks to workers and community during cap construction . Some wetlands impacts - will require replacement. Short term exposure protection through capping and institutional controls. 12 month implementation time.	Capping, SVE/air sparging and natural attenuation easy to implement. Institutional controls require cooperation of landowners.	$3,600,000
3. Capping and Lagoon Treatment/Pump and Treat	Reduction of toxicity of lagoon soils through treatment. Reduction of mobility through capping. Reduction of TMV of groundwater through treatment, however, wastes would be generated as part of the treatment process (sludge).	Minimal short-term risks to workers and community during cap construction . Some wetlands impacts - will require replacement. Short term exposure protection through capping and institutional controls. 2 year implementation time.	Capping and SVE/air sparging easy to implement. Institutional controls require cooperation of landowners. Specialty contractors required to construct GW collection trench. May be problems with discharge of treated GW.	$6,000,000
4. Capping and Lagoon Treatment/Treatment Wall	Reduction of toxicity of lagoon soils through treatment. Reduction of mobility through capping. Reduction of TMV of groundwater through treatment, however, wastes would be generated as part of the treatment process (replacement of spent granular iron)	Minimal short-term risks to workers and community during cap construction . Some wetlands impacts - will require replacement. Short term exposure protection through capping and institutional controls. 2 year implementation time.	Capping and SVE/air sparging easy to implement. Institutional controls require cooperation of landowners. Specialty contractors required to construct treatment wall.	$5,800,000


SITE
Woodford Hollow
Brooklyn Sch
BENNINGTON
Beech Street Sch
Park Lawn Cem
Fish Hatchery
Bushnell Cem
Bushnell Sch
Maple Grove
Thendara Camp
The Elbow
Harmon Hill
Stream
Brook
ROAD
STREET
BRANCH
ROARING
OLD
STAGE

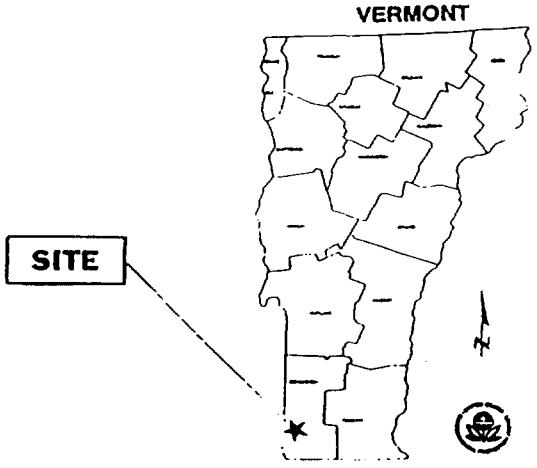
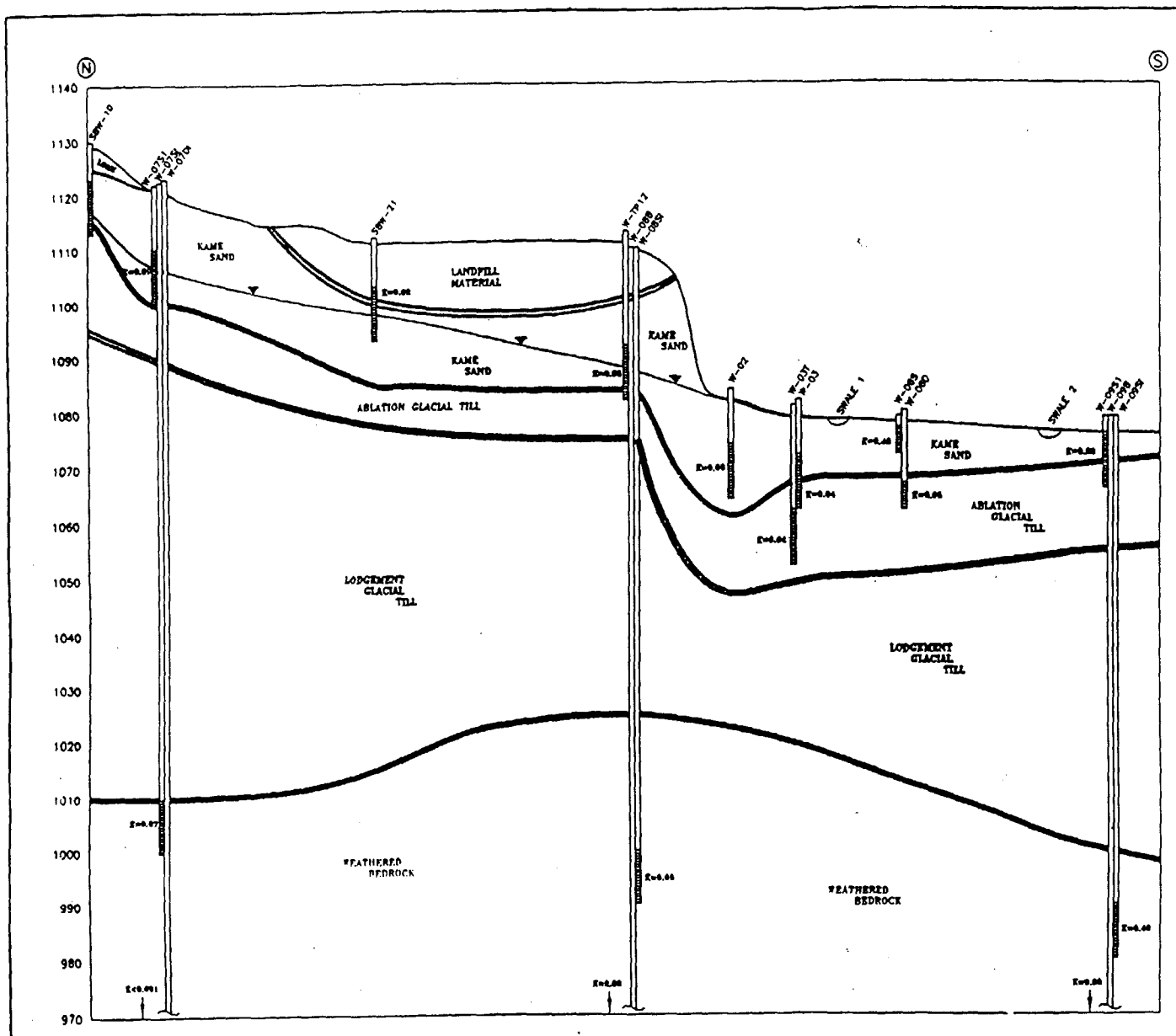

VERMONT
SITE

FIGURE 2



LEGEND

HORIZONTAL VELOCITIES

KAME SANDS	10–30	FT/YR
TILL	7	FT/YR
WEATHERED BEDROCK	5–8	FT/YR

AVERAGE HYDRAULIC CONDUCTIVITIES

	FT/D	CM/SEC
MARSHY AREA KAME	0.15	5.3×10^{-4}
LANDFILL AREA KAME	0.12	4.2×10^{-4}
LANDFILL MATERIALS	0.1	3.5×10^{-5}
ABLATION TILL	0.05	1.8×10^{-5}

K = HYDRUALIC CONDUCTIVITY (FT/D)

SCALE

VERTICAL SCALE	1"=20'
HORIZONTAL SCALE	1"=100'

- LANDFILL MATERIAL
- KAME SAND
- ABLATION GLACIAL TILL
- LODGEMENT GLACIAL TILL
- WEATHERED BEDROCK

ERM-New England, Inc.

205 PORTLAND STREET – BOSTON, MA 02114 (617) 742-6228

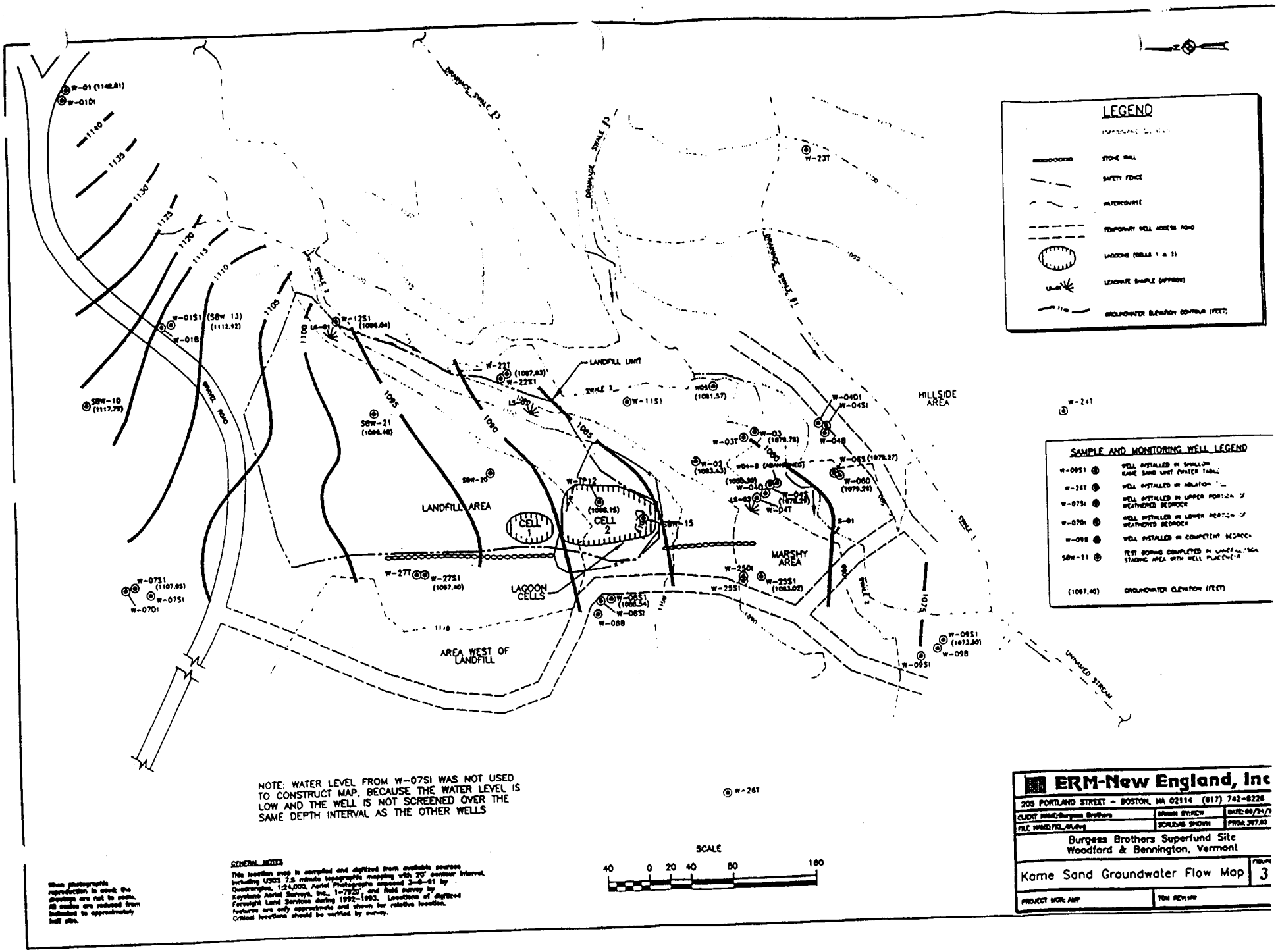
CLIENT NAME: Burgess Brothers | DRAWN BY: [illegible] | DATE: 02/19/9[illegible]

FILE NAME: SUPRL_05.dwg | SCALE: AS SHOWN | PROJ: 397.A3

Burgess Brothers Superfund Site
Woodford & Bennington, Vermont

North–South Geologic Cross Section | FIGURE 2

PROJECT MGR: [illegible] | TECH. REV: [illegible]



NOTE: WATER LEVEL FROM W-07SI WAS NOT USED TO CONSTRUCT MAP, BECAUSE THE WATER LEVEL IS LOW AND THE WELL IS NOT SCREENED OVER THE SAME DEPTH INTERVAL AS THE OTHER WELLS

SCALE

40 0 20 40 80 160

When photographic reproduction is used, the drawings are not to scale. All scales are reduced from indicated to approximately half size.

GENERAL NOTES

This location map is compiled and digitized from available sources including USGS 7.5 minute topographic mapping with 20' contour interval, Orthophotos, 1:24,000, Aerial Photographs exposed 3-6-81 by Keystone Aerial Surveys, Inc., 1=7920', and field survey by Foresight Land Services during 1992-1993. Locations of digitized features are only approximate and shown for relative location. Critical locations should be verified by survey.

ERM-New England, Inc

205 PORTLAND STREET - BOSTON, MA 02114 (617) 742-8228

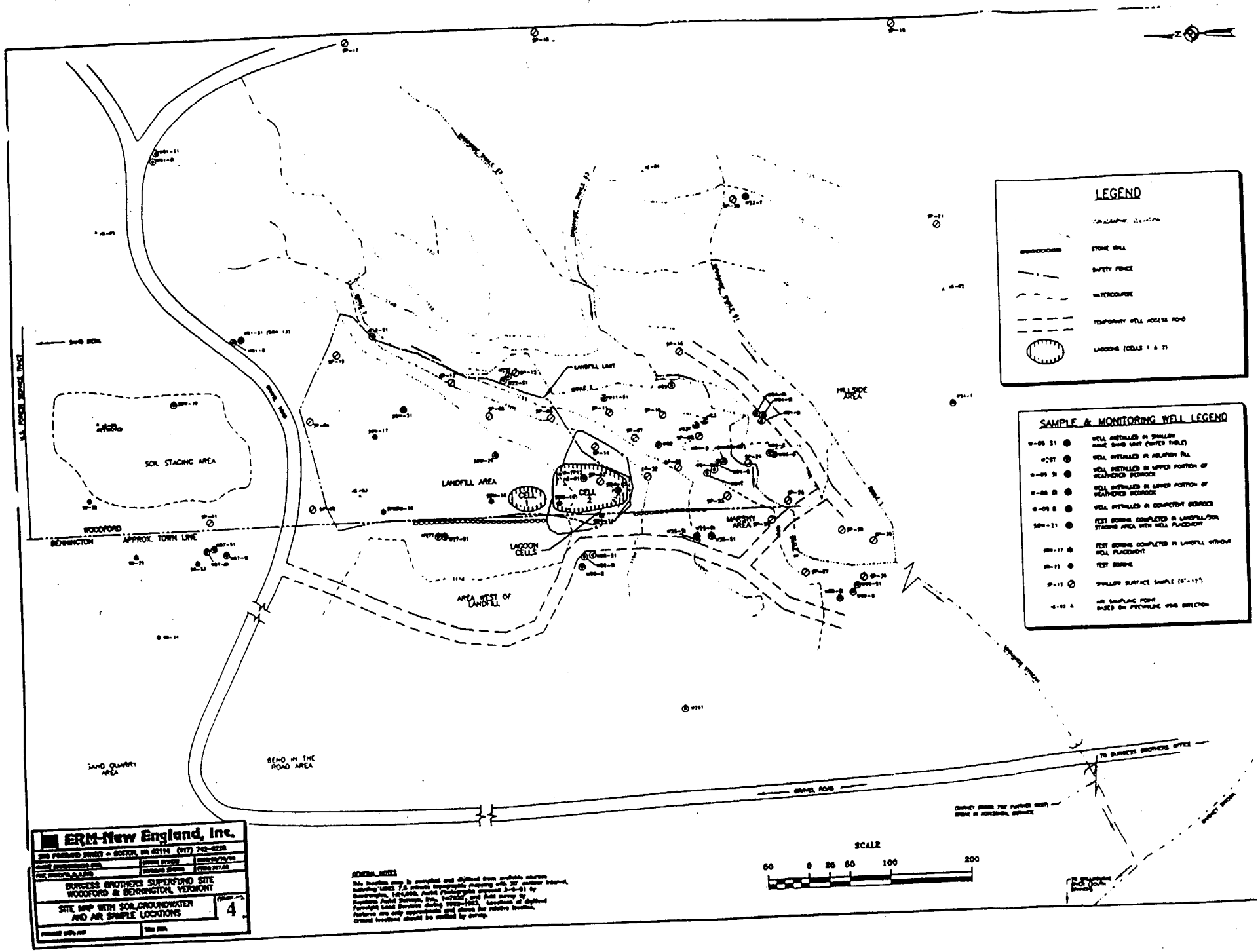
CLIENT NAME: Burgess Brothers	DRAWN BY: RCW	DATE: 09/24/
FILE NAME: FIG_MAP.dwg	SCALE: AS SHOWN	PROJ: 397.03

Burgess Brothers Superfund Site
Woodford & Bennington, Vermont

Kame Sand Groundwater Flow Map — FIGURE 3

PROJECT MGR: AHP — TOM REV: HV

FIGURE 4


LEGEND
STONE WALL
SAFETY FENCE
WATERCOURSE
TEMPORARY WELL ACCESS ROAD
LAGOONS (CELLS 1 & 2)
SAMPLE & MONITORING WELL LEGEND
WELL INSTALLED IN SHALLOW SAND SAND UNIT (WATER TABLE)
WELL INSTALLED IN ABUTTON FILL
WELL INSTALLED IN UPPER PORTION OF WEATHERED BEDROCK
WELL INSTALLED IN LOWER PORTION OF WEATHERED BEDROCK
WELL INSTALLED IN COMPETENT BEDROCK
TEST BORING COMPLETED IN LANDFILL/SOIL STAGING AREA WITH WELL PLACEMENT
TEST BORING COMPLETED IN LANDFILL WITHOUT WELL PLACEMENT
TEST BORING
SHALLOW SURFACE SAMPLE (0"-12")
AIR SAMPLING POINT BASED ON PREVAILING WIND DIRECTION
SOIL STAGING AREA
LANDFILL AREA
CELL 1
CELL 2
LAGOON CELLS
AREA WEST OF LANDFILL
MARSHY AREA
HILLSIDE AREA
WOODFORD
BENNINGTON
APPROX. TOWN LINE
SAND QUARRY AREA
BEND IN THE ROAD AREA
GRAVEL ROAD
TO BURGESS BROTHERS OFFICE
SCALE
60 0 25 50 100 200
ERM-New England, Inc.
BURGESS BROTHERS SUPERFUND SITE
WOODFORD & BENNINGTON, VERMONT
SITE MAP WITH SOIL/GROUNDWATER AND AIR SAMPLE LOCATIONS
4

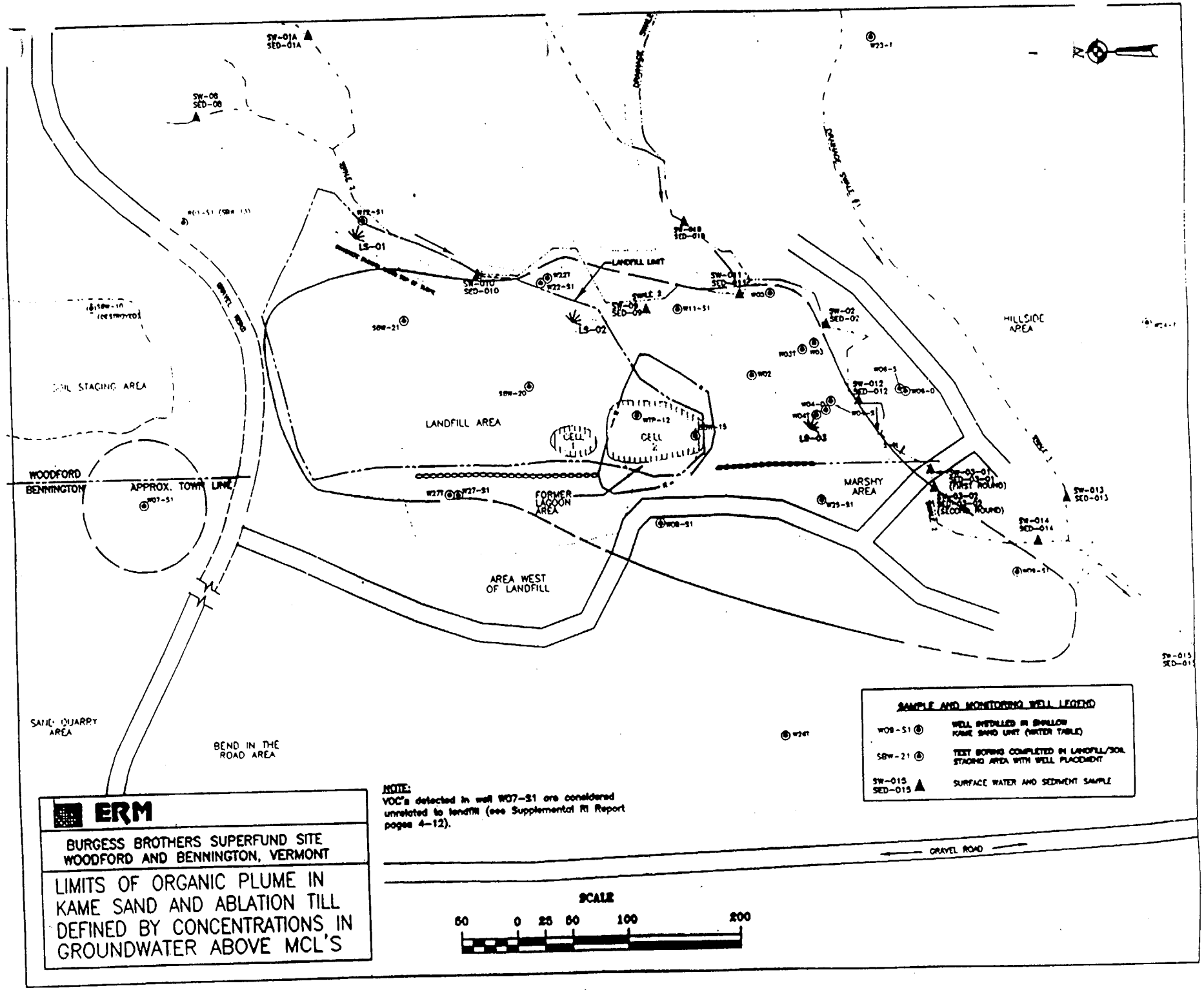
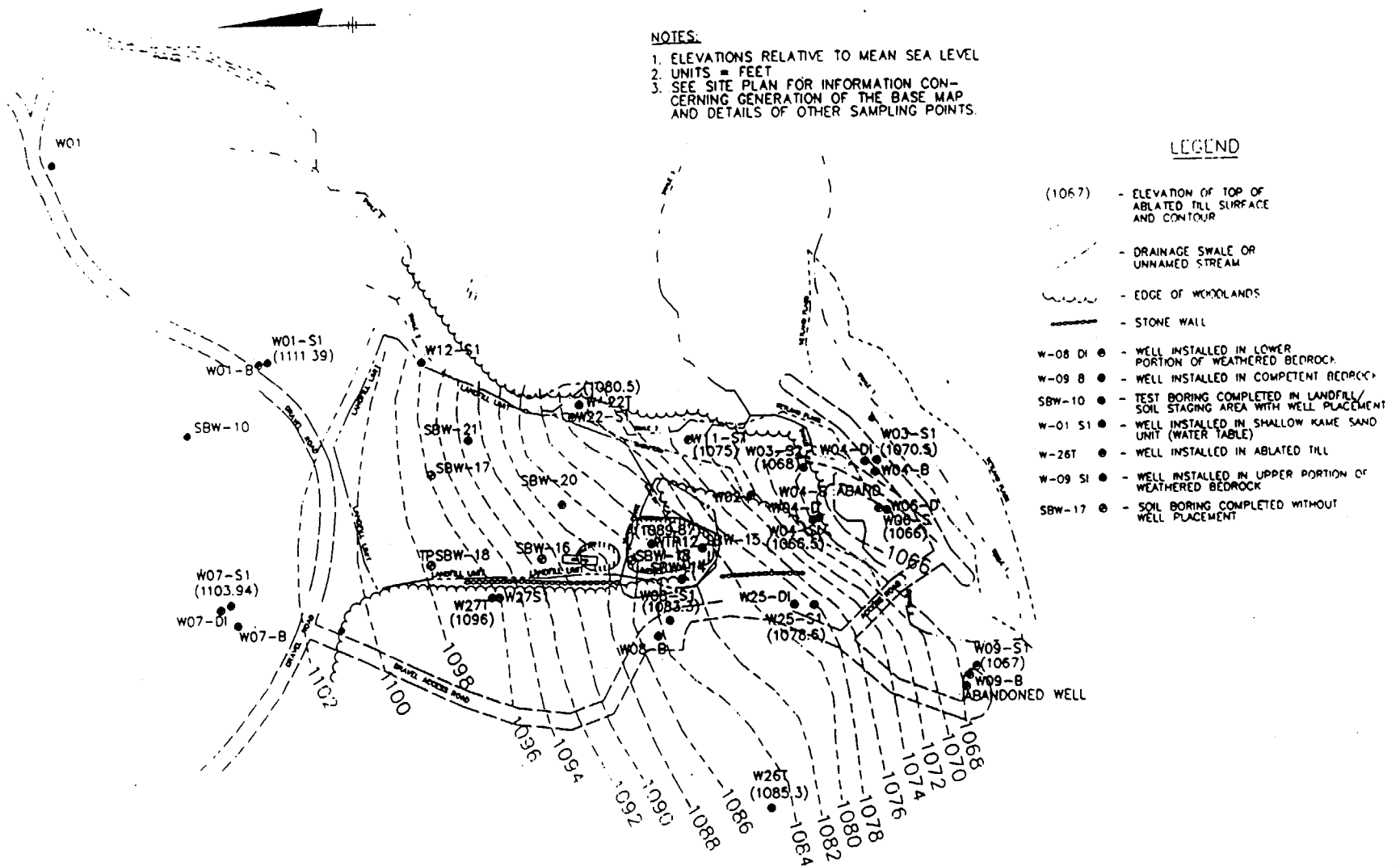

SW-01A
SED-01A
SW-08
SED-08
W23-1
LS-01
LS-02
LS-03
LANDFILL LIMIT
SW-010
SED-010
SW-011
SED-011
SW-012
SED-012
SW-013
SED-013
SW-014
SED-014
SW-015
SED-015
SW-03-01
SED-03-01
(FIRST ROUND)
SW-03-02
SED-03-02
(SECOND ROUND)
SW-02
SED-02
W03
W02
W04-0
W04-5
W06-5
W06-0
W11-S1
W22-S1
W27-S1
W07-S1
W08-S1
W09-S1
W23-S1
W25-S1
W27
W37
W47
WTP-12
WTP-15
SBW-20
SBW-21
SBW-10
(DESTROYED)
SOIL STAGING AREA
LANDFILL AREA
CELL 1
CELL 2
FORMER LAGOON AREA
MARSHY AREA
HILLSIDE AREA
AREA WEST OF LANDFILL
WOODFORD
BENNINGTON
APPROX. TOWN LINE
SAND QUARRY AREA
BEND IN THE ROAD AREA
DRAINAGE SWALE 1
DRAINAGE SWALE 2
DRAINAGE SWALE 3
GRAVEL ROAD
SAMPLE AND MONITORING WELL LEGEND
W09-S1 WELL INSTALLED IN SHALLOW KAME SAND UNIT (WATER TABLE)
SBW-21 TEST BORING COMPLETED IN LANDFILL/SOIL STAGING AREA WITH WELL PLACEMENT
SW-015 SED-015 SURFACE WATER AND SEDIMENT SAMPLE
NOTE:
VOC's detected in well W07-S1 are considered unrelated to landfill (see Supplemental RI Report pages 4-12).
SCALE
60 0 25 50 100 200
ERM
BURGESS BROTHERS SUPERFUND SITE
WOODFORD AND BENNINGTON, VERMONT
LIMITS OF ORGANIC PLUME IN KAME SAND AND ABLATION TILL DEFINED BY CONCENTRATIONS IN GROUNDWATER ABOVE MCL'S

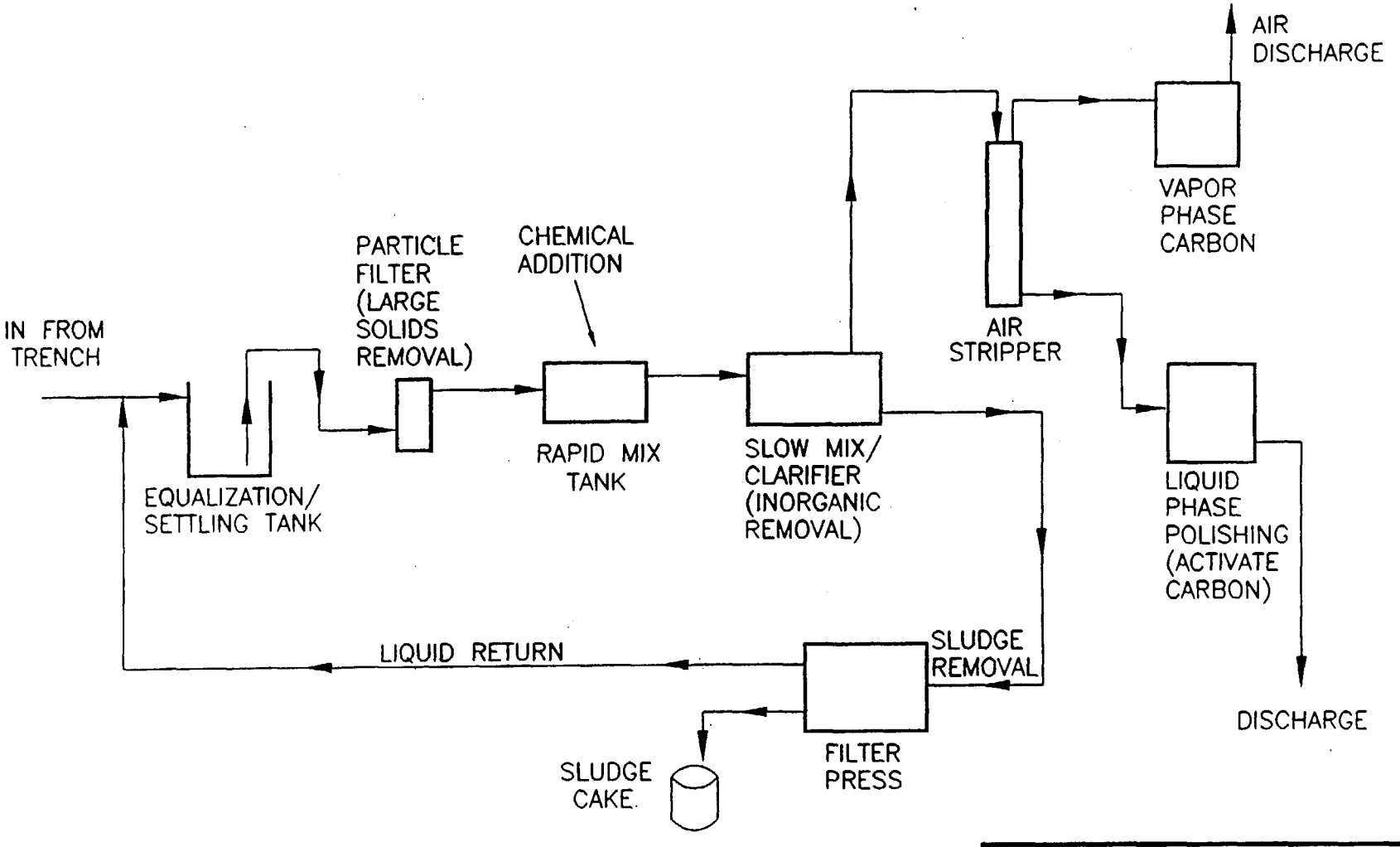
FIGURE 6



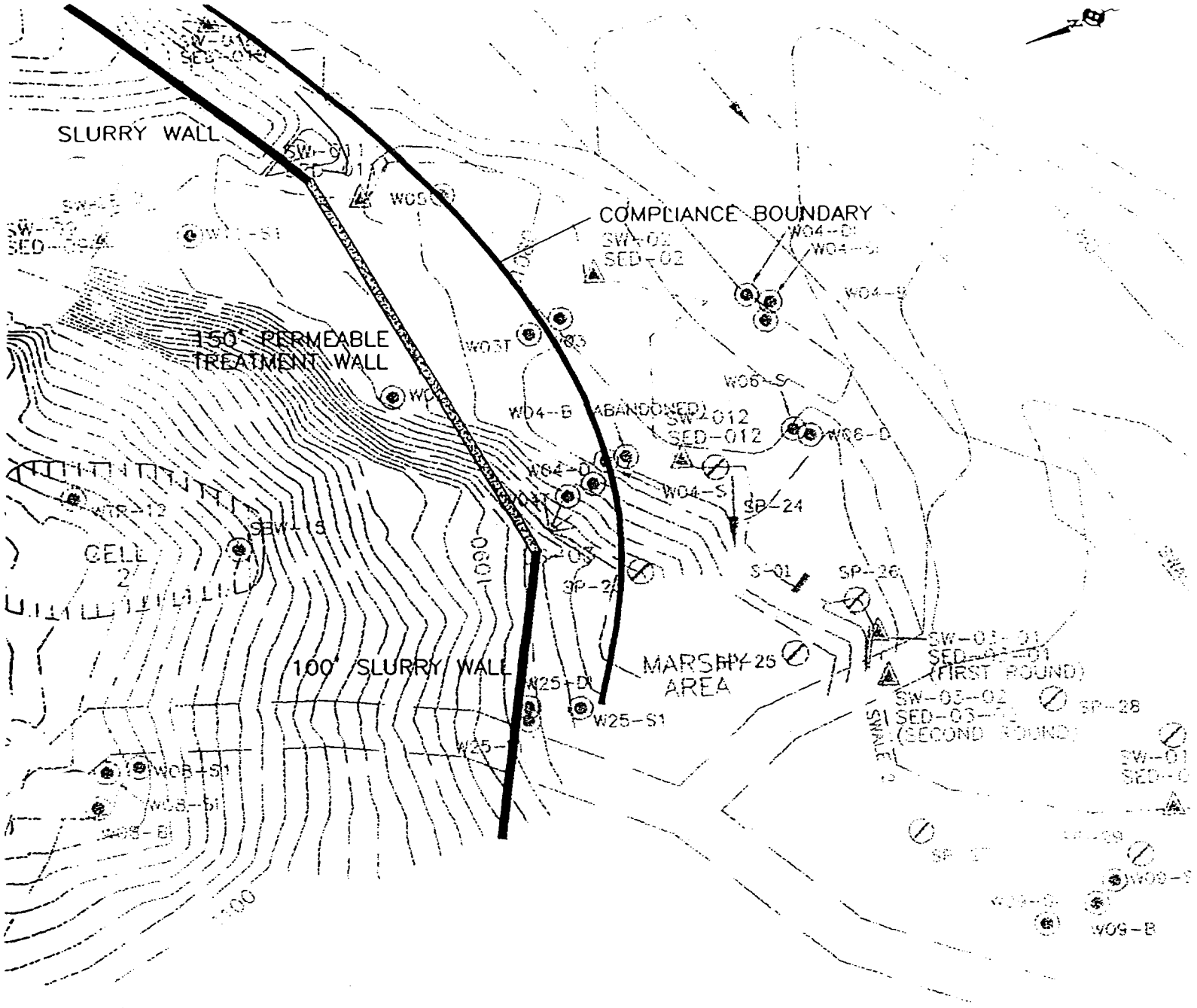
O'BRIEN & GERE ENGINEERS, INC.	BURGESS BROTHERS SUPERFUND SITE REMEDIAL INVESTIGATION TOP OF ABLATION TILL CONTOUR MAP	FILE NO. 5271.003.30F DATE FEBRUARY 1995	FIGURE 6

FIGURE 7

PROCESS FLOW DIAGRAM OF GROUNDWATER PUMP & TREAT SYSTEM



ERM		
399 BOYLSTON STREET – BOSTON, MA 02116 (617) 267-8377		
CLIENT NAME: Burgess Brothers	DRAWN BY: ADC	DATE: 9/2/97
FILE PATH: J:\Feas.Study\Cad Dwgs\397_10\fig_6	SCALE: N.T.S.	PROJ: 397_10
Burgess Brothers Superfund Site Woodford & Bennington, Vermont		
Process Flow Diagram of Groundwater Pump & Treat System		FIGURE NO. 7
PROJECT MGR: MW	TQM REV: GAD	



LEGEND

EXISTING TOPOGRAPHIC CONTOURS

EXISTING DRAINAGE SWALE

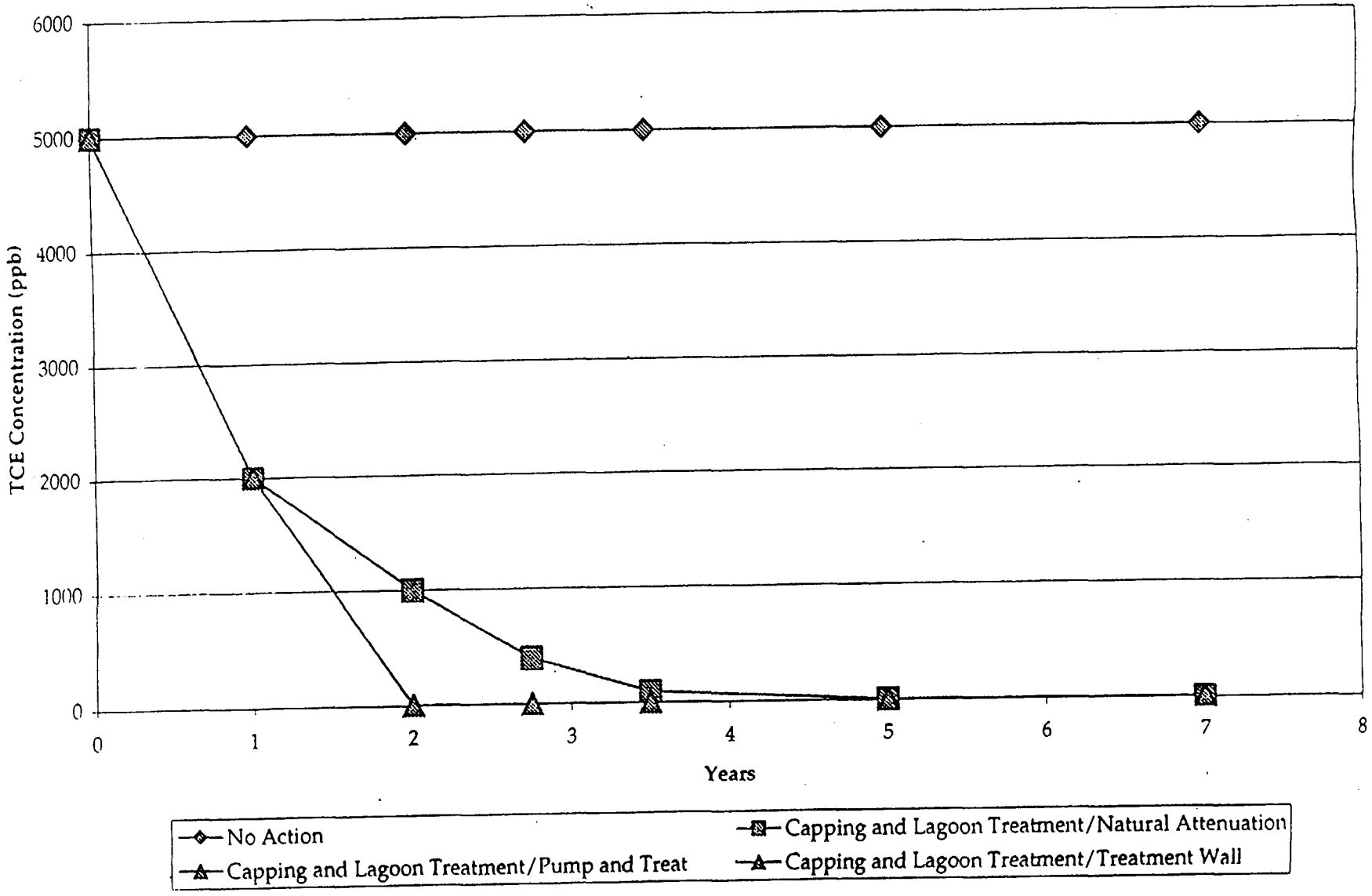
SCALE (FEET)

:5 0 12.5 25 50

ERM		
399 BOYLSTON STREET – BOSTON, MA 02116 (617) 267-8377		
CLIENT NAME: Burgess Brothers	DRAWN BY: ADC	DATE: 9/2/97
FILE PATH: J:\Feas.Stud\Cad Dwgs\397_10\fig_8	SCALE: 1" = 50'	PROJ: 397_10
Burgess Brothers Superfund Site Woodford & Bennington, Vermont		
Layout of Treatment System		FIGURE NO. 8
PROJECT MGR: MW	TQM REV: GAD	

FIGURE 8

Figure 9 - Comparative Evaluation of Concentration of TCE at Compliance Boundary



Note: This figure is for comparative purposes only. Projected time frames and TCE concentrations are estimated based on modeling.

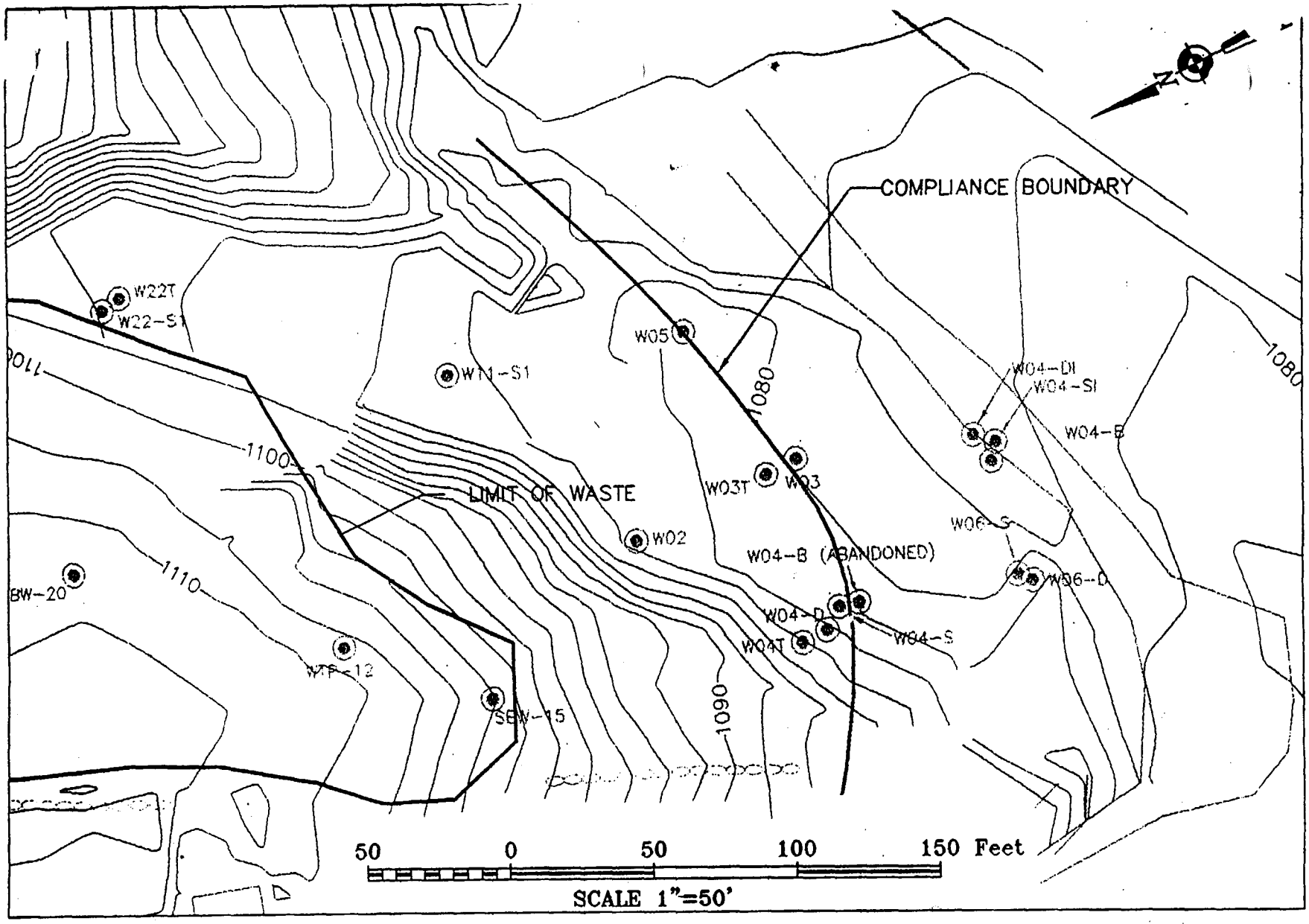


Figure 10

ENVIRONMENTAL PARTNERS GROUP, INC. P.O. BOX 730, HINGHAM, MA 02043			
Project: Burgess Bros. Landfill		Date: 8/27/96	Drawn By: KM
File Name: Compliance_Plan		Scale: 1"=50'	File: MNW
Burgess Brothers Superfund Site			
COMPLIANCE BOUNDARY			FIGURE NO. 10

APPENDIX B

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

R Compliance: Alternative 2 – Capping and Lagoon Treatment/N al Attenuation
Feasibility Study

Burgess Brothers Superfund Site
Bennington and Woodford, Vermont

Type	*Medium*	*Requirements*	*Status*	*Synopsis of Requirements*	*Action to be Taken to Attain ARAR*
Chemical-Specific	Groundwater	Vermont Groundwater Protection Regulations (EPR 12-702)	Applicable, for Enforcement Standards	Establish primary groundwater quality standards. Enforcement standards are applicable. Preventative action limits are not an ARAR.	Groundwater quality would improve due to the treatment of the lagoon soils and construction of a multi-barrier cap over the landfill. Source remediation and natural degradation processes would reduce the concentrations to below the primary groundwater quality standards.
		Vermont Health Advisories	To Be Considered	Vermont developed health advisories as guidance criteria for drinking water in the absence of Federal Maximum Contaminant Levels.	Considered in selection of remedial alternative, and will be used in the absence of numerical standards.
		Federal Safe Drinking Water Act - Maximum Contaminated Levels (MCLs) for Organic and Inorganic Chemicals (40 CFR 141 Subparts B, G and I)	Relevant and Appropriate	MCLs have been promulgated for a number of common organic and inorganic chemicals and action levels for lead and copper. These levels regulate the concentration of contaminants in public drinking water supplies, but may also be considered appropriate for groundwater aquifers potentially used for drinking water.	Groundwater quality would improve due to the treatment of the lagoon soils and construction of a multi-barrier cap over the landfill. Source remediation and natural degradation processes would reduce the concentrations to below MCLs.
		Federal Safe Drinking Water Act - Maximum Contaminant Level Goals (MCLGs) for Organic and Inorganic Chemicals (40 CFR 151 Subpart F)	Relevant and Appropriate, if non-zero	Establishes MCLGs for organic and inorganic contaminants. MCLGs that are non-zero will be relevant and appropriate.	Groundwater quality would improve due to the treatment of the lagoon soils and construction of a multi-barrier cap over the landfill. Source remediation and natural degradation processes would reduce the concentrations to below MCLGs.

Table 6-2

R Compliance: Alternative 2 - Capping and Lagoon Treatment/N il Attenuation
feasibility Study

Burgess Brothers Superfund Site
Bennington and Woodford, Vermont

Type	*Medium*	*Requirements*	*Status*	*Synopsis of Requirements*	*Action to be Taken to Attain ARAR*
		EPA Reference Doses (RfDs) and EPA Carcinogen Assessment Group Potency Factors	To Be Considered	RfDs are dose levels EPA has developed for use in risk characterization due to non-carcinogens in various media. The Potency Factors are used to evaluate an acceptable risk from a carcinogen.	Considered in selection of remedial alternative, and will be used in the absence of numerical standards.
		EPA Health Advisories	To Be Considered	EPA publishes contaminant-specific health advisories that indicate the non-carcinogenic risks associated with consuming contaminated drinking water.	Considered in selection of remedial alternative, and will be used in the absence of numerical standards.
Location-Specific	Wetlands	Federal Executive Order on Protection of Wetlands (E.O. 11990, 40 CFR Part 6, Appendix A)	Applicable	Requires federal agencies to avoid impacts associated with the destruction or loss of wetlands, minimize potential harm, preserve and enhance wetlands, and avoid support of new construction in wetlands if a practicable alternative exists.	Impacted wetlands would be restored or replicated.
		Federal Fish and Wildlife Coordination Act (16 USC 661 et. seq.) 40 CFR Part 6	Applicable	Establishes requirements for a consultation with U.S. Fish and Wildlife Service and state wildlife agencies to mitigate losses of fish and wildlife that result from modification of a water body.	Fish and Wildlife Service has been consulted regarding potential impacts to water bodies.
		Federal Clean Water Act (33 USC 1344), US Army Corps of Engineers Nationwide Permit Program (33 CFR Part 330), and Federal Guidelines for Specification of Disposal Sites" (40 CFR Part 230)	Applicable	Under this requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative that has less effect is available. The requirements also describe actions to minimize adverse impacts.	Permit conditions would be evaluated during pre-design. Impacted wetlands will be restored or replicated.

Type	Medium	Requirements	Status	Synopsis of Requirements	Action to be Taken to Attain ARAR
Action-Specific	Air	Vermont Air Pollution Control Regulations (10 VSA Section 551 et. seq. EPR 5-101, 5-211, 5-231to 5-252, 5-253.20, 5-261, 5-301 to 5-311, 5-501 to 5-502, and 5-1010)	Applicable	Establishes air quality standards and allowable discharges.	SVE/air sparge system and system generator would be designed to satisfy discharge limits.
		Federal RCRA Air Emission Standards for Equipment Leaks, 40 CFR Part 264, Subpart BB	Applicable, if threshold limits are exceeded	Standards for air emissions for equipment that contains or contacts RCRA wastes with organic concentrations of at least 10% by weight.	SVE/air sparge system would be designed to satisfy emission standards if threshold limits are exceeded.
		Federal RCRA Air Emission Standards for Process Vents, 40 CFR Part 264, Subpart AA	Applicable, if threshold limits are exceeded	Standards for air emissions from process vents associated with distillation, fractionation, thin film evaporation, column extraction or air steam stripping operations that treat RCRA substances and have total organic concentrations of 10 ppm or greater.	SVE/air sparge system would be designed to satisfy emission standards if threshold limits are exceeded.
		Federal Clean Air Act - Non-Methane Organic Compounds (40 CFR Part 60 Subpart WWW)	Relevant and Appropriate, if threshold limits are exceeded	Regulations require NMOC-specific gas collection and control systems, monitoring, and gas generation estimates. The rule establishes a performance standard for NMOCs emissions of greater than 50 megagrams/year from municipal solid waste landfills.	Landfill gas venting system would be designed to satisfy performance standards if threshold limits are exceeded.
	Groundwater	Vermont Groundwater Protection Regulations (10 VSA Chapter 48, EPR 12-704 and 12-705)	Applicable	Establish standards and requirements for groundwater monitoring.	The groundwater monitoring program would be designed to satisfy these requirements.

R Compliance: Alternative 2 - Capping and Lagoon Treatment/N il Attenuation
easibility Study

Burgess Brothers Superfund Site
Bennington and Woodford, Vermont

Type	*Medium*	*Requirements*	*Status*	*Synopsis of Requirements*	*Action to be Taken to Attain ARAR*
	Surface Water	Vermont Water Quality Standards (10 VSA Chapter 47, EPR Sections 1-04, 2-01, 2-02, 2-03, 2-05, 3-01, 3-03, 3-04, and Appendix C and D)	Relevant and Appropriate	Outlines criteria for discharging to surface waters, such as dissolved oxygen, temperature, nutrients, pH, and alkalinity, and outlines water quality criteria for protection of aquatic biota.	Source control measures would control erosion, runoff and contaminant migration and thereby improve surface water quality over time. Water Quality Standards will be used to measure the effectiveness of source control measures.
		Federal Clean Water Act - Ambient Water Quality Criteria	Relevant and Appropriate	Pursuant to Section 304(a)(1) of the Clean Water Act, the EPA establishes Ambient Water Quality Criteria. These criteria present scientific data and guidance on the environmental effects of pollutants. The criteria can contribute to establishing regulatory requirements that govern impacts to water quality.	Source control measures would control erosion, runoff and contaminant migration and thereby improve surface water quality over time. Water Quality Criteria will be used to measure the effectiveness of source control measures.
	Sediment	Ontario Ministry of the Environment Sediment Quality Guidelines	To be Considered	The Sediment Quality Guidelines present scientific data and guidance on the environmental effects of pollutants. The criteria can contribute to establishing requirements that govern impacts to sediment quality.	Sediment quality would improve due to the presence of a cap. However, existing inorganic concentrations would not change significantly. Sediment Quality Guidelines will be used to measure the effectiveness of source control measures.
	Landfill Material	Federal RCRA Subtitle C, Regulations, 40 CFR Part 264 Subpart N - Landfills, Section 264.310 *	Relevant and Appropriate	Requirements for Hazardous Waste landfill closure.	Landfill cap design and construction would satisfy requirements.

Type	Medium	Requirements	Status	Synopsis of Requirements	Action to be Taken to Attain ARAR
		Federal RCRA Subtitle C Regulations, 40 CFR Part 264 Subpart B - General Facility Standards, Section 264.19 *	Relevant and Appropriate	Requirements for developing a Construction Quality Assurance Program for final cover system.	Landfill cap construction would satisfy requirements.
		Federal RCRA Subtitle C Regulations, 40 CFR Part 264 Subpart F - Releases from Solid Waste Management Units, Sections 264.95, 264.96(a) and (c), 264.97, 264.98 and 264.99 *	Relevant and Appropriate	Groundwater monitoring requirements and compliance points for determining the need for additional monitoring and corrective action.	The groundwater monitoring program would be designed to satisfy these requirements.
		Federal RCRA Subtitle C Regulations, 40 CFR Part 264 Subpart G - Closure and Post Closure, Sections 264.111, 264.114, and 264.117 *	Relevant and Appropriate	Establishes performance standards for closure of hazardous waste landfills and groundwater monitoring.	Landfill closure and post-closure requirements would be satisfied.
		USEPA Technical Guidance Document: *Final Covers on Hazardous Waste Landfills and Surface Impoundments* (EPA/530-SW-89-047)	To Be Considered	Presents technical specifications for the design of multi-barrier covers at landfills at which hazardous wastes were disposed.	Guidance would be considered during design of landfill cap.
		USEPA Technical Guidance Document: Construction Quality Management for Remedial Action and Remedial Design Waste Containment Systems (EPA/540/R-92/073, October 1992)	To Be Considered	Presents technical specifications for the design of multi-barrier covers at landfills at which hazardous wastes were disposed.	Guidance would be considered during design of landfill cap.

R Compliance: Alternative 2 – Capping and Lagoon Treatment/N al Attenuation
easibility Study

Burgess Brothers Superfund Site
Bennington and Woodford, Vermont

Type	*Medium*	*Requirements*	*Status*	*Synopsis of Requirements*	*Action to be Taken to Attain ARAR*
		USEPA Technical Guidance Document: QA and QC for Waste Containment Facilities (EPA/600/R-93/182, September 1993)	To Be Considered	Presents technical specifications for the design of multi-barrier covers at landfills at which hazardous wastes were disposed.	Guidance would be considered during design of landfill cap.
		USEPA Technical Guidance Document: Alternative Cap Design Guidance for Unlined Hazardous Waste Landfills, EPA Region I, September 30, 1997.	To Be Considered	Presents technical specifications for the design of multi-barrier covers at landfills at which hazardous wastes were disposed.	Guidance would be considered during design of landfill cap.

* RCRA requirements are made effective by the Vermont Hazardous Waste Regulations (EPR 7-502).

APPENDIX C

STATE OF VERMONT
DECLARATION OF CONCURRENCE

State of Vermont

Department of Fish and Wildlife
Department of Forests, Parks and Recreation
Department of Environmental Conservation
State Geologist
RELAY SERVICE FOR THE HEARING IMPAIRED
1-800-253-0191 TDD>Voice
1-800-253-0195 Voice>TDD

AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation
Commissioner's Office
103 South Main Street / West Building
Waterbury, Vermont 05671-0404
802-241-3800
FAX 802-241-3296

September 18, 1998

Mary Jane O'Donnell, Chief, ME/VT/CT Superfund Section
Oiffice of Site Remediation and Restoration
U.S. Environmental Protection Agency, Region 1
J.F. Kennedy Federal Building
Boston, Massachusetts, 02203-0001

RE: Concurrence with Record of Decision (ROD) for Burgess Brothers Superfund Site
Bennington, VT (Site #77-0007)

Dear Mary Jane:

The State of Vermont concurs with the **Record of Decision (ROD)** proposed by the Environmental Protection Agency (EPA) for the Burgess Brothers Superfund Site. This concurrence is based on input from my staff, who have reviewed the *Record of Decision Final Draft* dated August 26, 1998. They have reported to me that the ROD comprehensively and accurately addresses past Superfund activities that led to the selected site remedy, which consists of the following:

- Multi-Barrier Cap Over the Landfill Area;
- Cap Over the Soils in the Marshy Area;
- SVE/Air Sparging in the Former Lagoon Area;
- Institutions Controls, such as deed restrictions and access controls;
- Long-term Monitoring;
- Five-Year Review; and
- Contingency for Alternative Response Action

The State believes that the selected remedy is protective of human health and the environment, meets all state requirements that are applicable to remedial action, and is cost effective. We look foward to working with the EPA during the remedial design and remedial action phases of the selected remedy.

I appreciate the work that you and your staff have done to develop this remedy and to keep the DEC updated. If you need additional information on the State's position concerning the ROD, please do not hesitate to contact me, George Desch, or John Schmeltzer of my staff.

Sincerely,

Canute Dalmasse, Commissioner
Department of Environmental Conservation

cc: George Desch, Department of Environmental Conservation
John Schmeltzer, Department of Environmental Conservation
770007/rod.con

APPENDIX D

ADMINISTRATIVE RECORD INDEX

Burgess Brothers Landfill

NPL Site

Administrative Record

Index

Compiled: May 7, 1998

Updated: August 28, 1998

Prepared by
EPA-New England
Office of Site Remediation and Restoration

With Assistance From
ads
2070 Chain Bridge Road
Vienna, VA 22182

Introduction

This document is the Index to the Administrative Record for the remedial action at the Burgess Brothers Landfill Superfund Site. The citations in the Index are for those documents that EPA relied upon in selecting a response action at the Site. Site-specific documents are cited in Section I of the Index, and EPA guidance documents are cited in Section II. Documents cited in Section I of the Index are ordered by the Document Number that appears at the end of each citation.

The Administrative Record is available for public review at the EPA Region I Office of Site Remediation and Restoration (OSRR) Records Center in Boston, Massachusetts [(617) 573-5729], and the Bennington Free Library, 101 Silver Street, Bennington, Vermont [(802) 442-9051]. The EPA guidance documents cited in Section II are available for review only at the OSRR Records Center. The Staff of the OSRR Records Center recommends that you set up an appointment prior to your visit.

Questions concerning the Administrative Record should be addressed to the Project Manager for the Burgess Brothers Landfill Superfund Site.

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

Burgess Brothers Landfill Site
NPL Site Remedial Administrative Record

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Volume VII

Documents 000030-000042

Volume VIII

Documents 000043-000058

Volume IX

Documents 000059-000062

Section I

1.02 SITE ASSESSMENT - PRELIMINARY ASSESSMENT

Title:	Potential Hazardous Waste Site Preliminary Assessment Form.		
Authors:	US EPA REGION I		
Date:	April 4, 1984		
Format:	FORM	No. Pgs:	4
AR No.	01.02.1	Document No.	000001

1.03 SITE ASSESSMENT - SITE INSPECTION/INVESTIGATION

Title:	Site Analysis, Burgess Brothers Landfill, Bennington County, Vermont.		
Authors:	US EPA REGION I		
Date:	May 1991		
Format:	REPORT, STUDY	No. Pgs:	38
AR No.	01.03.1	Document No.	000002

05 SITE ASSESSMENT - CORRESPONDENCE RELATED TO SITE ASSESSMENT

Title:	Burgess Brothers Landfill, Woodford, VT, National Priorities List Form.		
Authors:	US EPA RI REMEDIAL RESPONSE PROGRAM		
Date:	November 1988		
Format:	FORM	No. Pgs:	1
AR No.	01.05.1	Document No.	000003

03.01 REMEDIAL INVESTIGATION - CORRESPONDENCE

Title:	Request to Revise the Remedial Investigation Work Plan.		
Addressee:	SHEILA M. ECKMAN - US EPA RI WASTE MANAGEMENT DIVISION		
Authors:	CHERYL L. CUNDALL - O'BRIEN & GERE ENGINEERS, INC.		
Date:	September 25, 1992		
Format:	CORRESPONDENCE	No. Pgs:	5
AR No.	03.01.1	Document No.	000004

Title: Transmittal of Remedial Investigation Documents.
Addressee: SUSAN PAJU - BENNINGTON FREE LIBRARY
Authors: RONALD JENNINGS - US EPA REGION I
Date: October 1, 1992
Format: CORRESPONDENCE No. Pgs: 1
AR No. 03.01.2 Document No. 000005

Title: Review of Chromium Data for Sediment Sampling.
Addressee: RONALD JENNINGS - US EPA REGION I
Authors: CHERYL L. CUNDALL - O'BRIEN & GERE ENGINEERS, INC.
Date: October 14, 1992
Format: CORRESPONDENCE No. Pgs: 4
AR No. 03.01.3 Document No. 000006

Title: Evaluation of Soil Vapor Study Results.
Addressee: RONALD JENNINGS - US EPA REGION I
Authors: CHERYL L. CUNDALL - O'BRIEN & GERE ENGINEERS, INC.
Date: October 19, 1992
Format: CORRESPONDENCE No. Pgs: 7
AR No. 03.01.4 Document No. 000007

Title: Proposal to Modify Sampling Parameters.
Addressee: RONALD JENNINGS - US EPA REGION I
Authors: CHERYL L. CUNDALL - O'BRIEN & GERE ENGINEERS, INC.
Date: October 20, 1992
Format: CORRESPONDENCE No. Pgs: 3
AR No. 03.01.5 Document No. 000008

Title: Approval to Modify Sampling Activities.
Addressee: RONALD JENNINGS - US EPA REGION I
Authors: CHERYL L. CUNDALL - O'BRIEN & GERE ENGINEERS, INC.
Date: October 21, 1992
Format: CORRESPONDENCE No. Pgs: 2
AR No. 03.01.6 Document No. 000009

Title: Conditional Approval of work plan revision.
Addressee: CHERYL L. CUNDALL - O'BRIEN & GERE ENGINEERS, INC.
Authors: RONALD JENNINGS - US EPA REGION I
Date: October 23, 1992
Format: CORRESPONDENCE No. Pgs: 2
AR No. 03.01.7 Document No. 000010

Title: Road Construction Approval.
Addressee: CHERYL L. CUNDALL - O'BRIEN & GERE ENGINEERS, INC.
Authors: RONALD JENNINGS - US EPA REGION I
Date: December 8, 1992
Format: CORRESPONDENCE No. Pgs: 3
AR No. 03.01.8 Document No. 000011

Title: Conditional Permission to Construct a Stream Crossing.
Addressee: ROBERT GANLEY - O'BRIEN & GERE ENGINEERS, INC.
Authors: RONALD JENNINGS - US EPA REGION I
Date: March 29, 1993
Format: CORRESPONDENCE No. Pgs: 2
AR No. 03.01.9 Document No. 000012

Title: Sampling Requirements Between Phase 1A & Phase 1B.
Addressee: ROBERT GANLEY - O'BRIEN & GERE ENGINEERS, INC.
Authors: MARY J O'DONNELL - US EPA REGION I
Date: October 26, 1993
Format: No. Pgs: 2
AR No. 03.01.10 Document No. 000013

Title: Conditional Approval of Phase 1A Deliverables.
Addressee: GEOFF SEIBEL - DE MAXIMUS, INC.
Authors: MARY J O'DONNELL - US EPA REGION I
Date: April 14, 1994
Format: CORRESPONDENCE No. Pgs: 3
AR No. 03.01.11 Document No. 000014

3.02 REMEDIAL INVESTIGATION - SAMPLING & ANALYSIS DATA

Title: Sampling and Anaysis Data.
Format: No. Pgs: 1
AR No. 03.02.1 Document No. 000015

Title: Ground Penetrating Radar Survey, Burgess Brothers Landfill Site, Woodford and Bennington, Vermont.
Addressee: US EPA REGION I
Authors: HAGER-RICHTER GEOSCIENCE, INC.
Date: January 1992
Format: REPORT, STUDY No. Pgs: 14
AR No. 03.02.2 Document No. 000016

Title: Soil Vapor Extraction System Pilot Study Summary Report, Burgess Brothers Landfill Site.
Addressee: US EPA REGION I
Authors: ENVIRONMENTAL RESOURCES MANAGEMENT
Date: May 12, 1997
Format: REPORT, STUDY No. Pgs: 14
AR No. 03.02.3 Document No. 000017

03.04 REMEDIAL INVESTIGATION - INTERIM DELIVERABLES

Title: Health and Safety Plan, Limited Field Investigation, Burgess Brothers Landfill Superfund Site, Woodford/Bennington, Vermont.
Addressee: US EPA REGION I
Authors: O'BRIEN & GERE ENGINEERS, INC.
Date: December 1991
Format: REPORT, STUDY No. Pgs: 20
AR No. 03.04.1 Document No. 000018

Title: Final Health and Safety Plan, Remedial Investigation/Feasibility Study, Burgess Brothers Site.
Addressee: US EPA REGION I
Authors: O'BRIEN & GERE ENGINEERS, INC.
Date: September 1992
Format: REPORT, STUDY No. Pgs: 39
AR No. 03.04.2 Document No. 000019

Title: Quality Assurance Project Plan, Remedial Investigation, Burgess Brothers Site, Woodford and Bennington, Vermont.
Addressee: US EPA REGION I
Authors: O'BRIEN & GERE ENGINEERS, INC.
Date: September 1992
Format: REPORT, STUDY No. Pgs: 243
AR No. 03.04.3 Document No. 000020

Title: Quality Assurance Project Plan, Addendum No. 1, Phase 1B Investigation, Burgess Brothers Superfund Site.
Addressee: US EPA REGION I
Authors: O'BRIEN & GERE ENGINEERS, INC.
Date: April 1994
Format: REPORT, STUDY No. Pgs: 33
AR No. 03.04.4 Document No. 000021

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3 06 REMEDIAL INVESTIGATION - REMEDIAL INVESTIGATION REPORTS

Title: Final Remedial Investigation Report, Volume I - Text, Tables, and Figures, Burgess Brothers Superfund Site, Woodford and Bennington, Vermont.
Addressee: US EPA REGION I
Authors: O'BRIEN & GERE ENGINEERS, INC.
Date: July 1996
Format: REPORT, STUDY No. Pgs: 413
AR No. 03.06.1 Document No. 000022

Title: Final Remedial Investigation Report, Volume II - Appendices, Burgess Brothers Superfund Site.
Addressee: US EPA REGION I
Authors: O'BRIEN & GERE ENGINEERS, INC.
Date: July 1996
Format: REPORT, STUDY No. Pgs: 747
AR No. 03.06.2 Document No. 000023

Title: Final Remedial Investigation Report, Volume 3 - Appendices, Burgess Brothers Superfund Site.
Addressee: US EPA REGION I
Authors: O'BRIEN & GERE ENGINEERS, INC.
Date: July 1996
Format: REPORT, STUDY No. Pgs: 645
AR No. 03.06.3 Document No. 000024

Title: Draft Supplemental Remedial Investigation Report, Volume I, Revision 2, Burgess Brothers Superfund Site with Transmittal Letter.
Addressee: US EPA REGION I
Authors: ERM-NEW ENGLAND, INC.
Date: February 21, 1997
Format: REPORT, STUDY No. Pgs: 228
AR No. 03.06.4 Document No. 000025

Title: Draft Supplemental Remedial Investigation Report, Volume II, Revision 2, Burgess Brothers Superfund Site.
Addressee: US EPA REGION I
Authors: ERM-NEW ENGLAND, INC.
Date: February 21, 1997
Format: REPORT, STUDY No. Pgs: 276
AR No. 03.06.5 Document No. 000026

03.07 REMEDIAL INVESTIGATION - WORK PLANS AND PROGRESS REPORTS

Title: Work Plan, Limited Field Investigation, Burgess Brothers Superfund Site.
Addressee: US EPA REGION I
Authors: O'BRIEN & GERE ENGINEERS, INC.
Date: December 1991
Format: WORK PLAN No. Pgs: 61
AR No. 03.07.1 Document No. 000027

Title: Work Plan, Final, Remedial Investigation, Burgess Brothers Superfund Site.
Addressee: US EPA REGION I
Authors: O'BRIEN & GERE ENGINEERS, INC.
Date: September 1992
Format: REPORT, STUDY No. Pgs: 114
AR No. 03.07.2 Document No. 000028

Title: Well Drilling Program Modification.
Addressee: RONALD JENNINGS - US EPA REGION I
Authors: ROBERT GANLEY - O'BRIEN & GERE ENGINEERS, INC.
Date: April 8, 1993
Format: CORRESPONDENCE No. Pgs: 5
AR No. 03.07.3 Document No. 000029

Title: Work Plan Phase 1B Investigation, Burgess Brothers Superfund Site.
Addressee: US EPA REGION I
Authors: O'BRIEN & GERE ENGINEERS, INC.
Date: April 1994
Format: WORK PLAN No. Pgs: 50
AR No. 03.07.4 Document No. 000030

Title: Final Long-Term Monitoring Plan, Remedial Investigation, Burgess Brothers Superfund Site.
Addressee: US EPA REGION I
Authors: O'BRIEN & GERE ENGINEERS, INC.
Date: April 1994
Format: WORK PLAN No. Pgs: 15
AR No. 03.07.5 Document No. 000031

Title: Risk Assessment Work Plan, Burgess Brothers Superfund Site, Woodford and Bennington, Vermont.
Addressee: US EPA REGION I
Authors: TRC COMPANIES, INC.
Date: June 1994
Format: REPORT, STUDY No. Pgs: 21
AR No. 03.07.6 Document No. 000032

Title: Risk Assessment Work Plan, Addendum, Burgess Brothers Superfund Site.
Addressee: US EPA REGION I
Authors: ERM-NEW ENGLAND, INC.
Date: July 1996
Format: REPORT, STUDY No. Pgs: 3
AR No. 03.07.7 Document No. 000033

Title: Soil Vapor Extraction Pilot Study, Burgess Brothers Superfund Site.
Addressee: US EPA REGION I
Authors: ERM-NEW ENGLAND, INC.
Date: September 20, 1996
Format: WORK PLAN No. Pgs: 90
AR No. 03.07.8 Document No. 000034

Title: Risk Assessment Work Plan, Addendum, Burgess Brothers Superfund Site.
Addressee: US EPA REGION I
Authors: ERM-NEW ENGLAND, INC.
Date: October 1996
Format: REPORT, STUDY No. Pgs: 3
AR No. 03.07.9 Document No. 000035

Title: Comments Concerning the Soil Vapor Extraction Pilot Study Work Plan.
Addressee: RONALD JENNINGS - US EPA REGION I
Authors: PATRICE SVETAKA - METCALF & EDDY, INC.
Date: October 8, 1996
Format: CORRESPONDENCE No. Pgs: 2
AR No. 03.07.10 Document No. 000036

Title: Request for Approval to Modify the SVE Pilot Study Off-Gas Treatment.
Addressee: RONALD JENNINGS - US EPA REGION I
Authors: GEOFF SEIBEL - DE MAXIMUS, INC.
Date: October 14, 1996
Format: CORRESPONDENCE No. Pgs: 5
AR No. 03.07.11 Document No. 000037

Title: Response to EPA Approval of SVE Work Plan and Addendum 1.
Addressee: RONALD JENNINGS - US EPA REGION I
Authors: MARK WHITE - STATE OF VERMONT
Date: November 15, 1996
Format: CORRESPONDENCE No. Pgs: 3
AR No. 03.07.12 Document No. 000038

Title: Risk Assessment Work Plan, Addendum, Burgess Brothers Superfund Site.
Addressee: US EPA REGION I
Authors: ERM-NEW ENGLAND, INC.
Date: March 1997
Format: REPORT, STUDY No. Pgs: 3
AR No. 03.07.13 Document No. 000039

3.09 REMEDIAL INVESTIGATION - HEALTH ASSESSMENTS

Title: Preliminary Health Assessment for Burgess Brothers Landfill, Woodford, Bennington County, Vermont with Transmittal Letter.
Addressee: US EPA REGION I
Date: December 27, 1991
Format: REPORT, STUDY No. Pgs: 17
AR No. 03.09.1 Document No. 000040

03.10 REMEDIAL INVESTIGATION - ENDANGERMENT/BASELINE RISK ASSESSMENTS

Title: Risk Assessment Addendum, Burgess Brothers Superfund Site, Bennington/Woodford, Vermont.
Addressee: US EPA REGION I
Format: REPORT, STUDY No. Pgs: 13
AR No. 03.10.1 Document No. 000041

Title: Risk Assessment, Volume 1, Burgess Brothers Superfund Site, Woodford, Vermont.
Addressee: US EPA REGION I
Date: April 1997
Format: REPORT, STUDY No. Pgs: 189
AR No. 03.10.2 Document No. 000042

Title: Risk Assessment, Volume 2, Burgess Brothers Superfund Site, Woodford, Vermont,
Addressee: US EPA REGION I
Date: April 1997
Format: REPORT, STUDY No. Pgs: 181
AR No. 03.10.3 Document No. 000043

Title: Risk Assessment - Addendum 2, Burgess Brothers Superfund Site, Bennington and Woodford, Vermont.
Authors: US EPA REGION I
Date: May 1997
Format: REPORT, STUDY No. Pgs: 3
AR No. 03.10.4 Document No. 000044

04.06 FEASIBILITY STUDY - FEASIBILITY STUDY REPORTS

Title: Final Feasibility Study Report, Burgess Brothers Superfund Site, Woodford and Bennington, Vermont.
Addressee: US EPA RI WASTE MANAGEMENT DIVISION
Authors: ERM-NEW ENGLAND, INC.
Date: March 20, 1998
Format: REPORT, STUDY No. Pgs: 393
AR No. 04.06.1 Document No. 000059

04.09 FEASIBILITY STUDY - PROPOSED PLANS FOR SELECTED REMEDIAL ACTION

Title: Proposed Plan for the Burgess Brothers Superfund Site.
Authors: US EPA REGION I
Date: June 1998
Format: REPORT, STUDY No. Pgs: 13
AR No. 04.09.1 Document No. 000060

5.03 RECORDS OF DECISION - RESPONSIVENESS SUMMARIES

Title:	Comments on Proposed Plan.		
Addressee:	US EPA REGION I		
Authors:	JANET THOMPSON		
Date:	July 1998		
Format:	MEMORANDUM	No. Pgs:	2
AR No.	05.03.1	Document No.	000061

Title:	Comments on Proposed Plan.		
Addressee:	US EPA REGION I		
Authors:	DONALD DAVIS		
Date:	July 1998		
Format:	MEMORANDUM	No. Pgs:	2
AR No.	05.03.2	Document No.	000062

09.01 STATE COORDINATION - CORRESPONDENCE

Title:	Comments on the Limited Field Investigation Work Plan.		
Addressee:	SHEILA M. ECKMAN - US EPA REGION I		
Authors:	DAVE SHEPARD - STATE OF VERMONT		
Date:	November 1, 1991		
Format:	CORRESPONDENCE	No. Pgs:	9
AR No.	09.01.1	Document No.	000045

Title:	Comments on the Final Limited Field Investigation Work Plan.		
Addressee:	SHEILA M. ECKMAN - US EPA REGION I		
Authors:	DAVE SHEPARD - STATE OF VERMONT		
Date:	December 31, 1991		
Format:	MEMORANDUM	No. Pgs:	2
AR No.	09.01.2	Document No.	000046

Title:	Comments Concerning the Design of the Proposed Soil Vapor Extraction.		
Addressee:	RONALD JENNINGS - US EPA REGION I		
Authors:	LYNDA PROVENCHER - STATE OF VERMONT		
Date:	October 16, 1996		
Format:	CORRESPONDENCE	No. Pgs:	1
AR No.	09.01.3	Document No.	000047

.01 ENFORCEMENT/NEGOTIATION - CORRESPONDENCE

Title:	Request for a Copy of the Proposed Administrative Settlement.		
Addressee:	RONA GREGORY - US EPA REGION I		
Authors:	WILLIAM A. SHIRLEY		
Date:	June 18, 1992		
Format:	LETTER	No. Pgs:	3
AR No.	10.01.1	Document No.	000055

Title:	Request for Copy of Proposed Administrative Settlement.		
Addressee:	RONA GREGORY - US EPA REGION I		
Authors:	EVELYN BROWN - COHEN, SHAPIRO, POLISHER, SHIEKMAN, AND		
Date:	July 6, 1992		
Format:	LETTER	No. Pgs:	2
AR No.	10.01.2	Document No.	000056

Title:	Proposed Administrative Settlement Request.		
Addressee:	RONA GREGORY - US EPA REGION I		
Authors:	KELLY E. GALE - COLL DAVIDSON CARTER SMITH SALTER & BRAC		
Date:	August 3, 1992		
Format:	LETTER	No. Pgs:	2
AR No.	10.01.3	Document No.	000057

Title:	Transmittal of Proposed Administrative Settlement Docket No. I-91-1101.		
Addressee:	KINSEL LIBRARIAN - METCALF & EDDY, INC.		
Authors:	RONA GREGORY - US EPA REGION I		
Date:	September 11, 1992		
Format:	LETTER	No. Pgs:	1
AR No.	10.01.4	Document No.	000058

).07 ENFORCEMENT/NEGOTIATION - EPA ADMINISTRATIVE ORDERS

Title:	Administrative Order by Consent for Remedial Investigation/Feasibility Study, US EPA Docket No. I-91-1101.		
Authors:	US EPA REGION I		
Date:	August 27, 1991		
Format:	LITIGATION	No. Pgs:	53
AR No.	10.07.1	Document No.	000048

Title:	Administrative Agreement for Cost Recovery, US EPA Region I CERCLA Docket No. 1101.		
Authors:	US EPA REGION I		
Date:	August 20, 1992		
Format:	LITIGATION	No. Pgs:	12
AR No.	10.07.2	Document No.	000049

.0.09 ENFORCEMENT/NEGOTIATION - PLEADINGS

Title:	Complaint, Eveready Battery Company, Inc., Plaintiff v. United States of America, et al.		
Authors:	US EPA REGION I		
Date:	August 11, 1994		
Format:	LITIGATION	No. Pgs:	24
AR No.	10.09.1	Document No.	000050

13.02 COMMUNITY RELATIONS - COMMUNITY RELATIONS PLANS

Title:	Community Relations Plan, Burgess Brothers Site, Bennington, VT.		
Authors:	US EPA REGION I		
Date:	February 1995		
Format:	REPORT, STUDY	No. Pgs:	15
AR No.	13.02.1	Document No.	000051

.01 NATURAL RESOURCE TRUSTEE - CORRESPONDENCE

Title: Contaminant Release Notification.
Addressee: KENNETH FINKLESTEIN - NATIONAL OCEANIC & ATMOSPHERIC ADMINISTR
Authors: MERRILL S. HOHMAN - US EPA REGION I
Date: April 29, 1991
Format: CORRESPONDENCE No. Pgs: 2
AR No. 16.01.1 Document No. 000052

Title: Contamination Release Notification.
Addressee: WILLIAM PATTERSON - US DEPARTMENT OF THE INTERIOR
Authors: MERRILL S. HOHMAN - US EPA REGION I
Date: April 29, 1991
Format: CORRESPONDENCE No. Pgs: 2
AR No. 16.01.2 Document No. 000053

7.05 SITE MANAGEMENT RECORDS - SITE DESCRIPTIONS/CHRONOLOGIES

Title: Site Description, Burgess Brothers Landfill, Woodford, Vermont.
Authors: US EPA REGION I
Date:
Format: MISCELLANEOUS No. Pgs: 2
AR No. 17.05.1 Document No. 000054

Section II

GUIDANCE DOCUMENTS

T EPA guidance documents listed below were considered during the process of selecting the response action for the Burgess Brothers Landfill Superfund Site. These EPA guidance documents may be reviewed at the EPA Region I Office of Site Remediation and Restoration Records Center, 90 Canal Street, Boston, MA 02114.

1. Air Stripper Control Guidance, Gitto, Louis F. OSWER # 9355.0-28. July 12, 1989. [C110]

2. ARARs Fact Sheet: Compliance with the Clean Air Act and Associated Air Quality Requirements. September 1, 1992. [C281]

3. ARARs Q's and A's (Quick Reference Fact Sheet). OSWER # 9234.2-01FS. May 1, 1989. [3006]

4. ARARs Q's and A's: Compliance with Federal Water Quality Criteria, Office of Solid Waste and Emergency Response. OSWER # 9234.2-09/FS. June 1, 1990. [C192]

5. CERCLA Compliance with Other Laws Manual (Draft), Office of Emergency and Remedial Response. OSWER # 9234.1-01. August 8, 1988. [3002]

   CERCLA Compliance with Other Laws Manual Part II: Clean Air Act and Other Environmental Statutes and State Requirements. OSWER # 9234.1-02. August 1, 1989. [3013]

7. Comprehensive Environmental Response, Compensation and Liability Act of 1980 as Amended by PL 99-499, October 17, 1986. October 17, 1986. [C018]

8. Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites. OSWER # 9355.3-11. February 1, 1991. [C177]

9. Interim Final Guidance For Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Office of Solid Waste and Emergency Response/Office of Emergency and Remedial Response. OSWER # 9355.3-01. [2002]

10. National Oil and Hazardous Substances Pollution Contingency Plan. [C063]

11. Presumptive Remedy for CERCLA Municipal Landfill Sites. OSWER # 9355.0-49FS. September 1, 1993. [C157]

12. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). Interim Final. (EPA/540/1-89/002). December 1, 1989. [C174]

Risk Assessment Guidance for Superfund, Volume II, Environmental Evaluation Manual. (EPA/540/1-89/001). March 1, 1989. [5024]

14. Streamlining the RI/FS for CERCLA Municipal Landfill Sites. OSWER # 9355.3-11FS. September 1, 1990. [C176]

APPENDIX E

RESPONSIVENESS SUMMARY

BURGESS BROTHERS SUPERFUND SITE

RESPONSIVENESS SUMMARY

SEPTEMBER 1998

BURGESS BROTHERS SUPERFUND SITE
RESPONSIVENESS SUMMARY

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Attachments

A List of Formal Community Relations Activities Conducted to Date at the Burgess Brothers Superfund Site A-1

B Transcript From the June 23, 1998 Public Hearing B-1

BURGESS BROTHERS DRAFT RESPONSIVENESS SUMMARY

PREFACE

The U.S. Environmental Protection Agency (EPA) held a 30-day public comment period from June 15 to July 15, 1998 to provide an opportunity for public comment on the Proposed Plan to address contamination at the Burgess Brothers Superfund Site in Bennington and Woodford, Vermont (the "Site"). The EPA prepared the Proposed Plan based on the results of the Remedial Investigation (RI) and Feasibility Study (FS). The RI was conducted to determine the nature and extent of site contamination and to identify potential risks to human health and the environment. The FS examined and evaluated various options, or alternatives, for addressing the contamination. The Proposed Plan, issued on June 10, 1998, presented the EPA's preferred alternative for the site before the start of the public comment period. All documents which were used in the EPA's selection of the preferred alternative were placed in the site Administrative Record, which is available for public review at the EPA Records Center, 90 Canal Street, Boston, Massachusetts, and at the Bennington Free Library, 101 Silver Street, Bennington, Vermont.

The purpose of this Responsiveness Summary is to document the EPA's responses to the questions and comments raised during the public comment period. The EPA considered all of the comments summarized in this document before selecting a final remedial alternative to address contamination at the site.

This Responsiveness Summary is organized into the following sections:

I. **Overview of Remedial Alternatives Considered in the FS and Proposed Plan, including the Preferred Alternative** - This section briefly outlines the remedial alternatives evaluated in the FS and the Proposed Plan, including the EPA's preferred alternative.

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

III. **Summary of Comments Received During the Public Comment Period** - This section summarizes and provides the EPA's responses to the oral and written comments received from the public during the comment period.

IV. **Changes in Selected Remedy Based on Public Comments** - This section summarizes changes that were made to the preferred remedy in the Proposed Plan based on EPA's consideration of the comments received during the public comment period.

In addition, two attachments are included with this Responsiveness Summary. Attachment A lists community participation activities conducted by the EPA and VT DEC to date at the site. Attachment B contains a copy of the transcript from the public hearing held on Tuesday, June 23, 1998 in Bennington, Vermont. The original comments submitted by citizens, the State of Vermont, and PRPs are available in the Administrative Record.

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

Using information gathered during the RI and the Risk Assessment, the EPA identified several cleanup objectives for the Burgess Brothers Site.

The primary cleanup objectives are to reduce risks to public health and the environment by 1) preventing direct exposures to contaminated materials on site; 2) minimizing the movement of contamination away from the site; and 3) preventing use of groundwater which might pose a risk to human health. Cleanup levels for groundwater are set at levels that the EPA and VT DEC consider protective of human health and the environment.

After identifying the cleanup objectives, the EPA developed and evaluated potential cleanup alternatives to address site contamination. The FS describes the cleanup alternatives and the criteria the EPA used to narrow the list of four potential alternatives to control sources of contamination and address migration of contaminants off site.

The EPA's Proposed Alternative, Alternative 2, includes the following features:

- A multi-barrier (or "composite barrier") cap over the Landfill Area.

- A cap over the soils in the Marshy Area;

- Hot spot remediation of the Former Lagoon Cells within the Landfill Area using soil-vapor extraction (SVE) and air sparging;

- Natural attenuation of contaminated groundwater beyond the area of influence of the SVE and air sparging system;

- The establishment of institutional controls to protect the capped areas and to prevent the use of groundwater potentially impacted by the Site, and to inform future purchasers of the groundwater restrictions associated with the property;

- Long-term monitoring of the groundwater, surface water, sediments, and soil gas to evaluate the overall effectiveness of the remedy;

- A review of the Site every five years after the initiation of the remedial action to assure that the remedial action continues to protect human health and the environment.

In the Feasibility Study Report, the estimated net present worth of the remedy is $3,600,000. This alternative was selected because it achieved the best balance among the criteria with which EPA is required by law to evaluate clean-up options. The selected remedy provides an effective reduction in human health risk through a combination of source control (capping and SVE/air sparging) and management of contaminant migration (natural attenuation of groundwater) technologies. The remedy will attain Federal and State cleanup standards, reduce the toxicity of contaminated groundwater, and utilize permanent solutions to the extent possible.

The following other alternatives were evaluated in detail in the FS:

- ***Alternative 1: No Action*** - Under this alternative, no containment or treatment of the landfill or lagoon soils would occur and no effort would be made to control the migration of

contaminated groundwater.

- *Alternative 3: Capping and Lagoon Treatment/Pump and Treat* - Alternative 3 is similar to Alternative 2, with the exception of the approach to address contaminated groundwater. This Alternative includes the extraction of groundwater and construction of a water treatment facility to actively address groundwater contamination. The groundwater would be treated and discharged.

- *Alternative 4 - Capping and Lagoon Treatment/Treatment Wall* - Alternative 4 is also similar to Alternative 2, with the exception of the approach to address contaminated groundwater. This Alternative includes the construction of a subsurface treatment wall that would allow groundwater to flow through under natural flow conditions. The materials in the treatment wall would treat the contaminated groundwater.

All of the remedial alternatives considered for implementation at this site are described in the Record of Decision (ROD) Summary Document and in the Proposed Plan, and are discussed in detail in the FS.

II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

Site Description / History

The Burgess Brothers Superfund Site (the "Site") is located in the towns of Woodford and Bennington, Bennington County, Vermont, between Burgess Road and the Walloomsac Brook. Access to the Site is through the Burgess Brothers Construction Company's facility on Burgess Road, approximately 1.1 miles southeast of the junction of Burgess Road and State Highway 9. The Green Mountain National Forest borders the Site to the north.. The latitude of the Site is 42°52'40" and the longitude is 73°09'00". The Site consists of approximately three acres located in the northeastern section of a 60-acre parcel which is owned by Clyde Burgess, Jr.

The Site includes the following six areas:

- Landfill Area - which is the waste disposal area.

- Lagoon Area - former lagoon cells which are located within the Landfill Area. This area consists of two former waste disposal cells where solvent and reserve energizer battery waste were reportedly disposed.

- Soil Staging Area - located north of the Landfill Area.

- Area West of Landfill - includes the areas to the west of the Landfill Area, downslope of the landfill, and in the vicinity of a temporary access Landfill Road.

- Marshy Area - located south and southeast downslope of the landfill and consists of several small wetland areas.

- Hillside Area - includes areas upslope and to the east of the Marshy Area and Landfill Area on Harmon Hill.

As stated above, the Site consists of approximately three acres. The Landfill Area occupies approximately two acres which includes the two former Lagoon Cells. The Lagoon Cells occupy approximately 4,000 square feet (0.09 acres) of the landfill. The marshy area and area impacted by the contaminated groundwater plume occupy approximately one acre beyond the Landfill Area. Both the landfill and lagoon cells have been covered with clean soils from the Burgess Brothers property.

The primary land use in the vicinity of the site is undeveloped forest. Industrial, commercial, and residential properties are located along Burgess Road, approximately one mile southwest of the Site. Although Bennington, Vermont contains many historic structures, no cultural resources have been identified in the immediate vicinity of the Site.

Two municipal water supply systems, Ryder Spring and Morgan Spring, are located within one mile of the Site. These systems are operated by the Bennington Water Department. Two private drinking water wells have been identified within one mile of the Site.

A new housing development is being constructed just north of the Site. This construction is not expected to impact environmental conditions at the Site as the development will be connected to town water and sewerage (Publicly Owned Treatment Works (POTW)).

Activities at the Site began as sand and gravel mining operations in the 1940s. Beginning in the early 1950's the site was used as a metal salvage facility and as a disposal area for construction debris. Starting in the 1960's metals, sludges, and rejected small appliance batteries were also disposed at the Site. The two Lagoon Cells (unlined pits) received liquid wastes and sludge from approximately 1967 to 1976. These wastes consisted of lead sludges, lead contaminated wastewater, spent solvents (primarily PCE and TCE), and battery waste. Manganese dioxide cells (containing zinc and mercury) were also disposed. Approximately 2,371,100 gallons of liquid waste and 241,090 pounds of solid or semi-solid wastes were disposed of at the Site from 1971-1976. An unknown quantity of waste, primarily lead sludge, was also disposed of at the Site from the 1960's through 1971.

Numerous investigations have been performed at the Site to evaluate the environmental impact of the disposal operation which occurred in the Landfill Area and former Lagoon Cells. VTAEC inspected the Site several times during the late 1960's and 1970's to evaluate disposal practices and environmental impacts. In August 1976, VTAEC disallowed disposal operations at the Site.

From 1984 - 1989, preliminary investigations and periodic monitoring of soil, surface water, groundwater, and leachate were performed by the State, EPA, and Union Carbide Corporation.

VTDEC (then VTAEC) conducted a Preliminary Assessment in 1985 and EPA proposed the Site for listing on the NPL on June 24, 1988. On March 31, 1989 the Site was added to the National Priorities List.

On May 10, 1991, EPA notified five parties who either owned or operated the facility, generated wastes that were shipped to the facility, arranged for the disposal of wastes at the facility, or transported wastes to the facility, of their potential liability with respect to the Site. Negotiations commenced with these potentially responsible parties (PRPs) regarding the PRPs' performance of an RI/FS at the Site.

On August 13, 1991, EPA entered into an Administrative Order by Consent with three of the PRPs for the performance of a Remedial Investigation and Feasibility Study (RI/FS). These three PRPs agreed to conduct and pay for the RI and FS, and to reimburse EPA for the cost of overseeing the investigations. These PRPs also agreed to pay for a portion of past costs at the site. The EPA will continue to negotiate with all of the PRPs to fund the site cleanup.

The RI consisted of a series of field investigations to further evaluate the nature and extent of contamination related to the site. Consistent with the EPA's "presumptive remedy approach," EPA determined that the landfill would be covered with a cap to contain the waste materials; therefore, extensive sampling of the landfill was not necessary. The RI confirmed that the Landfill Area, Lagoon Area, and Marshy Area soils were contaminated with VOCs, semi-volatile organic compounds (SVOCs), and metals. The highest contaminant concentrations in soil were detected in the Lagoon Area. Groundwater samples from overburden monitoring wells also contained a variety of VOCs, SVOCs, and metals; many of these contaminants were detected at levels above Federal and State drinking water standards Private wells located downgradient of the site and two public water supply sources, Ryder Spring and Morgan Spring, were sampled and determined to not be affected by site related contamination. The RI also indicated that surface water and sediments in the swales and unnamed stream that runs along the eastern side of the landfill contained concentrations of VOCs and metals.

Studies of the site hydrogeology indicated that contaminated groundwater beneath the landfill enters the soils in the Marshy Area and empties into the swales and unnamed stream. The zone of contamination, or plume, is gradually spreading to the south and west as the groundwater flows through the overburden. The area of contamination is slightly south of well cluster W-09.

The EPA conducted a risk assessment to evaluate potential risks to human health and the environment posed by the site if no action were taken to address contamination. The risk assessment indicated that there are no unacceptable health risks to people currently exposed to contamination at the landfill. However, the EPA has determined that if in the future, residential development were to occur closer to the landfill area and new drinking water wells were installed, unacceptable cancer and noncancer health effects would be associated with household use of the contaminated groundwater.

The ecological risk assessment indicated that levels of contaminants in leachate, soils, and sediments in the Marshy Area, swales, and unnamed stream pose an unacceptable risk to some types of wildlife.

History of Community Involvement

Throughout the Site's history, community concern and involvement has been fairly low. EPA has kept the community and other interested parties apprised of the Site activities through informational fact sheets, press releases, and public meetings. On June 10, 1998, EPA issued a Proposed Plan for the cleanup of the site.

On June 11, 1998, EPA published a notice and brief analysis of the Proposed Plan in the Bennington Banner. On June 15, 1998 EPA made the Proposed Plan and Administrative Record available to the public by placing a copy in the Bennington Free Library, Bennington, Vermont, and at EPA's office in Boston. On June 23, 1998, EPA held an informational meeting/public hearing at the Bennington Free Library to discuss the results of the Remedial Investigation and the cleanup alternatives presented in the Feasibility Study. During this meeting EPA presented the Proposed Plan and accepted oral comments. Approximately 12 people attended the meeting. The public comment period ran from June 15 through July 15, 1998.

Public Reaction to the EPA's Preferred Alternative

There was general support for EPA's Proposed Plan, although very few comments were received. Specific issues raised are discussed below.

III. SUMMARY OF PUBLIC COMMENTS AND AGENCY RESPONSES

This Responsiveness Summary addresses comments pertaining to the Proposed Plan and FS which were received by the EPA during the public comment period (June 15 to July 15, 1998). Approximately twelve individuals, including representatives of VT DEC, PRPs, a local

newspaper, EPA, and area residents attended the meeting. No oral comments were provided during the public hearing. Two sets of written comments were received by the EPA during the comment period. These comments are presented and addressed below:

Comment #1: A citizen raised a concern related to site access. He had seen children fishing in the streams very near the site and felt that this should not be allowed.

Response: Institutional controls proposed in the selected alternative will include restricting site access. This will include a chain link fence or similar device surrounding the perimeter of the site which should address this type of activity as well as other trespassers.

Comment #2: A citizen questioned how the contamination at the Site would be contained and remediated.

Response: The selected remedy will require capping the landfill area and marshy area soils which will adequately contain the contamination within the site boundary. Remediation will include soil vapor extraction and air sparging to remove VOCs from the lagoon area soils as well as natural attenuation of groundwater.

Comment #3: A citizen asked where the contamination from the site was to be transported.

Response: There will be no transportation of site contamination. All site contamination will be contained and treated on-site. Transportation of some material used in a treatment processes, such as spent organic carbon, may occur depending on the treatment method determined during design. Any transportation of these types of material is expected to be done by a truck and is expected to be minimal.

Comment #4: A citizen questioned the amount of additional traffic expected that would be related to construction activities. This concern also included whether the process would cause excess noise or odors as well as when the activities would be performed.

Response: Negligible additional traffic is expected. The construction activities will occur

during normal working hours which is consistent with the activities that are typical at the Burgess Brothers Construction Company. All activities with be performed on-site which is in a remote area. No adverse odor or noise impacts are expected to impact any nearby residences.

Comment #5: A citizen was concerned whether the presence of site contamination over the years had caused lasting damage to plant life and/or animal life.

Response: There have been impacts to both plant and animal life over the years. The presence of stressed vegetation has been documented and the soils in the marshy area are currently an unacceptable risk to some forms of wildlife. None of these impacts, however, are expected to be permanent. Once the capping of the landfill and marshy area and the treatment of lagoon soils is complete, the source of contamination will be greatly reduced. Further, natural attenuation of groundwater is expected to achieve drinking water standards at the compliance boundary within seven years. When the remediation activities are complete, there will be no further unacceptable risks associated with the site.

Comment #6: A citizen questioned whether is was possible that some contamination at the site could have been missed.

Response: Investigatory activities have included a comprehensive evaluation of all potential pathways of contamination including groundwater, soil, sediments, surface water, and air. There is a very high level of confidence that all site related contamination has been identified and thoroughly defined.

IV. CHANGES IN SELECTED REMEDY BASED ON PUBLIC CONCERNS

The comments received generally supported EPA's proposed alternative. The were no changes based on comments received.

ATTACHMENT A

LIST OF FORMAL COMMUNITY RELATIONS ACTIVITIES CONDUCTED TO DATE AT THE BURGESS BROTHERS SUPERFUND SITE

September 16, 1992	Community interviews conducted by the EPA in Bennington and Woodford, Vermont.
February 1995	Community Relations Plan issued.
April 1998	Fact Sheet No. 1 issued describing the findings of the RI/FS, risk assessment and proposed FS alternatives.
June 10, 1998	EPA Proposed Plan released
June 11, 1998	Public notice published in the Bennington Banner announcing the availability of the Proposed Plan and Administrative Record and the upcoming public meeting.
June 15, 1998	Start of the public comment period.
June 23, 1998	Public meeting held by the EPA and VT DEC at the Bennington Free Library discuss the results of the RI, risk assessment, and EPA's proposed alternative.
September 1998	Responsiveness Summary issued as part of the Record of Decision on the EPA's preferred alternative for the Burgess Brothers Site.

ATTACHMENT B

TRANSCRIPT FROM JUNE 23, 1998 PUBLIC HEARING

1 **********

2 EPA PROPOSED PLAN

3 BURGESS BROTHERS SUPERFUND SITE

4 WOODFORD & BENNINGTON, VERMONT

5 **********

6 Information Session

7 and

8 Formal Comment Session

9 Tuesday, June 23, 1998
7:00 PM

10 Wills Room

11 Bennington Free Library
Bennington, Vermont

12 **********

13 PRESENT:

14 RONALD JENNINGS
15 REMEDIAL PROJECT MANAGER
U.S. ENVIRONMENTAL PROTECTION AGENCY
16 JFK FEDERAL BUILDING, HBT
BOSTON, MA. 02203

17 MARY JANE S. O'DONNELL
18 SUPERVISORY ENVIRONMENTAL ENGINEER
JFK FEDERAL BUILDING
19 BOSTON MA. 02203

20 GEOFFREY SEIBEL
DEMAXIMIS, INC.
21 SUITE 202
ALLENTOWN, PA.

22 SARAH WHITE
23 COMMUNITY INVOLVEMENT COORDINATOR
OFFICE OF THE SUPERFUND COMMUNITY RELATIONS
24 US ENVIRONMENTAL PROTECTION AGENCY
JFK FEDERAL BUILDING (RAA)
25 BOSTON, MA. 02203

MS. O'DONNELL: As you can see, the formal part of the hearing has started. It will be transcribed. If you would like to make some formal comments on the post cleanup plan, now is your opportunity.

MRS. MacINTYRE: What's the timeframe for putting on the cover and completing the covering up process?

MS. O'DONNELL: Could you identify yourself just for the record?

MRS. MacINTYRE: Barbara MacIntyre. We did that doing the first? In other words, you're going to put a cover on, how long will it take to put the cover on, make sure the test wells are in place and be able to walk away and come back casually and come back?

MS. O'DONNELL: Do you have a sense of that?

MR. JENNINGS: We are not formally answering questions right now but the schedule needs to be put forward. However, we are talking about construction happening fairly soon. You folks over there are going to be moving forward on design, we are basically moving faster than what our schedule requirement is. Can you give me some idea of what your hope is?

MR. SEIBLE: Geoff Seible for the record. We're probably planning on an aggregate of anywhere from 18 months to 24 months for design and construction total. And it's our objective to design and build this remedy as quickly as possible and construction may start as early as this year but the bulk of the work will likely be next year.

MR. JENNINGS: That's fast for superfunds.

MRS. MacINTYRE: That is, that is.

MS. O'DONNELL: If you could combine your comments to comments of the proposed plan that would be great but we would be more than happy to answer certification type questions after we close the formal hearing.

Any other comments? Well, seeing there are none, the formal hearing is now closed but certainly when we will be more than that happy to answer any questions you might have for as long as you people want to stay.

(WHEREUPON THE HEARING WAS CONCLUDED, THIS DATE.)

1 C E R T I F I C A T I O N

2 I, ERIN K. O'HEARN, a Shorthand
3 Reporter in and for the State of Vermont do hereby
4 certify that the foregoing record taken by me at
5 the time and place noted in the heading hereof is a
6 true and accurate transcript of same, to the best
7 of my ability and belief.
8
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11 ERIN K. O'HEARN
12 SHORTHAND REPORTER
13
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17 Dated: June 29, 1998
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