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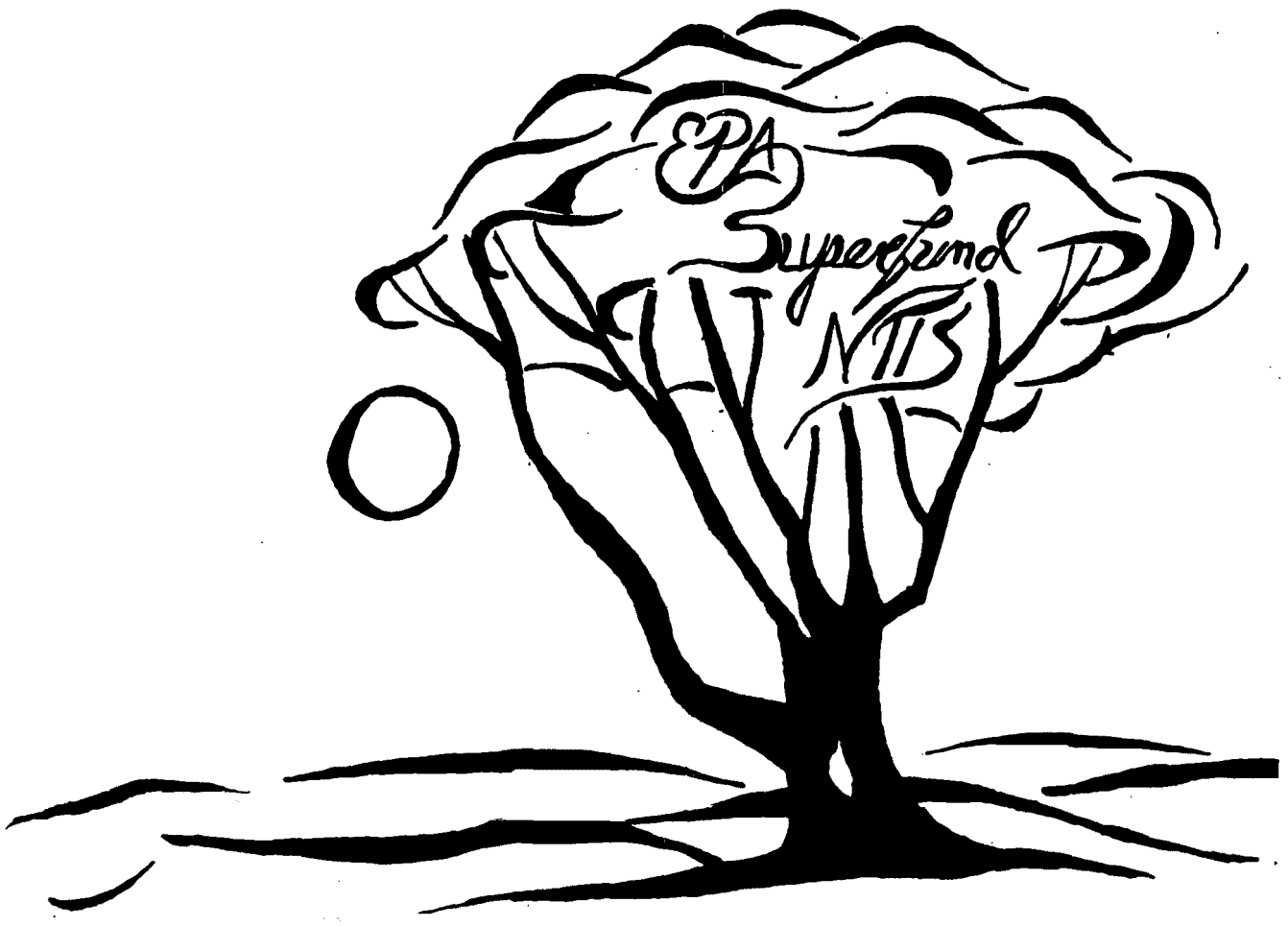
EPA Superfund Record of Decision:

BFI Sanitary Landfill (O.U. 1), Rockingham, VT 9/21/1994



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203-2211

DECLARATION FOR THE RECORD OF DECISION

BFI-Rockingham Landfill
Rockingham, Vermont

STATEMENT OF PURPOSE

This decision document represents the selected remedial action for the BFI-Rockingham Landfill Superfund Site in Rockingham, Vermont, developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986, and to the extent practicable, the National Oil and Hazardous Substances Contingency Plan (NCP), 40 CFR Part 300 et seq., as amended. The New England Region Administrator has been delegated the authority to approve this Record of Decision.

STATEMENT OF BASIS

This decision is based upon the Administrative Record which has been developed in accordance with Section 113 (k) of CERCLA and which is available for public review at the Rockingham Free Public Library and at the New England Region Waste Management Division Records Center in Boston, Massachusetts. The Administrative Record Index (Appendix E 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 the environment.

DESCRIPTION OF THE SELECTED REMEDY

This ROD sets forth the selected remedy for the BFI-Rockingham Landfill Superfund Site, which addresses both the source control and management of migration of contamination at the Site.

The remedial measures described in this ROD will protect the drinking water aquifer and Connecticut River by minimizing further migration of contamination into the ground water and surface water, will eliminate the potential for direct contact and/or incidental ingestion of the material within the landfill, and will control landfill gas and prevent exposure to landfill gas containing hazardous substances.

The selected remedy consists of operating and maintaining the existing Site controls to achieve the natural restoration of the ground water and protect surface water. This alternative includes:

- continued maintenance of the multi-layer cap currently under construction;
- continued operation and maintenance of the existing leachate collection system and ground water collection trench. The collected leachate and ground water will be shipped to an off-site facility for treatment and disposal;
- continued operation and maintenance of the gas collection and treatment system;
- maintenance of institutional controls: to prevent future use of the landfill that would damage the multi-layer cap; to prevent ground water use throughout the area of Site-related contamination; and to assure a water supply to residents with Site-related contaminated ground water beneath their residences.
- continued long-term monitoring of the seeps, ground water, collected ground water and leachate, Connecticut River surface water and sediments, and storm water run-off, to confirm the nature and extent of contamination and confirm the restoration of the ground water; and
- a review of Site conditions every five years.

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 does not satisfy 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 was equally protective and more cost effective and implementable than the treatment alternative evaluated. This remedy 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 remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

9/21/94
Date

John P. DeVillars
Regional Administrator
U.S EPA, New England Region

NEW ENGLAND REGION

RECORD OF DECISION SUMMARY

FOR THE

BFI-ROCKINGHAM LANDFILL SUPERFUND SITE

September 1994

BFI-ROCKINGHAM LANDFILL SUPERFUND SITE

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ROD DECISION SUMMARY
September 1994

I. SITE NAME, LOCATION AND DESCRIPTION

The Site is the BFI-Rockingham Landfill Superfund Site, also known as the Disposal Specialists Inc. Landfill, and will hereafter be referred to as the "Site". The Site is located along U.S. Route 5, locally known as Missing Link Road, in the Town of Rockingham, Windham County, Vermont. The Site is located on a terrace within 500 feet of the Connecticut River (See Figure 1). The surrounding area is rural residential and agricultural land. Four residences are located between the landfill and the Connecticut River. Three of these residences are supplied water by a private water line on BFI property. The fourth residence has a private water supply upgradient of the Site. Much of the topography between the landfill and the Connecticut River is too steep for development.

The Site consists of a 17 acre solid waste landfill and the surrounding areas impacted by the Site. The impacted areas include the overburden ground water, bedrock ground water, and at least three areas of leachate discharge and the associated seep sediments along Route 5. Two of these areas of leachate discharge are now dry. There is a substantial floodplain/wetland area at the base of the steep slopes between the Site and the Connecticut River. There are no wetlands or floodplain areas on the west side of Route 5 within the 25 acre area consisting of the landfill and operating facility. The facility adjacent to the landfill includes an office building, garage, a solid waste transfer station, and storage areas for the transfer station.

The overburden ground water is discontinuous in the area of the Site. Bedrock ground water is the primary drinking water resource for the residences in the area of the Site. A publicly owned sewage treatment works (POTW) is located directly across the Connecticut River in Charlestown, N.H.

A more complete description of the Site can be found in the Remedial Investigation Report at pages 1-4 thru 1-16 and the Supplemental Remedial Investigation Report at pages 3-1 thru 3-3.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

A. Land Use and Response History

The Site consists primarily of a 17 acre sanitary landfill. The landfill and associated facilities occupy 25 acres of approx. 120 acres owned by DSI. From 1968 until 1991, the landfill received residential, commercial, and industrial solid and liquid waste. Industrial waste was only accepted during the 1960s and 1970s.

Approximately 1.2 million cubic yards of solid waste and an unknown quantity of industrial waste were disposed of in the landfill during its operation. The landfill stopped receiving waste in November 1991. An interim cover of clean soil was placed over the landfill after the end of solid waste activity. The landfill was regraded in 1993 to establish a three foot horizontal to one foot vertical (3H:1V) grade over the landfill.

Prior to the 1960s, the Site was undeveloped woodland. During the early 1960s it was used as embankment fill for the construction of Interstate 91. In 1968, Harry K. Shepard received approval from the Vermont Department of Health to operate a municipal solid waste landfill. In 1969, Harry K. Shepard, Inc. deeded the landfill property to Disposal Specialists, Inc. (DSI) which operated the landfill. Harry K. Shepard, Inc. was continued as a solid and industrial waste hauling company. In 1973, Browning-Ferris Industries, Inc. purchased DSI and Harry K. Shepard, Inc. and continued operation of the landfill as DSI. In that same year, Harry K. Shepard, Inc. changed its name to Browning-Ferris Industries of Vermont, Inc. (BFI-VT).

The current and future land use of the landfill was considered non-residential due to the impracticality of constructing residences on a closed landfill with 3H:1V slopes. The adjacent property is currently residential. The future land use for areas adjacent to the landfill was considered residential. However, a significant portion of the area between the facility and the Connecticut River is not suitable for development due to steep topography.

A site chronology is attached as Table 1. A more detailed description of the Site history can be found in the Remedial Investigation Report at pages 1-5 - 1-8.

B. Enforcement History

On May 15, 1992, EPA notified two parties, DSI, as owner and operator of the facility, and BFI-VT, as a transporter of wastes to the facility, of their potential liability with respect to the Site. Negotiations commenced with these potentially responsible parties (PRPs) on May 15, 1992 regarding the settlement of the PRP's liability at the Site.

In July 1992, EPA and the two PRPs, BFI-VT and DSI, entered into an Administrative Order by Consent, U.S. EPA Region I CERCLA Docket No. I-92-1053 for the performance of a remedial investigation and feasibility study (RI/FS). EPA also recovered past costs from the same parties under a separate Administrative Order by Consent, U.S. EPA Region I CERCLA Docket No. I-92-1052.

As part of the Superfund Accelerated Cleanup Model (SACM), EPA initiated a non-time-critical removal action (NTCRA) for the Site in

December 1992. In February 1993, EPA required the PRPs to prepare an engineering evaluation/cost analysis (EE/CA) under the existing RI/FS Order to support the selection of a NTCRA for the Site. The EE/CA included the assumption that containment was the preferred approach for landfill closure as described by the EPA document "Guidance for Conducting Remedial Investigations and Feasibility Studies at CERCLA Municipal Landfill Sites".

Based upon the EE/CA, EPA selected the installation of a multi-layer landfill cap as the NTCRA activity in an Action Memorandum signed September 13, 1993. On September 24, 1993, EPA entered into a third administrative order by consent, U.S. EPA CERCLA Docket No. I-93-1099, for the design and implementation of the activities described in the Action Memorandum. The design of the NTCRA was initiated in October 1993 and completed in June 1994. As of August 1994, the PRPs have completed design and are performing the construction of the NTCRA. The construction is expected to be completed by November 1994.

In addition, the State of Vermont has regulated the landfill's operations under its solid waste management program since 1968. In 1979, the Vermont Department of Environmental Conservation (VTDEC) collected and analyzed groundwater samples from six bedrock wells in the vicinity of the landfill. Based upon the results of those samples, the VTDEC required DSI to supply nearby residents with bottled water. In 1980, a new water supply well was installed on the DSI property to service the facility and the residences. DSI entered into an agreement with the residents to maintain the water line for twenty years. Since the installation of the water line no residences have been supplied bottled water. Several hydrogeologic investigations were performed during the 1980s by DSI pursuant to VTDEC requirements.

The landfill received municipal incineration ash from 1986 to 1989. The municipal incineration ash was disposed in a lined monofill section in the southeastern section of the landfill. In 1989, DSI installed an active gas collection system in order to comply with the Vermont air pollution control regulations. The gas collection and treatment system is operated and maintained pursuant to a permit issued by the Vermont Air Pollution Control Division.

The PRPs have been active in the remedy selection process for this Site. The PRPs representatives and/or contractors have attended all public meetings at the Site and the PRPs contractor prepared the Remedial Investigation, Supplemental Remedial Investigation, and Feasibility Study Reports.

III. COMMUNITY PARTICIPATION

Throughout the Site's history, community concern and involvement has been moderately high. A local environmental organization and several residents have been actively involved at the Site. EPA has kept the community and other interested parties apprised of the Site activities through informational meetings, fact sheets, press releases and public meetings.

On October 22, 1992 EPA held an informational meeting at the Rockingham Town Hall in Bellows Falls, VT to announce the signing of the Administrative Order and to describe the plans for the Remedial Investigation and Feasibility Study. On April 6, 1993, EPA released a community relations plan which outlined a program to address community concerns and keep citizens informed about and involved in activities during remedial activities.

In May 1993, EPA issued a fact sheet describing the results of the remedial investigation and human health risk assessment. In June 1993, EPA released a fact sheet describing a proposed NTCRA to control the source of contamination. A public information meeting was held on July 12, 1993 at the Rockingham Town Hall in Bellows Falls to discuss the proposed NTCRA. On July 12, 1994 EPA made the administrative record for the NTCRA available for public review at EPA's offices in Boston and at the Rockingham Free Library. A thirty day comment period was held from July 13 - August 12, 1993. A public hearing was held on August 5, 1993 at the Rockingham Town Hall to receive oral comment on the proposed NTCRA alternative and the engineering evaluation/cost analysis. On September 13, 1993, EPA signed the Action Memorandum selecting a multi-layer cap and expansion of the gas collection and treatment system as the NTCRA. The Action Memorandum included a responsiveness summary.

In October 1993, EPA awarded a technical assistance grant (TAG) to the Vermont Public Interest Research Education Fund (VPIREF). In March 1994, VPIREF hired technical advisors to provide technical assistance to the community. VPIREF has been very active in Site activities.

In April 1994, EPA issued a fact sheet announcing the upcoming construction of the multi-layer cap for the NTCRA and updating the remedial investigation and feasibility study. EPA held a public meeting at the Hit or Miss Club in Rockingham, Vermont (across from the Site) on April 13, 1994 to discuss the fact sheet.

EPA issued a Press Release discussing the Long-Term Monitoring Program in May 1994. EPA held a public meeting at the Hit or Miss Club on May 18, 1994 to discuss a the Long-Term Monitoring Plan and the plan to sample residential wells in the vicinity of the Site.

On June 15, 1994, EPA issued the Proposed Plan for the remediation of the Site's ground water. On June 30, 1994, EPA made the administrative record available for public review at EPA's offices in Boston and at the Rockingham Free Library. EPA published a notice and brief analysis of the

Proposed Plan in the Bellows Falls Town Crier and Springfield Reporter on June 22, 1994 and made the plan available to the public by mailing copies of the Proposed Plan to the mailing list and placing copies at the Rockingham Free Library.

On June 29, 1994 EPA held an informational meeting at the Hit or Miss Club to discuss the results of the Remedial Investigation and the cleanup alternatives presented in the Feasibility Study and to present the Agency's Proposed Plan. From June 30 to July 30, 1994, the Agency held a 30 day public comment period to accept public comment on the alternatives presented in the Feasibility Study and the Proposed Plan and on any other documents previously released to the public. On July 20, 1994, the Agency held a public meeting at the Hit or Miss Club to discuss the Proposed Plan and to accept any oral comments. A transcript of this meeting and the comments and the Agency's response to comments are included in the attached responsiveness summary.

IV. SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

The selected remedy is the second cleanup activity initiated by EPA at the Site. The first action was the NTCRA designed to control the source of ground water and surface water contamination. The NTCRA also addressed the release of landfill gas and potential public contact with the landfill debris and soils. The Action Memorandum selecting the NTCRA was signed September 13, 1993. An Administrative Order by Consent, signed by EPA, DSI and BFI-VT, to implement the NTCRA was signed September 24, 1993. The gas control required by the NTCRA has been completed and the landfill cap required by the NTCRA is currently under construction and should be complete by November 1994. Additional overburden ground water source control, to prevent contaminated seeps from flowing into the Connecticut River, and institutional controls to prevent the use of the Site in any manner that would compromise the integrity of the cap are also being implemented under the NTCRA. The NTCRA also includes the continued operation of the leachate collection system and ground water collection trench. The NTCRA only included operation and maintenance of the cap, leachate collection, ground water collection, and gas collection and treatment systems until the NTCRA is superseded by a long-term remedial action. Therefore, the selected remedy also provides a determination of the need to continue the operation and maintenance of the controls installed under the NTCRA.

This Site has been a national pilot site for the implementation of the EPA Guidance "Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites". The Site has also used the Presumptive Remedy Statement for Landfill Sites and the Superfund Accelerated Cleanup Model.

The selected remedy was developed by combining components of different source control and management of migration alternatives to obtain a comprehensive approach for Site remediation. All alternatives evaluated assumed the successful construction of the NTCRA. In addition, all alternatives evaluated in detail, except No Further Action, include the operation and maintenance of the controls installed under the NTCRA as a

component.

V. SUMMARY OF SITE CHARACTERISTICS

Chapter 1 of the Feasibility Study contains an overview of the Remedial Investigation. The significant findings of the Remedial Investigation and Supplemental Remedial Investigation are summarized below.

Landfill

The major source of contamination of the Site is the 17 acre solid waste landfill. The landfill is up to 100 feet deep and contains approximately 1.2 million cubic yards of material. The majority of the landfill has slopes of 3H:1V. During the late 1960's and 1970's unknown quantities of industrial waste were disposed in the landfill. The landfill also contains a 1.5 acre lined ash monofill. (See Figure 2 for the location of the ash monofill and other Site facilities) The industrial waste and municipal solid waste within the landfill mix with snow melt and rain water which percolate through the waste material to form leachate. This leachate is characterized by high iron and manganese, elevated levels of other metals, volatile organic compounds, semi-volatile organic compounds, and very low levels of pesticides. The evaluation of indicator parameters also suggest that the leachate creates a reducing condition. (See Figure 3 for a conceptual cross-section of the leachate generation)

The leachate generated by the ash monofill portion of the landfill is collected by a leachate collection system and shipped off-site for disposal. The leachate that is not collected by the leachate collection system enters either the bedrock or overburden ground water system. Most of the landfill is underlain by overburden. The leachate which flows into the overburden ground water flows horizontally towards the Connecticut River. The overburden ground water does not penetrate deeply into the ground because the overburden soils are mostly stratified silts and clays which restrict the downward flow of ground water. Prior to January of 1993, this contaminated overburden ground water discharged to the ground surface at three seep locations along U.S. Route 5.

As of January 1993, the majority of this flow is being collected by a ground water collection trench. A small amount of the overburden ground water still discharges to the ground surface at the location of seep #6 during the spring and summer (See Figure 4 for the location of seep #6). This water then flows downslope toward the Connecticut River or infiltrates into the ground between the seep and the river.

Portions of the landfill are directly above or very close to the bedrock surface. In these areas, the leachate migrates into the bedrock fractures and mixes with the bedrock ground water. This leachate is believed to be act as a reducing agent in bedrock which is hypothesized to cause the mobilization of naturally occurring arsenic and manganese out of the bedrock and into the bedrock ground water.

The bedrock ground water flows towards and eventually discharges to the Connecticut River.

Surface Water

The water of the Connecticut River has been investigated throughout the RI and SRI (see Figure 4 for surface water and seep sampling locations). The results of the investigation revealed localized areas of impact to the Connecticut River immediately adjacent to the point where the landfill seeps flow into the Connecticut River. The installation of the ground water collection trench has eliminated the impact from the two most contaminated seeps. A third seep, which is identified as seep #6, still flows into the Connecticut River during the spring and early summer. The cap will significantly reduce the generation of leachate by the landfill and thus reduce the flow from the third seep. In addition, Seep #6 has been fenced and the contaminated water will be collected as part of the NTCRA.

Sampling of the Connecticut River in August 1993 and May 1994, after the installation of the trench, revealed reduced levels of metals in the surface water. The ground water collection trench appears to have significantly reduced the impact of landfill seeps on the Connecticut River. Table 2 shows a comparison of the maximum values detected in the Connecticut River surface water as compared with federal and state ambient water quality criteria. Table 2 demonstrates that, while historical impacts may have occurred, the Connecticut River is not currently being impacted by the Site.

In addition to the seeps, there is an existing storm water discharge pipe extending from the landfill and facility parking lot into the Connecticut River. (See Figure 5) The discharge in the storm drain is also fed by overburden ground water as evidenced by the consistent flow from the pipe. Samples from the storm drain indicate very low, less than 1 part per billion (ppb) level of VOC and elevated levels of several metals. However, river samples from this location do not show an impact from the storm drain.

Sediments

The sediments located in leachate seeps adjacent to the landfill and within the three seeps along U.S. Route 5 were sampled during the RI (see Figure 6 for sediment sampling locations). These sediments contained VOCs and metals similar to those detected in the associated surface water at these same locations and very low levels of several pesticides. In addition, low levels of polycyclic aromatic hydrocarbons were also detected in the sediments.

The sediments in the Connecticut River were also evaluated during the SRI. Site-related contamination was not detected in the Connecticut River sediments significantly above the National Oceanic and Atmospheric Administration effects-range low or medium reference

levels. Low levels of several pesticides have been detected in the sediment of the Connecticut River. However, these levels were not consistent or widespread.

Air

An air quality assessment was performed as part of the RI and SRI. This included the use of field instruments to provide an initial screening of potential gas emissions on June 20, 1991 and a quantitative analysis of ambient air using an eight hour sampling device on December 9, 1992. (See Figures 7 and 8 for sampling locations) In addition, daily air monitoring with field screening equipment was performed in August and September 1993 during the landfill regrading project. The monitoring reflected a worst case situation as 45,000 cubic yards of landfill material was excavated and relocated during the regrading activities. In addition to the screening surveys, quantitative air sampling was performed several times a week during the regrade. These air studies confirmed that while the landfill is a source of methane, hazardous compounds were not detected in the ambient air above or adjacent to the landfill.

The results of these studies also confirmed that the gas collection and treatment system is controlling the landfill gas. However, some odors may still be detected when the system is down for maintenance and when leachate is exposed at the seeps.

The landfill gas system was expanded in April-May 1994 to include 11 new gas extraction wells. Once the cap is completed these wells should provide additional control over the release of landfill gas. In addition, the cap should significantly reduce the release of odors from the leachate seeps along surface of the landfill.

Air exposure outside the landfill was not considered a potential exposure pathway and was only qualitatively assessed. The factors included in the qualitative assessment were: (1) the fact that the overburden ground water, which contains the higher levels of volatile organic compounds, does not extend to the area of residences adjacent to the landfill; and (2) the volatile organic compound levels in the bedrock ground water beneath the residences are very low.

Ground water

As discussed previously, water which percolates through the landfill enters either the overburden or bedrock ground water flow system. The overburden ground water in the immediate vicinity of the landfill contains moderate to high levels of VOCs, semi-VOCs, and metals contamination. (See Figure 9 for overburden sampling locations) This overburden contamination is confined to a limited area between the landfill and east side of Route 5. The overburden ground water has historically discharged at the top of the ravines adjacent to Route 5. The extent of contamination in overburden ground water is shown on Figure 10. Overburden ground water was not considered a pathway for

human health exposure because the limited area, low yield, and steep slopes make the development of a residential water supply in the area of contamination unlikely.

The majority of the contaminated overburden ground water is being collected by the ground water collection trench. (See Figure 9 for trench location) This water is being transported to an off-site facility for treatment and disposal. Following the installation of the cap, the volume of contaminated overburden ground water being produced should be significantly reduced. The overburden ground water that discharges at seep #6 will be collected in an extension of the ground water collection trench as part of the NTCRA. Some overburden ground water contamination exists in the soils and road bed east of the ground water collection trench. This contamination will decrease over time as clean water flushes the residual contamination.

Bedrock ground water between the landfill and the Connecticut River also contain elevated levels of VOCs, semi-VOCs, and metals. However, the bedrock ground water has much lower levels of VOCs and semi-VOCs than the overburden ground water. (See Figure 11 for bedrock sampling locations) The major contaminants in the bedrock ground water are arsenic and manganese. The extent of bedrock contamination is shown in Figure 12. The VOC and semi-VOC contamination is attributed to the waste material in the landfill. The arsenic and manganese contamination appears to result from the flow of landfill leachate into bedrock ground water, which causes the mobilization of naturally occurring arsenic and manganese from the bedrock into ground water. While a significant percentage of the manganese is also contributed by the landfill leachate, the RI sampling of the leachate seeps and overburden ground water supports that the arsenic is primarily contributed by the bedrock.

As shown in Figure 10, overburden ground water contamination has only been detected in the area north of the Hit or Miss Club and south of monitoring wells 8, 9, and 10. As shown in Figure 12, bedrock ground water contamination has been detected in an area north of the Hit or Miss Club to monitoring wells K-39 and K-40. Low levels of volatile organic compounds (4 ppb of trichloroethene and 2 ppb of tetrachloroethene) detected at monitoring well K-40 indicate that the northern edge of the plume may extend further north than the K wells. Water level data, which indicated the direction of ground water flow, collected as part of the RI and SRI does not support the migration of contaminated overburden and bedrock ground water to other areas.

The landfill cap will significantly reduce the generation of leachate. This will result in less flow of water to the ground water collection trench and leachate collection system and less flow into the bedrock ground water. As the leachate flow drops contaminant concentrations in the bedrock ground water should return to the natural levels for bedrock in the area of the Site.

A complete discussion of site characteristics can be found in the Remedial Investigation and Supplemental Remedial Investigations Reports at chapters 4 and 5. A discussion of the natural restoration model for the bedrock ground water can be found in pages 93 through 115 of the Feasibility Study.

VI. SUMMARY OF SITE RISKS

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

Twenty-three contaminants of concern, listed below in Tables 3-7 were selected for evaluation in the risk assessment. These contaminants constitute a representative subset of the more than 76 contaminants identified at the Site during the Remedial Investigation. The twenty-three contaminants of concern were selected to represent potential site related hazards based on toxicity, concentration, frequency of detection, and mobility and persistence in the environment. A summary of the health effects of each of the contaminants of concern can be found in Section 2.3 of the human health risk assessment.

TABLE 3: SUMMARY OF CONTAMINANTS OF CONCERN IN BEDROCK GROUND WATER

Contaminants of Concern	Average Concentration (ug/l)	Maximum Concentration (ug/l)	Frequency of Detection
2-Butanone	18	370	2/34
Antimony	14	28	1/32
Arsenic	49	282	18/32
Barium	303	1850	30/32
Benzene	6	17	10/34
Bis(2-chloroiso propyl)ether	11	100	1/33
Bis(2-ethylhexyl) phthalate	8	62	10/33
Chromium	5	81	5/32
Manganese	1020	5830	28/32
Nickel	30	102	14/32
Pentachlorophenol	3	3	1/34
Tetrachloroethene	5	12	2/34
Xylenes	82	1200	11/34
Vinyl Chloride	4	6	3/34

TABLE 4: SUMMARY OF CONTAMINANTS OF CONCERN IN DRAINAGE POND SEDIMENTS

Contaminants of Concern	Average Concentration (mg/kg)	Maximum Concentration (mg/kg)	Frequency of Detection
Arsenic	2.18	5.5	4/8
Benzo(b)fluoranthene	0.06	0.07	2/8
Benzo(k)fluoranthene	0.06	0.07	2/8
Beryllium	0.18	0.26	2/8
Chromium	15.8	34.7	8/8
Manganese	277.0	677.0	8/8
Nickel	19.8	41.5	8/8
Vanadium	20.2	45.0	8/8

TABLE 5: SUMMARY OF CONTAMINANTS OF CONCERN IN SEEP SEDIMENTS

Contaminants of Concern	Average Concentration (mg/kg)	Maximum Concentration (mg/kg)	Frequency of Detection
Arsenic	16.5	64.8	11/12
Barium	707	2240.0	12/12
Benzo(a)anthracene	0.23	0.77	6/12
Benzo(a)pyrene	0.24	0.53	5/12
Benzo(b)fluoranthene	0.32	1.30	8/12
Benzo(k)fluoranthene	0.30	1.20	8/12
Beryllium	0.22	0.40	1/12
Chrysene	0.18	0.40	7/12
Indeno(1,2,3-cd)pyrene	0.18	0.39	4/12
Manganese	1550.0	3810.0	12/12

TABLE 6: SUMMARY OF CONTAMINANTS OF CONCERN IN DRAINAGE POND SURFACE WATER

Contaminants of Concern	Average Concentration (ug/l)	Maximum Concentration (ug/l)	Frequency of Detection
4-Methylphenol	62.3	210	3/3
Arsenic	2.8	5.2	2/4
Manganese	3040.0	6180.0	4/4

TABLE 7: SUMMARY OF CONTAMINANTS OF CONCERN IN CONNECTICUT RIVER SURFACE WATER

Contaminants of Concern	Average Concentration (ug/l)	Maximum Concentration (ug/l)	Frequency of Detection
4-Methylphenol	2.0	200.0	1/6
Beryllium	0.7	1.1	1/6
Chromium	15.8	40.0	2/6
Manganese	381.0	1600.0	6/6
Vanadium	11.3	47.6	4/6

Potential human health effects associated with exposure to the contaminants of concern 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 the present uses, potential future uses, and location of the Site.

The Site is a 17 acre solid waste landfill and transfer station that is unlikely to have a future residential use. The areas to the north and south of the landfill are residential. The area between the landfill and the Connecticut River is very steep and heavily vegetated and future development of that area is unlikely. However, exposure to the seep sediments on the landfill and between the landfill and the Connecticut River by trespassers who might occasionally contact seep sediments was evaluated. Bedrock ground water is the primary source of drinking water in the vicinity of the Site and local residents rely on bedrock wells or overburden springs for their water supply. Overburden ground water is discontinuous in the area of the landfill and discharges along Route 5 at the top of steep drainages that lead to the Connecticut River. Due to the limited extent and low yield, the overburden ground water was not considered a current or future exposure pathway. One drainage pond on-site and the Connecticut River adjacent to the Site are suitable for swimming. Although the drainage pond is very small and is fenced the risk assessment assumed that exposure to the drainage pond surface water could occur during occasional swimming. The Connecticut River is a major water body that supports a variety of recreational uses including fishing. A sewage treatment plant is located directly across the river from the Site. A second sewage treatment plant is located five miles upriver on the Black River, a major tributary of the Connecticut River. The presence of the sewage plants make future use of this section of the river as a drinking water supply unlikely. In the risk assessment, only exposure while swimming in the Connecticut River was evaluated.

Seven potential exposure pathways were quantitatively assessed for the Site. A more thorough description can be found in chapter 4 of the Human Health Risk Assessment. The following is a brief summary of the exposure pathways evaluated.

Future potential exposure from ingestion of bedrock ground water as a residential drinking water supply was evaluated. This pathway assumes that a future user of bedrock ground water would drink 2 liters of contaminated water for 350 days per year for 30 years.

The current and future potential exposure from ingestion of the sediments of the three seeps along Route 5 and on the landfill were evaluated for an adolescent 6-18 years old. The adolescent was assumed to ingest 100 mg/day of contaminated soil and visit the seep a total of 36 days per year.

The current and future potential exposure from ingestion of the sediments of the drainage pond on the landfill were evaluated for an adolescent 6-18 years old. The adolescent was assumed to ingest 100 mg/day of contaminated soil and visit the drainage pond a total of 36 days per year.

The current and future potential exposure from dermal contact with the surface water of the drainage pond on the landfill and the Connecticut River were evaluated for an adolescent 6-18 years old. The adolescent was assumed to contact the surface water during a one hour swimming event in the drainage pond for a total of 36 days per year.

The current and future potential exposure from ingestion of the surface water of the drainage pond on the landfill were evaluated for an adolescent 6-18 years old. The adolescent was assumed to ingest 0.05 liters of water during a one hour swimming event in the drainage pond for a total of 36 days per year.

The current and future potential ingestion of the surface water of the Connecticut River for an adolescent 6-18 years old. The adolescent was assumed to ingest 0.05 liters of water during a one hour swimming event in the Connecticut River for a total of 36 days per year.

For each pathway evaluated, an average and a reasonable maximum exposure estimate was generated corresponding to exposure to the average and the maximum concentration detected in that particular medium.

Excess lifetime cancer risks were determined for each exposure pathway by multiplying the exposure level with the chemical specific cancer 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 (using this example), 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 as defined to the compound at the stated concentration. Current EPA practice considers carcinogenic risks to be additive when assessing exposure to a mixture of hazardous substances.

The hazard index 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).

Table 8 depicts the carcinogenic risks for the contaminants of concern in bedrock ground water evaluated to reflect potential future ingestion of bedrock ground water corresponding to the average and the reasonable maximum exposure (RME) scenarios.

TABLE 8
CARCINOGENIC RISKS FOR THE POSSIBLE FUTURE INGESTION OF BEDROCK GROUNDWATER

Contaminant of Concern (class)	Concentration (ug/l) avg	max	Exposure Factor (l/kg/day)	Cancer Potency Factor (mg/kg/day)-1	Risk Estimate avg	RME
Arsenic (A)	49	282	1.2×10^{-2}	1.75	1×10^{-3}	6×10^{-3}
Benzene (A)	6	17	1.2×10^{-2}	2.9×10^{-2}	2×10^{-6}	6×10^{-6}
Bis (2-Chloroisopropyl) ether (B2)	11	100	1.2×10^{-2}	7.0×10^{-2}	9×10^{-6}	8×10^{-5}
Bis (2-ethyl hexyl) phthalate (B2)	8	62	1.2×10^{-2}	1.4×10^{-2}	1×10^{-6}	1×10^{-5}
Pentachlorophenol (B2)	3	3	1.2×10^{-2}	1.2×10^{-1}	4×10^{-6}	4×10^{-6}
Tetrachloroethene (B2)	5	12	1.2×10^{-2}	5.0×10^{-2}	3×10^{-6}	7×10^{-6}
Vinyl Chloride (A)	4	6	1.2×10^{-2}	1.9	9×10^{-5}	1×10^{-4}
				SUM	1×10^{-5}	6×10^{-5}

Table 9 depicts the non-carcinogenic risks for the contaminants of concern in bedrock ground water evaluated to reflect potential future ingestion of bedrock ground water corresponding to the average and the reasonable maximum exposure (RME) scenarios.

TABLE 9
NON-CARCINOGENIC RISKS FOR THE POSSIBLE FUTURE INGESTION OF BEDROCK GROUNDWATER

Contaminant of concern (class)	Concentration (ug/l) avg	max	Exposure Factor (1/kg/day)	Reference Dose (mg/kg/day)	Target Endpoint of Toxicity	Hazard Quotient avg	RME
MEK (D)	18	370	$2.7x10^{-2}$	$5x10^{-2}$	Fetotox.	$1x10^{-2}$	$2x10^{-1}$
Antimony(ND)	14	28	$2.7x10^{-2}$	$4x10^{-4}$	Blood	1.0	2.0
Arsenic(A)	49	282	$2.7x10^{-2}$	$3x10^{-4}$	Skin	4.4	25.4
Barium(ND)	303	1850	$2.7x10^{-2}$	$7x10^{-2}$	Blood Pres.	$1x10^{-1}$	$7x10^{-1}$
Bis(2-chloroisopropyl) ether(ND)	11	100	$2.7x10^{-2}$	$4x10^{-2}$	Blood	$7x10^{-3}$	$7x10^{-2}$
Bis(2-ethylhexyl) phthalate(B2)	8	62	$2.7x10^{-2}$	$2x10^{-2}$	Incr. Liver Weight	$1x10^{-2}$	$8x10^{-2}$
Chromium	5	81	$2.7x10^{-2}$	$5x10^{-3}$	none obs.	$3x10^{-2}$	$4x10^{-1}$
Manganese	1002	5830	$2.7x10^{-2}$	$5x10^{-3}$	CNS	5.4	31.5
Nickel (A)	30	102	$2.7x10^{-2}$	$2x10^{-2}$	Wgt.Loss	$4x10^{-2}$	$1x10^{-1}$
Pentachlorophenol(B2)	3	3	$2.7x10^{-2}$	$3x10^{-2}$	Liver/Kidney	$3x10^{-3}$	$3x10^{-3}$
Tetrachloroethene(B2)	5	12	$2.7x10^{-2}$	$1x10^{-2}$	liver	$1x10^{-2}$	$3x10^{-2}$
Xylene (D)	82	1200	$2.7x10^{-2}$	2	Wgt.Loss	$1x10^{-3}$	$2x10^{-2}$
					HI Liver	$3x10^{-2}$	$1x10^{-1}$
					HI Kidney	$3x10^{-3}$	$3x10^{-3}$
					HI CNS	5.4	31.5
					HI Blood	1.1	2.7
					HI Skin	4.4	25.4

Table 10 presents a summary of the carcinogenic and non-carcinogenic risk for all other pathways. These pathways are summarized since they did not contribute to an unacceptable risk at the Site.

TABLE 10
RISK SUMMARY FOR OTHER PATHWAYS

Exposure Pathway	Non-Carcinogenic Hazard Index		Carcinogenic Total Risk	
	Avg.	RME	Avg.	RME
Seep Sediment				
Ingestion	0.2	0.5	4.0×10^{-6}	1.0×10^{-5}
Drainage Pond				
Sediment Ingestion	0.02	0.04	2.0×10^{-7}	5.0×10^{-7}
Surface Water Ingestion and Dermal Contact	0.08	0.2	1.0×10^{-7}	3.0×10^{-7}
Total	0.10	0.24	3.0×10^{-7}	8.0×10^{-7}
Connecticut River				
Surface Water Ingestion and Dermal Contact	0.02	0.09	1×10^{-7}	3.0×10^{-7}

The results of the Human Health Risk Assessment indicate that an unacceptable carcinogenic and non-carcinogenic risk would result from ingestion of bedrock ground water. This is a future use scenario since no individuals are currently ingesting contaminated ground water at the Site. The carcinogenic risk results primarily from arsenic and vinyl chloride. Arsenic, manganese, and antimony all had hazard quotients greater than 1. Arsenic and manganese represented the majority of the non-carcinogenic risk at the Site under both average and maximum scenarios. The risk estimates for antimony were just above the hazard quotient under both the average and maximum scenarios. Compounds which exceed an MCL or MCLG in bedrock ground water during any of the five rounds of samples obtained at the Site include: antimony, arsenic, barium, benzene, bis (2-ethyl hexyl) phthalate, chromium, nickel, pentachlorophenol, tetrachloroethene, trichloroethene, and vinyl chloride. In addition to the above chemicals, the State of Vermont ground water standards were also exceeded for 2-butanone, lead, and xylene.

All other pathways evaluated in the human health risk assessment were well within the 10^{-4} to 10^{-6} target risk range.

An Ecological Risk Assessment was also prepared for the Site. The Ecological Risk Assessment evaluated the potential ecological impacts from the release of hazardous substances to the environment. The Connecticut River surface water and sediments were identified as the most significant ecological habitat at the Site. Impacts to aquatic receptors were assessed using federal and Vermont ambient water quality criteria for surface water impacts and NOAA effects range low and medium sediment quality criteria for sediment impacts. A hazard quotient for ecological receptors was prepared by dividing the average and maximum concentrations by the selected criteria.

The Ecological Risk Assessment concluded that localized areas of the Connecticut River surface water were impacted by the landfill seeps. Aluminum, chromium, iron, and lead were identified as contributing to a Hazard Index significantly greater than 1 based upon the maximum concentrations. Connecticut River sediments did not show a hazard index above 1 based upon the effects-range medium criteria and a low hazard index of 3 resulted from the evaluation based upon the effects-range low criteria.

The Ecological Risk Assessment also concluded that the sediments and surface water of the seeps would be unacceptable aquatic habitat.

The Ecological Risk Assessment was prepared using data collected prior to the installation of a ground water collection trench which has eliminated two of the three seeps impacting the Connecticut River. The third seep is still uncontrolled. Data collected after the installation of the ground water trench demonstrates that impacts to the Connecticut River have been significantly reduced. Table 2 shows the maximum levels detected in the Connecticut River during the 10/92, 8/93, and 5/94 sampling events. All of the metals detected in these sampling events were below the ambient water quality criteria. Therefore, there is no longer an impact to the Connecticut River from the Site provided surface water seeps are controlled in the future. Figure 13 shows the locations of the areas evaluated in the Ecological Risk Assessment. Table 11 provides a summary of the results of the Ecological Risk Assessment.

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment. In particular, the future potential ingestion of contaminated bedrock ground water as a drinking water supply would represent an unacceptable risk to human health.

VII. DEVELOPMENT AND SCREENING OF ALTERNATIVES

A. Statutory Requirements/Response Objectives

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

Based on preliminary information relating to types of contaminants, environmental media of concern, and potential exposure pathways, remedial action objectives were developed 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 (Source Area) Remedial Action Objectives

- Prevent, to the extent practicable, the potential for water to contact or infiltrate through the debris mass;
- Prevent, to the extent practicable, the generation of landfill seeps and the migration of landfill impacted surface water into the Connecticut River;
- Control landfill gas emissions so methane gas does not represent 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 ground water/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 multi-layer landfill cap or any future action;

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

Ground Water Remedial Action Objectives

- Prevent, to the extent practicable, the ingestion of landfill-impacted bedrock ground water exceeding EPA Safe Drinking Water Act Maximum Contaminant Levels (MCLs), Vermont Primary Ground Water 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 1 for each noncarcinogenic compound, by any individual who may use the bedrock ground water within the area of landfill-impacted ground water or within an area that could become impacted as a result of pumping activities;

- Restore the bedrock ground water at the edge of the Waste Management Unit to: MCLs, Vermont Primary Ground Water 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 1 for each noncarcinogenic compound.

Surface Water (Ecological) Remedial Action Objectives

- Protect off-site surface water by preventing the occurrence of landfill impacted seeps;

- Meet federal and state applicable or relevant and appropriate requirements (ARARs) for any surface water discharge to the Connecticut River; and

- Provide long term monitoring of the surface water and sediments of the section of the Connecticut River adjacent to the landfill to assure that no landfill related impacts occur in the future.

B. Technology and Alternative Development and Screening

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

With respect to source control, the FS assumed the successful implementation of the NTCRA. The NTCRA included the construction of a multi-layer low permeability landfill cap to control the generation of leachate which is the source of ground water contamination. In addition, the NTCRA involved the collection and treatment of leachate from the ash monofill leachate collection system, collection and treatment of ground water from the ground water collection trench, expansion of the active gas collection and treatment system, and institutional controls to prevent the future use of the cap in any manner that would reduce its effectiveness. Since the NTCRA addressed all of the source control remedial action objectives, only the need to continue to operate and maintain the NTCRA components was evaluated as source control alternatives.

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

As discussed in Chapter 3.0 of the Feasibility Study, the RI/FS identified, assessed and screened technologies based on implementability, effectiveness, and cost. The identification and screening of technologies is shown in Table 12. These technologies were combined into source control (SC) and management of migration (MM) alternatives. Chapter 4.0 of the Feasibility Study presented the remedial alternatives developed by combining the technologies identified in the previous screening process in the categories identified in Section 300.430(e) (3) of the NCP. The purpose of the initial screening was to narrow the number of potential remedial actions for further detailed analysis while preserving a range of options. Each alternative was then evaluated and screened in Chapter 5 of the Feasibility Study. In summary, the two source control and three management of migration remedial alternatives screened in Chapter 4.0 were combined into 3 site-wide alternatives. The 3 site-wide alternatives were retained for detailed analysis. Chapter 4 of the FS discussed the alternatives that were retained through the screening process, as well as those that were eliminated from further consideration.

VIII. DESCRIPTION OF ALTERNATIVES

This Section provides a narrative summary of each alternative evaluated. A detailed assessment of each alternative can be found in Chapters 4 and 5 of the Feasibility Study.

Alternative SW-1: No Further Action:

This serves as a baseline for comparison with the other remedial alternatives under consideration, as required by the National

Contingency Plan. Under this alternative, no extraction and treatment of the ground water or maintenance of the existing leachate collection, ground water collection, or gas extraction system would occur. In addition, the multi-layer cap and institutional controls would not be maintained. Long-term monitoring and five year reviews of Site conditions would be included in this alternative.

Annual monitoring costs: $110,000/year for at least thirty years
Net Present Worth: $1,400,000

ALTERNATIVE SW-2: Management and Natural Restoration:

SW-2 consists of operating and maintaining the existing Site controls to achieve the natural restoration of the ground water and protect surface water. This alternative includes:

- continued maintenance of the multi-layer cap currently under construction;
- continued operation and maintenance of the existing leachate collection system and ground water collection trench. The collected leachate and ground water will be shipped to an off-site facility for treatment and disposal;
- continued operation and maintenance of the gas collection and treatment system;
- maintenance of institutional controls: to prevent future use of the landfill that would damage the multi-layer cap; to prevent ground water use throughout the area of Site-related contamination; and to assure a water supply to residences with Site-related contaminated ground water beneath their residence.
- continued long-term monitoring of the seeps, ground water, collected ground water and leachate, Connecticut River surface water and sediments, and storm water run-off to confirm the nature and extent of contamination and confirm the restoration of the ground water; and
- a review of Site conditions every five years.

The operation and maintenance activities for the multi-layer cap and gas system would continue for at least thirty years. The operation and maintenance of the leachate collection and ground water collection systems would continue for as long as these systems collect water.

Estimated Time of Operation: at least 30 years
Estimated Annual Operations and Maintenance Costs:

years 1 - 5: $ 400,000/year
years 5 - 15: $ 200,000/year
years 16 - 30:$ 90,000/year
Estimated Total Cost (net present worth): $2,900,000

Alternative SW-3: Ground Water Extraction and Treatment:

This alternative would control the further spread of contamination through the bedrock ground water by extracting ground water using five extraction wells.

Contaminated water pumped from wells would be treated to remove metals and VOCs by separate processes. Metals would be removed using a chemical precipitation and flocculation process to separate metals from the ground water. Water would be removed from the residual solids and the solids would be shipped to a hazardous waste disposal facility, if determined to be hazardous, or to an off-site solid waste landfill, if determined to be non-hazardous. The water extracted from the solids then would be processed through the on-site ground water treatment system.

Ground water then would be treated for removal of VOCs using air stripping and carbon adsorption. In air stripping, the contaminated ground water is pumped to the top of a tower where, as the water cascades down, air is forced up through the tower. The rush of air through the contaminated water transfers VOCs in the water to the air stream. The resulting air stream is then passed through an activated carbon filter to which contaminants adhere before the air is released to the atmosphere. The water leaving the air stripper would also pass through carbon filters to further reduce the levels of organic compounds prior to discharge.

Water would be treated to meet the surface water discharge requirements established by the State of Vermont. Treated water would be discharged from the system through a pipe into the Connecticut River. Alternative SW-3 is described in more detail in Section 5.0 of the Feasibility Study .

Estimated Time for Design and Construction: 2-3 years
Estimated Time of Operation: 12-14 years for Ground Water Treatment and at least 30 years for cap, gas system, and monitoring
Estimated Capital Cost: $1,100,000
Estimated Annual Operations and Maintenance Costs:
years 1 - 3: $ 600,000/year
years 2 - 5: $ 400,000/year
years 5 - 15: $ 380,000/year
years 16 - 30:$ 90,000/year
(net present worth at 7%): $4,350,000
Estimated Total Cost (Capital and net present worth): $5,450,000

IX. SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

Section 121(b)(1) of CERCLA presents several factors that, at a minimum, EPA is required to consider in its assessment of alternatives. Building upon these specific statutory mandates, the National Contingency Plan 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 other Federal and State environmental laws and/or provide grounds for invoking a waiver.

Primary Balancing Criteria

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

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

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

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

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

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

Modifying Criteria

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

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

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

A detailed assessment of each alternative according to the nine criteria can be found in Chapter 5 of the Feasibility Study.

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 Chapter 6 and Table 6.1 of the Feasibility Study.

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.

1. Overall Protection of Human Health and the Environment addresses how an alternative as a whole will protect human health and the environment. This includes an assessment of how public health and environmental risks are properly eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

Alternatives SW-2, the selected remedy, and SW-3 provide overall protection by preventing direct contact, ingestion, and inhalation of Site contaminants. Protection is provided by: preventing contact with soils and debris buried within the landfill by maintaining the multi-layer landfill cap constructed as part of the NTCRA; preventing exposure to airborne contamination by operating the existing gas collection and treatment system; preventing ingestion of contaminated bedrock ground water, in the short term, through the use of institutional controls and maintenance of the water line to residences with ground water contaminated by the landfill, and in the long-term by restoring the ground water to drinking water standards; and protecting the Connecticut River by maintaining the multi-layer cap, leachate collection system, and ground water collection trench to prevent contaminated seeps from flowing into the Connecticut River.

In addition, alternative SW-3 would provide additional containment of the ground water during the time period required for ground water restoration by extracting ground water at the edge of Route 5 adjacent to the landfill. However, alternative SW-3 would have several implementability concerns due to steep topography and the lack of connectivity between the bedrock fractures. In addition, with the existence of the water line and the natural discharge of the bedrock ground water to the Connecticut River at undetectable levels, there is a very low probability of exposure to the bedrock ground water during the time period required for restoration. Alternatives SW-2 and SW-3 would achieve protection in a similar time period. Only SW-1, the no action alternative, would not meet this criteria. SW-1 would allow for the degradation of the cap and other control systems. This would lengthen the time period for ground water restoration and allow the seeps to flow to the Connecticut River.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) addresses whether or not a remedy complies with all state and federal environmental and public health laws and requirements that apply or are relevant and appropriate to the conditions and cleanup alternatives at a specific Site. If an Applicable or Relevant and Appropriate Requirement (ARAR) cannot be met, the analysis of the alternative must provide the grounds for invoking a statutory waiver.

With the exception of the no action alternative (SW-1), all of the other alternatives that received detailed analysis in the FS would meet the identified ARARs. The no action alternative would not meet ARARs because it would allow the continued release of contaminants from source areas which would not allow for the restoration of the ground water to federal and state drinking water standards. The no action alternative, SW-1, would also fail to meet the closure requirements for landfills as required by Subparts N and G of the Resource Conservation and Recovery Act. These requirements are described in detail in Chapters 2 and 5 of the FS.

3. Long-term Effectiveness and Permanence refers to the ability of an alternative to maintain reliable protection of human health and the environment over time once the remedial action objectives and cleanup levels have been met.

Both SW-2 and SW-3 would achieve the same level of long-term effectiveness and permanence in a comparable time frame. The ground water would be restored to drinking water standards in approximately 15 years for SW-2 and 13 years for SW-3. The long-term effectiveness and permanence of both alternatives SW-2 and SW-3 relies primarily on the maintenance of the multi-layer cap, ground water collection trench, leachate collection system, and gas collection system. SW-2 and SW-3 significantly reduce the mobility of the contaminants within the landfill debris mass because the multi-layer landfill cap will prevent infiltration from contacting and mixing with the landfill waste material. The multi-layer cap and gas collection system are reliable technologies if they are properly maintained. The landfill cap and ground water collection trench will also prevent the generation of seeps that could flow to the Connecticut River. Alternative SW-1, the no action alternative, is not considered permanent or effective in the long term because the multi-layer landfill cap and related systems would not be maintained.

4. Reduction of Toxicity, Mobility, or Volume through Treatment are three principal measures of the overall performance of an alternative. The 1986 amendments to the Superfund statute emphasize that, whenever possible, EPA should select a remedy that uses a treatment process to permanently reduce the level of toxicity of contaminants at the Site, the spread of contaminants away from the source of contamination, and the volume, or amount, of contamination at the Site.

Alternatives SW-2 and SW-3 achieve a reduction in toxicity, mobility, and volume through treatment of the landfill gas and treatment of the collected overburden ground water and leachate. Only SW-3 includes treatment as a principle component of the remedy through treatment of the collected bedrock ground water. SW-1, no action, would not provide any reduction of toxicity, mobility, or volume through treatment.

5. Short-term Effectiveness refers to the likelihood of adverse impacts on human health or the environment that may be posed during the construction and implementation of an alternative until remedial action objectives and cleanup levels are achieved.

All of the alternatives retained for detailed analysis in the FS would have minimal short term impacts. No additional excavation activities within the landfill would occur under the alternatives considered. However, as part of SW-3 some increase in traffic and construction impacts would occur as a result of the installation of the bedrock ground water extraction wells. The time period until remedial action objectives are achieved are comparable, 13 years vs. 15 years, for alternative SW-3 and SW-2, respectively. The time period to achieve remedial action objectives under alternative SW-1 could not be estimated.

In addition, SW-2 and SW-3 would be effective until restoration is achieved by providing water to the residences through maintenance of the water line, implementing a deed restriction to protect the cap and prevent ground water use in the area of impacted ground water, and maintaining the leachate collection system and ground water collection trench to prevent contaminated surface water from migrating to the Connecticut River.

6. Implementability refers to the technical and administrative feasibility of an alternative, including the availability of materials and services needed to implement the alternative.

Alternative SW-2 would be readily implementable. All of SW-2 and the majority of alternative SW-3 relies upon the operation and maintenance of controls previously constructed. The materials and services required to maintain the landfill cap, gas collection and extraction system, ground water collection trench, and leachate collection system are readily available. Alternative SW-3 has the most significant implementability concerns. The extraction of ground water from fractured bedrock, as required under SW-3, would be very difficult and the extent to which a proper capture zone can be achieved will not be known until pump tests are performed. In addition, reducing metals concentrations in the treatment system discharge to ambient water quality standards can be very difficult given the extremely low acceptable levels established by these criteria. Alternative SW-1 would be technically implementable as no activities other than monitoring are required. However, the administrative feasibility of this alternative would be low given the existence of several state permits requiring the operation of the gas collection and treatment system and the closure of the landfill.

7. Cost includes the capital (up-front) cost of implementing an alternative as well as the cost of operating and maintaining the alternative over the long term, and net present worth of both capital and operation and maintenance costs.

Alternative SW-1, No Action is the least costly alternative. Excluding the no action alternative, EPA's SW-2, the selected alternative, would have a 30 year net present worth of $2,900,000 as compared to alternative SW-3 at $5,450,000. SW-2 is the most cost-effective of the alternatives that are protective of human health and the environment and comply with ARARs.

8. State Acceptance addresses whether, based on its review of the RI/FS and Proposed Plan, the State concurs with, opposes, or has no comment on the alternative EPA has selected as the remedy for the Site.

VTDEC has been extensively involved in all Site activities to date. The VTDEC has provided EPA with a letter of concurrence with the selected remedy. This letter is attached as Appendix C.

9. Community Acceptance addresses whether the public concurs with EPA's Preferred Alternative. Community acceptance of this cleanup proposal will be evaluated based on comments received at the upcoming public meetings and during the public comment period.

As presented in the Responsiveness Summary, attached as Appendix D, the public did not strongly oppose the selected remedy. The technical assistance grant (TAG) group, VPIREF, provided extensive comments regarding the RI/FS and requested additional evaluations of the risk from exposure to household vapors and the extent of contamination. The TAG group also opposed the continued discharge of the bedrock contamination into the Connecticut River. EPA considered all of the public comments received. A response to all of the TAG groups comments is presented in the Responsiveness Summary.

X. THE SELECTED REMEDY

The selected remedy combines the previously implemented NTCRA activities at the Site, including a multi-layer landfill cap, with the natural attenuation/dilution processes. This combination of source control and management of migration actions will result in the restoration of the bedrock ground water to drinking water standards within 15 years of the completion of the cap and protect surface water by preventing the generation of landfill impacted seeps that could migrate to the Connecticut River.

A. Interim Ground Water Cleanup Levels

Interim cleanup levels have been established in ground water for contaminants of concern identified in the Baseline Risk Assessment found to pose an unacceptable risk to either public health or the environment. Interim cleanup levels have been set based on the ARARs (e.g., Drinking Water Maximum Contaminant Level Goals (MCLGs) and MCLs) 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 Ground Water 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 ground water contamination to determine whether the remedial action is protective. This risk assessment of the residual ground water contamination shall follow EPA procedures and will assess the cumulative carcinogenic and non-carcinogenic risks posed by an individual consuming

bedrock ground water. The residual risk assessment will include sampling of a sufficient number of Site monitoring wells for VOCs, SVOCs, target analyte list metals, and pesticides to determine if constituents not previously identified as cleanup levels represent an unacceptable carcinogenic or non-carcinogenic risk or exceed federal or state drinking water standards. If, after review of the risk assessment, the remedial action is not determined to be protective by EPA, the remedial action shall continue until either protective levels are achieved, and are not exceeded for a period of three consecutive years, or until the remedy is otherwise deemed protective. These protective residual levels shall constitute the final cleanup levels for this Record of Decision and shall be considered performance standards for any remedial action.

Because the aquifer at and beyond the compliance boundary for the landfill is a federal Class IIB and a State of Vermont Class III aquifer, which are both considered potential source of drinking water, MCLs and non-zero MCLGs established under the Safe Drinking Water Act are ARARs.

Interim cleanup levels for known, probable, and possible carcinogenic compounds (Classes A, B, and C) 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 and proposed 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 and proposed 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 and proposed 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 ground water. 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 represents 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 bedrock ground water. 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 Ground Water Cleanup Level.

Table 13 below summarizes the Interim Cleanup Levels for carcinogenic and non-carcinogenic contaminants of concern identified in ground water.

TABLE 13: INTERIM GROUND WATER CLEANUP LEVELS

Carcinogenic Contaminants of Concern (class)	Interim Cleanup Level (ug/l)	Basis	Level of Risk
Benzene (A)	5	MCL	1.7×10^{-6}
Trichloroethylene (B2)	5	MCL	6×10^{-7}
Tetrachloroethylene (B2)	0.7	VT Std.	4×10^{-7}
Arsenic(A)[1]	50	MCL	1×10^{-4}
Vinyl Chloride(A)	2	MCL	4.6×10^{-5}
Bis (2-chloroisopropyl) ether (B2)	1	RB	1×10^{-6}
Bis(2-ethyl hexyl) phthalate (B2)	6	MCL	1.4×10^{-6}
Methylene Chloride(B2)	5	MCL	4.5×10^{-7}
Pentachlorophenol(B2)	1	MCL	1.4×10^{-4}
		SUM	1.6×10^{-4}

Non-carcinogenic Contaminants of Concern (Class)	Interim Cleanup Level (ug/l)	Basis	Target Endpoint of Toxicity	Hazard Quotient
Antimony(ND)	6	MCLG	Blood	0.4
Arsenic(A)	50	MCL	Skin	4.5
Barium(ND)	1000	VT Std.	Incr. Blood Pressure	0.39
2-Butanone	170	VT Std.	Fetal Tox.	0.09
Chromium	50	VT Std.	none obs.	0.27
Lead(B2)	20	VT Std.	CNS	no RFD
Manganese(D)	180	RB	CNS	1
Nickel(A)	100	MCLG	Body Wght.	0.14
Tetrachloroethene(B2)	0.7	VT Std	Liver	0.014
Trichloroethene(B2)	5	MCL	Liver	0.02
Xylene (D)	400	VT Std.	Body Wght	0.005
			HI Skin	4.5
			HI CNS	1

*** note 1 *** Recent studies indicate that many skin tumors arising from oral exposure to arsenic are non-lethal and that the dose-response curve for the skin cancers may be sublinear (in which case the cancer potency factor used to generate risk estimates may be overestimated). It is Agency policy to manage these risks downward by as much as a factor of ten. As a result, the carcinogenic risk for arsenic at this Site has been managed as if it were one order or magnitude lower than the calculated risk. Consequently, the risk level for arsenic in the above table

reflects a risk management factor.

While these interim cleanup levels are consistent with ARARs or suitable TBC criteria for ground water, 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 ground water. At the time that these 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 ground water contamination to determine whether the remedial action is protective. This risk assessment of the residual ground water contamination shall follow EPA procedures and will assess the cumulative carcinogenic and non-carcinogenic risks posed by ingestion of bedrock ground water. If, after review of the risk assessment the remedial action is not determined to be protective by EPA, the remedial action shall continue until either protective levels are achieved and are not exceeded for a period of three consecutive years, or until the remedy is otherwise deemed protective. These protective residual levels shall constitute the final cleanup levels for this Record of Decision and shall be considered performance standards for any remedial action.

All Interim Groundwater Cleanup Levels identified in the ROD and newly promulgated ARARs and modified ARARs which call into question the protectiveness of the remedy and the protective levels determined as a consequence of the risk assessment of residual contamination, must be met at the completion of the remedial action at and beyond the points of compliance which is the boundary of the Waste Management Unit as defined by monitoring wells adjacent to the landfill and shown in figure 11. The points of compliance include the ground water collection trench along Route 5, monitoring wells E23, E24, C17, C18, MW-6, MW-7, MW-3, MW-4, MW-9, MW-10, J-37, J-38, K-39, K-40, H-27, H-28, B-3, G-25, G-26, and any new bedrock monitoring wells in close proximity to the landfill in a flow direction not covered by the previously mentioned monitoring wells. The Waste Management Unit includes the 17 acre landfill and associated surface water controls, gas collection and treatment system, and ground water and leachate collection systems and storage tanks. EPA has estimated that these levels will be obtained within 15 years after completion of the landfill cap which is being installed as part of the NTCRA.

B. Description of Remedial Components

The selected remedy, SW-2, consists of operating and maintaining the existing Site controls to achieve the natural restoration of the ground water and protect surface water. This alternative includes:

- continued maintenance of the multi-layer cap currently under construction;
- continued operation and maintenance of the existing leachate collection system and ground water collection trench. The collected leachate and ground water will be shipped to an off-site facility for treatment and disposal;
- continued operation and maintenance of the gas collection and treatment system;
- maintenance of institutional controls: to prevent future use of the landfill that would damage the multi-layer cap; to prevent ground water use throughout the area of Site-related contamination; and to assure a water supply to residents with Site-related contaminated ground water beneath their residences.
- continued long-term monitoring of the seeps, ground water, collected ground water and leachate, Connecticut River surface water and sediments, and storm water run-off, to confirm the nature and extent of contamination and confirm the restoration of the ground water; and
- a review of Site conditions every five years.

The continued maintenance of the multi-layer cap will involve the implementation of the landfill cap maintenance plan. This plan will require periodic inspection of the cap to identify areas of erosion or signs of cap failure. Slippage of the cap due to steep slopes is the most serious maintenance concern. The cap has been designed to minimize the potential for slippage. However, the inspections will be performed to identify any mass movements of the cap. While direct measurements of the overall leachate generation is not possible, the observation of the water levels in the overburden wells and the leachate and ground water collection trenches will provide information regarding the effectiveness of the cap. The reduction in contaminant concentrations in the bedrock ground water will also provide an indication of the cap's effectiveness. In the event that leachate and overburden levels do not decrease and the bedrock

ground water is not fully restored, the potential for horizontal flow into the landfill from the bedrock will be re-evaluated. This re-evaluation will focus on the need to provide upgradient controls to further reduce leachate generation and restore bedrock ground water concentrations. In addition, the slopes adjacent to the landfill on both sides of Route 5 will be periodically inspected to identify any new seeps that may result from changes in ground water flow after cap installation.

The continued operation and maintenance of the leachate collection and ground water collection system will involve the periodic replacement of pumps and piping as necessary. The pumps, leachate tank, ground water collection tank, and piping will be periodically inspected. The collected leachate and ground water will continue to be shipped to an off-site facility. Testing of the leachate and ground water to date indicates that the levels are below the standards for characteristic wastes, therefore, the collected leachate and ground water is currently considered a non-hazardous waste water. The acceptability of an off-site facility will be based upon state and federal regulations, the analytical results from the leachate and ground water, and EPA guidance regarding CERCLA discharges to off-site facilities.

The continued operation and maintenance of the gas collection and treatment system involves the collection of methane levels in gas monitoring probes on a regular basis. In addition, the flare must be operated and maintained in accordance with the operating permit issued by the Vermont Air Pollution Control Division. This permit specified that the gas flare temperature must be maintained at a minimum of 1600 F.

Institutional controls in the form of deed restrictions on the property owned by BFI-VT and DSI are being implemented as part of the NTCRA. These deed restrictions will prevent the use of the landfill in any manner that would compromise the effectiveness of the cap and prevent future use of the contaminated ground water on BFI owned property. (See Figure 14 for the extent of BFI (DSI) owned property) In addition, BFI-VT has entered into agreements with the owners of three properties in the area of the contaminated ground water requiring BFI-VT to provide them with a water system at no charge for a period of twenty years from the date of full and final closure of the entire BFI-Rockingham solid waste disposal facility. This period is considerably longer than the estimated time for the natural attenuation of contaminants in the ground water. A drinking water supply line will be provided to the residents until EPA and VTDEC determine that the water beneath the residences is acceptable for use as a water supply. In addition, when the water beneath their residence is considered acceptable for use as a drinking water supply, a new water supply well will be installed for each of the residences that were not able to use the ground water beneath their residence. EPA will evaluate the need for, and if it deems appropriate, require

additional institutional controls if the above referenced controls prove ineffective at preventing the extraction of contaminated ground water.

Long-term monitoring of the surface water, ground water, 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 ground water to confirm that the cleanup model was correct. The Long-Term Monitoring Plan will also include interim goals to evaluate the effectiveness of the selected remedy.

The surface water of the Connecticut River will be sampled to confirm that the landfill is not impacting the Connecticut River. At least five locations in the Connecticut River will be sampled until the grass cover on the cap is well established. After the grass cover on the cap is well established, the Connecticut River will be sampled at the points at which surface water from the landfill discharges to the river and at least one background location. In particular, surface water will be sampled to comply with storm water discharge requirements. The three on-site retention ponds shall be sampled periodically for VOCs, SVOCs, and TAL metals to characterize the quality of the water from the surface water run-off and drainage layer. Sediment samples will be obtained from the Connecticut River at the same locations as the surface water samples until EPA determines that sediment samples are no longer necessary. The surface water and sediments of any leachate seeps flowing after the installation of the landfill cap will be sampled. Connecticut River surface water and sediment samples will be analyzed for full TAL metals, at a minimum. The Connecticut River sediments will only be sampled for volatile organic compounds if these compounds are detected in the surface water.

A program will be developed to sample a subset of the residential wells in the vicinity of the landfill. The depth, location, and proximity of the residential wells to the landfill will be used to identify the wells to be sampled. These samples will be analyzed using methods capable of achieving detection limits lower than federal and state of Vermont drinking water standards. Residential wells will be sampled for VOCs and select metals, at a minimum. A subset of residential wells will be periodically sampled for SVOCs.

A subset of the existing monitoring well network will be sampled twice per year. All monitoring well samples will be analyzed for volatile organic compounds and select metals, at a minimum. A subset of the ground water monitoring wells will be periodically sampled for semi-volatile organic compounds and pesticides. Water level measurements shall be obtained during the time period

prior to restoration as necessary to develop an accurate understanding of the ground water flow conditions and the relationship between the bedrock ground water and Connecticut River levels.

Monthly measurements of water levels and quarterly monitoring of a subset of monitoring wells and Connecticut River locations will be performed for three years after all of the cleanup levels have first been achieved. Analytical parameters will include VOCs, SVOCs, TAL Metals, and pesticides. Analytical methods capable of achieving detection limits below federal and state drinking water standards and the cleanup levels established in this ROD shall be used during this confirmation period. All of the data collected to confirm cleanup levels shall be validated. If the ground water restoration has been confirmed by the three years of monitoring, then a revised Long-Term Monitoring Program will be developed for post-restoration monitoring. The post-restoration Long-Term Monitoring Program will involve the sampling of a reduced set of monitoring wells, residential wells, and Connecticut River locations.

To the extent required by law, EPA will review the Site at least once every five years after the initiation of remedial action at the Site if any hazardous substances, pollutants or contaminants remain at the Site to assure that the remedial action continues to protect human health and the environment. During the five year reviews the existing data base of technical and maintenance information will be evaluated to determine if the remedy is meeting the remedial action objectives. In addition, sampling for additional analytical parameters may be performed as part of the five year review. Changes in land use, toxicity information, or federal and state regulations will be assessed to determine if the selected remedy is still protective. In addition, EPA will perform a review of the Site prior to a determination that remedial activities are complete and/or the Site is removed from the NPL.

The operation and maintenance activities for the multi-layer cap and gas system will continue for at least thirty years. The operation and maintenance of the leachate collection and ground water collection systems will continue for as long as these systems collect water. Long-term monitoring will continue for at least thirty years. A detailed cost breakdown is included on Table 5-3 and Appendix E of the FS. A summary of the cost of the selected remedy is provided below.

Estimated Time of Operation: at least 30 years
Estimated Annual Operations and Maintenance Costs:
years 1 - 5: $ 400,000/year
years 5 - 15: $ 200,000/year
years 16 - 30: $ 90,000/year
Estimated Total Cost (net present worth): $2,900,000

XI. STATUTORY DETERMINATIONS

The remedial action selected for implementation at the BFI-Rockingham Landfill Site is consistent with CERCLA and the NCP. The selected remedy is protective of human health and the environment, attains ARARs and is cost effective. The selected remedy does not satisfy the statutory preference for treatment which permanently and significantly reduces the mobility, toxicity or volume of hazardous substances as a principal element. However, treatment alternatives for the bedrock ground water were not considered as cost effective and had significant implementability concerns. Additionally, the selected remedy utilizes alternate treatment technologies or resource recovery technologies to the maximum extent practicable.

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

The remedy at this Site will permanently reduce the risks posed to human health and the environment by eliminating, reducing or controlling exposures to human and environmental receptors through treatment, engineering controls, and institutional controls; more specifically the selected remedy will provide for the restoration of bedrock ground water in approximately 15 years of the completion of the landfill cap, prevent direct contact with the landfill debris mass and soils, reduce the generation of leachate that would otherwise migrate to the Connecticut River, control the release of landfill gas containing hazardous substances, prevent a methane buildup, and provide for the maintenance of the water line serving affected residences.

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 and to be considered criteria. At the time that the Interim Ground Water 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 ground water contamination to determine whether the remedial action is protective. This risk assessment of the residual ground water contamination shall follow EPA procedures and will assess the cumulative carcinogenic and non-carcinogenic risks posed by ingestion of bedrock ground water. If, after review of the risk assessment, the remedial action is not determined to be protective by EPA, the remedial action shall continue 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. These protective residual levels shall constitute the final cleanup levels for this Record of Decision and shall be considered performance standards for any remedial action.

B. The Selected Remedy Attains ARARs

This remedy will attain all applicable or relevant and appropriate federal and state requirements that apply to the Site. Environmental laws from which ARARs for the selected remedial action are derived, and the specific ARARs include:

- Resource Conservation and Recovery Act (RCRA)
- Clean Water Act (CWA)
- Safe Drinking Water Act (SDWA)
- Executive Order 11988 (Floodplain Management)
- Executive Order 11990 (Protection of Wetlands)
- Clean Air Act (CAA)
- Vermont Ground Protection Rule and Strategy
- Vermont Water Quality Standards
- New Hampshire Water Quality Standards
- Vermont Act 250
- Vermont Hazardous Waste Management Regulations
- Vermont Wetland Rules

A more detailed discussion of why these requirements are applicable or relevant and appropriate may be found in Table 14 and in the FS Report at pages 32-51. The RCRA Land Ban requirements do not apply to the selected remedy as no excavation, placement, or disposal of Land Ban waste will occur as a result of the remedial action.

The following policies, criteria, and guidances will also be considered (TBCs) during the implementation of the remedial action:

- Safe Drinking Water Act Proposed MCLs
- EPA Human Health Assessment Cancer Slope Factors
- EPA Reference Doses
- Vermont Health Advisories
- Federal Ambient Water Quality Criteria
- NOAA ER-1 and ER-M Sediment Criteria
- EPA Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments (EPA/530-SW-89-047, July 1994)

A brief narrative summary of the ARARs and TBCs follows.

CHEMICAL-SPECIFIC ARARS

Safe Drinking Water Act (SDWA)

The bedrock ground water in the aquifer at and beyond the edge of the Waste Management Unit has been historically used as a drinking water supply. Several residences are now supplied water by DSI, the operator of the landfill, through a water line from a supply well on the property of DSI. The water is classified according to Vermont ground water classification as class III, which is suitable for domestic use. Therefore, the SDWA 40 CFR 141.11-141.16 maximum contaminant levels and maximum contaminant level goals for a drinking water supply are relevant and appropriate ground water cleanup standards. The selected remedy will comply with this ARAR by meeting SDWA MCLs and MCLGs at and beyond the edge of the Waste Management Unit. The selected remedy is expected to reach these levels within 15 years of the completion of the landfill cap. Proposed MCLs and secondary MCLs were designated "to be considered" when MCLs and Vermont Ground Water Enforcement Standards did not exist for a compound.

Resource Conservation and Recovery Act (RCRA) and Vermont Hazardous Waste Management Regulations

The maximum concentration limits specified in RCRA 40 CFR 264.94 and the Vermont Hazardous Waste Management regulations, which incorporate these levels by reference, are relevant and appropriate ground water standards at the boundary of the Waste Management Unit. The selected remedy will comply with this remedy by achieving these levels at and beyond the edge of the Waste Management Unit.

Vermont Ground Water Protection Rule and Strategy and Ground Water Quality Standards.

The Vermont Ground Water Classification scheme and Ground Water Quality Standards (10 V.S.A. Chapter 47 and 48) are applicable requirements for the remedial actions at the Site. The State of Vermont Classification for the aquifer at the Site is class III. Class III aquifers are suitable for use as domestic water supplies under the State of Vermont classification. The Ground Water Quality Standards are ambient ground water quality standards. These levels were used as cleanup levels when they were more stringent than SDWA requirements. The selected remedy will comply with this ARAR by achieving the Primary Ground Water Enforcement Standards at the boundary of the Waste Management Unit.

EPA Proposed MCLS, EPA Human Health Cancer Slope Factors, EPA Reference Doses, and Vermont Health Advisories are designated "to be considered" when developing risk based cleanup levels and in

evaluating the residual risk represented at the time cleanup levels are met. The use of these factors during risk evaluations at the Site will assure that these TBC's are considered.

Federal Ambient Water Quality Criteria, Vermont Surface Water Quality Criteria, New Hampshire Surface Water Quality Criteria, and National Oceanic and Atmospheric Administration Sediment Guidelines will be used as "To Be Considered" guidance in evaluating impacts to the surface water and sediment of the Connecticut River.

Location Specific ARARs

The selected remedy will comply with all location-specific ARARs specified in Table 14 and in the FS, including Executive Orders 11990 and 11988, and the Vermont Wetland Rules. No wetlands or floodplains will be impacted by the selected remedy.

Action Specific ARARs

Resource Conservation and Recovery Act (RCRA) and Vermont Hazardous Waste Management Regulations

RCRA Sections 40 C.F.R. 264 Subparts 264.90-101; 264.111, 264.117, 264.310 and Vermont Subchapter 7-502(3) which incorporates the federal RCRA 40 CFR 264, Subparts B through O and X regulations by reference are considered relevant and appropriate to the closure of the landfill due to the pre-1980 disposal of materials sufficiently similar to RCRA regulated hazardous wastes in the landfill. Vermont is the delegated authority to implement the hazardous waste management and closure program, therefore, the Vermont regulations are the controlling ARAR. Since Vermont has incorporated the federal regulations by reference, the discussion will focus on the federal regulations cited above. The majority of these requirements have been addressed through the construction of a multi-layer landfill cap under the NTCRA. However, long-term maintenance of the cap, erosion control, surface water run-off, and leachate collection system will be performed to comply with the closure requirements. The point of compliance is designated as the boundary of the Waste Management Unit. This boundary includes the 17 acre landfill, gas collection and treatment system, and ground water and leachate collection systems. The monitoring points used to evaluate compliance at the boundary of the Waste Management Unit are shown in Figure 11. The points include the ground water collection trench along Route 5, monitoring wells E23, E24, C17, C18, MW-6, MW-7, MW-3, MW-4, MW-9, MW-10, J-37, J-38, K-39, K-40, H-27, H-28, B-3, G-25, G-26, and any new bedrock monitoring wells in close proximity to the landfill in a flow direction not covered by the previously mentioned monitoring wells.

The selected remedy will meet this ARAR by: monitoring ground

water quality for the entire compliance period of at least thirty years; achieving ground water compliance levels as measured by testing the monitoring wells at the point of compliance; and the implementation of long-term operation and maintenance activities to reduce the impact of erosion and protect the long-term integrity of the cap.

Safe Drinking Water Act

Certain elements of the Safe Drinking Water Act are relevant and appropriate to the operation and maintenance of the water line. The testing requirements of 40 C.F.R. 141 Subparts B, C, and D will be included in the Long-Term Monitoring Plan to meet this ARAR.

Vermont Surface Water Quality Standards (10 VSA Chapter 47), New Hampshire Water Quality Standards (RSA Ch. 149:3, Ws. 400, Parts 430-439 and Ws. 437), and Clean Water Act Storm Water Discharge Requirements (40 C.F.R. 122.26)

The Vermont Water Resource Board promulgates the water quality classifications and water quality standards for the State of Vermont pursuant to the Vermont Water Pollution Control Act (10 VSA Chapter 47) which are applicable to the storm water discharge from the Site. New water classifications and water quality standards were promulgated on July 12, 1994 and became effective August 1, 1994. The Vermont Water Quality Standards include the storm water discharge requirements.

The section of the Connecticut River adjacent to the Site is designated a Class B surface water according to Vermont, New Hampshire, and the EPA. Any discharge to the Connecticut River from the Site cannot cause a impact in the beneficial use of this classification of surface water. Class B surface waters are suitable for swimming, fishing, recreational use, and as a drinking water supply after treatment. The presence of a sewage treatment plant directly across the river from the Site significantly reduces the potential for use of the Connecticut River in the immediate vicinity of the Site as a drinking water supply. Based upon the presence of the sewage plant, the water quality criteria used as discharge criteria for the storm water discharge from the Site will be based upon the acute, chronic, and fish ingestion criteria listed in the Vermont Water Quality Standards, effective August 1, 1994. Although the Connecticut River is entirely within the boundaries of the State of New Hampshire, the Clean Water Act and case law provide the state within which the discharge occurs to be the permit authority. Since the discharge will originate in Vermont, Vermont will be the permit authority for the storm water discharge. Vermont regulations are no less stringent than the federal and State of New Hampshire standards. Therefore, compliance with the Vermont requirements will be considered compliance with the federal Clean

Water Act and State of New Hampshire Water Quality Standards.

The selected remedy will comply with this ARAR through testing of the surface water discharge to ensure compliance with the Vermont standards and proper management and control of erosion and run-off.

Vermont Air Pollution Control Regulations

These requirements of the Vermont Air Pollution Control Regulations (10 VSA Chapter 5) are applicable to the continued operation and maintenance of the landfill gas collection and treatment system. The landfill gas collection and treatment system was tested and permitted by the VTDEC prior to the initiation of Superfund activity on the Site. The selected remedy will comply with this ARAR by incorporating the requirements of the VT Air Pollution Control permit into this action. Since the Air Pollution Control permit for the gas treatment system was issued prior to the initiation of the CERCLA action, the facility owner must continue to comply with the administrative and substantive aspects of the permit.

Vermont Act 250

This regulation specifies ten criteria that must be addressed by an improvement to property. Several of the ACT 250 requirements were determined be applicable to the actions at the Site. The selected remedy must not:

- cause undue water or air pollution;
- cause unreasonable soil erosion or affect the capacity of the land to hold water;
- cause unreasonably dangerous or congested conditions with respect to highways or other means of transportation;
- have an undue adverse effect on aesthetics, scenic beauty, historical sites, or natural area, and
- imperil necessary wildlife habitat or endangered species in the immediate area.

The selected remedy will comply with ACT 250 through proper maintenance of the cap and surface water controls.

C. The Selected Remedial Action is Cost-Effective

In the Agency's judgment, the selected remedy is cost effective, i.e., the remedy affords overall effectiveness proportional to its costs. In selecting this remedy, once EPA identified alternatives that are protective of human health and the environment and that attain, or, as appropriate, waive ARARs, EPA evaluated the overall effectiveness of each alternative by

assessing the relevant three criteria--long term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short term effectiveness, in combination. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs.

The costs of this remedial alternative are:

Estimated Time of Operation: at least 30 years
Estimated Annual Operations and Maintenance Costs:
years 1 - 5: $ 400,000/year
years 5 - 15: $ 200,000/year
years 16 - 30:$ 90,000/year
Estimated Total Cost (net present worth): $2,900,000

The selected alternative provides the same level of protection and achieves bedrock ground water restoration in a comparable time frame to alternative SW-3 which would cost an estimated $5,450,000.

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

Once the Agency identified those alternatives that attain or, as appropriate, waive ARARs and that are protective of human health and the environment, EPA identified which alternative utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. This determination was made by deciding which one of the identified alternatives provides the best balance of trade-offs among alternatives in terms of: 1) long-term effectiveness and permanence; 2) reduction of toxicity, mobility or volume through treatment; 3) short-term effectiveness; 4) implementability; and 5) cost. The balancing test emphasized long-term effectiveness and permanence and the reduction of toxicity, mobility and volume through treatment; and considered the preference for treatment as a principal element, the bias against off-site land disposal of untreated waste, and community and state acceptance. The selected remedy provides the best balance of trade-offs among the alternatives. The selected remedy provides long-term effectiveness and permanence by maintaining the multi-layer low permeability cap to reduce the generation of landfill leachate. The landfill cap reduces the mobility of the hazardous constituents. The operation and maintenance of the landfill gas system also reduces the mobility and volume of hazardous constituents and provides treatment of the collected gases. The collection of leachate and shallow ground water prevents the migration of leachate and contaminated surface water into the Connecticut River. The collected leachate and ground water is

shipped off-site for treatment. The selected remedy will achieve the restoration of the bedrock ground water in approximately 15 years. The selected remedy considers the presumptive remedy statement for municipal landfills which acknowledges that removal of the landfill contents as impractical alternative. Therefore, treatment options for source control were determined to be impractical and containment was identified as the presumptive approach for source control. The selected remedy complies with all identified ARARs.

As described above, the selected remedy achieves long-term effectiveness by maintaining the existing Site controls. The selected remedy does not include treatment of the ground water. However, the selected remedy will achieve the restoration of the ground water in a time period comparable with the alternative that included treatment. The selected remedy will provide protection until the remedial action objectives are achieved through maintenance of the water line, institutional controls to prevent ground water use, and long-term monitoring to detect any changes in ground water flow paths or contaminant distribution. The selected remedy is readily implementable and was the most cost effective of the alternatives evaluated. The State of Vermont supports the selected remedy. Public comments were strongly considered in developing the selected remedy and measures to provide significant long-term monitoring, additional institutional controls, and water supply wells for the effected residences were included.

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

The selected remedy does not include treatment which permanently and significantly reduces the toxicity, mobility or volume of the hazardous substances as a principal element. The principal element of the selected remedy is the maintenance of the actions implemented as part of the NTCRA and the natural restoration and dilution processes. The NTCRA includes a landfill cap to significantly reduce the mobility of the hazardous substances by preventing infiltration into the landfill waste material. Reductions in toxicity, mobility, or volume are achieved through the gas collection and treatment system. The leachate collection and ground water collection systems prevent the migration of leachate and shallow ground water. The collected leachate and ground water is treated at an off-site facility.

Bedrock ground water is the principal medium addressed by the selected remedy. Bedrock extraction and treatment options were considered less implementable and cost effective than the selected remedy due to the steep topography which limits the locations for extraction wells and the difficulties associated

with bedrock ground water extraction.

XII. DOCUMENTATION OF SIGNIFICANT CHANGES

EPA presented a proposed plan (preferred alternative) for remediation of the Site on June 29, 1994. The preferred alternative included the continued operation and maintenance of the existing Site controls, long-term monitoring, institutional controls, and five year reviews. There were significant changes in the proposed alternative. These changes are described below.

The Barium target cleanup level has been changed from 2000 ug/l to 1000 ug/l to comply with the Vermont Primary Ground Water Enforcement Standards. In addition, EPA has added several compounds to the target cleanup list based upon public comment and a re-evaluation of the cleanup levels. All compounds that exceeded a federal or state drinking water standard or which were identified as a contaminant of concern in the Human Health Risk Assessment are specified as a target cleanup level in the ROD. The additional compounds for which cleanup levels were specified are: 2-butanone, bis(2-ethyl hexyl) phthalate, bis(2-chloroisopropyl) ether, lead, pentachlorophenol, antimony, methylene chloride, and nickel. The Proposed Plan had included a statement that all federal and state drinking water standards were considered cleanup levels for the remedial action. However, only the nine compounds that had most consistently exceeded standards were included as target cleanup levels in Table 1 of the Proposed Plan. To provide more specificity with respect to the objective for meeting all federal and state drinking water standards, the target cleanup level table in the ROD was expanded to include all compounds which were identified as a contaminant of concern in the Human Health Risk Assessment or for which a federal or state drinking water standard was exceeded.

The Record of Decision provides clarification of the relationship between the Vermont, federal, and New Hampshire regulations regarding the discharge of storm water into the Connecticut River. The FS identified the Vermont Water Quality Standards as the applicable ARAR for determining compliance with storm water discharge regulations. Vermont is a delegated authority with respect to implementation of the National Pollution Discharge Elimination System. The National Pollution Discharge Elimination System is the program which implements the storm water discharge regulations. Although the Connecticut River is entirely within New Hampshire, case law and the Clean Water Act provide the state within which a discharge originates to be the enforcement and permit authority. New Hampshire and federal Clean Water Act requirements are addressed through the Vermont requirements. Finally, the Vermont Water Quality Standards were updated on July 12, 1994, by the Vermont Water Resources Board pursuant to the Vermont Water Pollution Control Act (10 VSA 47) with an effective implementation date of August 1, 1994. These

regulations will serve as the surface water classification and water quality criteria for the storm water discharge.

The Proposed Plan included a split cleanup level for the compounds xylene and tetrachloroethene. This split level was proposed based upon an expectation that Vermont will be changing the enforcement standard to the MCL. However, a timeframe for the adjustment of these standards could not be specified. Therefore, EPA has determined that the best method to adjust these standards would be an explanation of significant difference to the ROD after the State of Vermont has promulgated the new standards. The existing Vermont standards were included as the cleanup levels.

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, Supplemental Remedial Investigation, Human Health and Ecological Risk Assessments, and Feasibility Study 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 BFI-Rockingham Landfill Site. A copy of the declaration of concurrence is attached as Appendix C.

APPENDIX A

TABLES

TABLE 1
SITE CHRONOLOGY

BFI-ROCKINGHAM LANDFILL SUPERFUND SITE
ROCKINGHAM, VERMONT

Date	Site-Related Activity
Early 1960's	Site soil was used for embankment fill to build Interstate 91.
January 1968	Harry K. Shepard, Inc. received approval from the Vermont Department of Health to operate a municipal solid waste landfill at the site.
1968	Landfill operations began at the site.
May 1969	Harry K. Shepard, Inc. deeded the landfill to Disposal Specialists, Inc. (DSI).
Early 1970's	A ground water seep was observed to be in contact with refuse by Vermont Department of Environmental Conservation.
1973	Browning Ferris-Industries purchased DSI and Harry K. Shepard, Inc. Harry K. Shepard, Inc. changed its name to Browning-Ferris Industries of Vermont (BFIVT).
1977	Neighbors began reporting potential ground water quality impacts.
1977	DSI was given an Interim Operating Certificate by Vermont Department of Health to operate the facility until January 1980.
1979	Ground water samples from the bedrock aquifer were found to contain some metals and volatile organic compounds.
1979	DSI was ordered by the state to supply potable water to residents. Bottled water for potable use was supplied to nearby residents by DSI.
1979	Hydrogeologic investigations were started by DSI's hydrogeologic consultant, Donald Reed. Operation plans were prepared by W. H. Moore Associates, Inc.
December 1979	The first Assurance of Discontinuance and Agreement was issued to DSI by the state.

Date	Site-Related Activity
September 1980	DSI installed a water supply well and distribution system to serve 19 neighbors.
November 1981	A bituminous cap/liner was sprayed over bedrock and fill. DSI requested a one-year extension of the Assurance of Discontinuance and Agreement.
March 1982	A second Assurance of Discontinuance and Agreement was issued to DSI.
October 1982	DSI's consultant, Donald Reed, completed the first hydrogeologic report. Reed continued to sample wells through 1986 and issued annual reports.
November 1982	DSI established an escrow account for maintenance of the potable water supply.
February 1983	Final engineering report is submitted to the state by W. H. Moore Associates, Inc.
July 1983	A Limited Release Agreement was signed between DSI and nearby residents.
September 1983	Sampling of six domestic wells was performed by the state.
October 1983	The third Assurance of Discontinuance and Agreement was issued to DSI.
October 1983	The landfill was certified for municipal waste disposal by the state for the period October 15, 1983 to October 15, 1988.
Summer 1984	A ground water interceptor well located upgradient of the landfill was installed by DSI and placed into use.
Summer 1985	Use of the interceptor well was stopped because of ineffective performance, freezing conditions, and pump problems.

Date	Site-Related Activity
December 1985	DSI installed 1.5 acre 40-mil high-density, polyethylene (HDPE) liner in southeast area of landfill.
July 1985	The NUS/FIT Preliminary Assessment Superfund study was completed.
July 1986	DSI obtained approval from the state to use the expansion area in the southeast area of the site.
1987	Haley and Aldridge, Inc., hydrogeologic consultants to DSI, installed additional monitoring wells, sampled wells and undertook a hydrogeologic study.
September 1987	The NUS/FIT Final Site Inspection Report was completed.
April 1988	Haley and Aldridge, Inc. issued the 1986 to 1987 Annual Hydrogeologic Report.
October 1988	The state issued DSI an Interim Certificate (Permit WH66C) for operation for the period October 15, 1988 to July 1, 1990.
1988-March 1989	Geotechnical Engineers, Inc., hydrogeologic consultants to DSI, sampled monitoring wells.
March 1989	DSI samples residential wells.
June 1989	The lined landfill area, filled mostly with municipal solid waste incinerator ash, was proposed for closure.
October 1989	The site was included on the EPA National Priority List (NPL).
October 1989-	Balsam Environmental Consultants, Inc., consultants to DSI, installed additional monitoring wells and collected ground water samples.
December 1989	Balsam issued the 1989 Annual Hydrogeologic Report.
1989/1990	DSI installed a landfill gas extraction and flaring system.

Date	Site-Related Activity
June 1990	The state confirmed that the landfill could operate after July 1, 1990, while DSI pursued recertification.
August 1990	Balsam issued the 1990 Annual Hydrogeologic Report.
February 1991	Geotechnical Engineers, Inc. issued a report on behalf of the state regarding 1989 field work for the Phase I Vermont Landfill Assessment Program.
June 1991	Balsam began Remedial Investigation of DSI landfill.
November 1991	Landfilling of MSW and construction and demolition debris was discontinued.
August 1992	An Administrative Order, EPA Docket No. I-92-1053, for Remedial Investigation and Feasibility Study activities was entered into by EPA, DSI and BFIVT.
May - August 1992	The Route 5 slope stabilization and seepage control system was designed.
November 1992	A Draft Remedial Investigation and Initial Screening of Alternative Report was completed and submitted to the EPA and VTDEC.
November 1992/ January 1993	The Route 5 slope stabilization and seepage control system was constructed.
February 1993	EPA required DSI and BFIVT to perform an Engineering Evaluation/Cost Analysis due to the need for a non-time-critical removal action.
February 1993	Residential Wells in the area of the landfill were sampled.
April 1993	Submittal of the Final Remedial Investigation Report to the EPA.
May 1993	EPA issues Fact Sheet describing the results of the RI and Human Health Risk Assessment

Date	Site-Related Activity
May - July 1993	Balsam, on behalf of DSI and BFIVT, prepared an Engineering Evaluation/Cost Analysis to perform a non-time-critical removal action.
June 1993	EPA issues Fact Sheet proposing to cap the landfill as a non-time-critical removal action.
July 1993	EPA issues the Human Health Risk Assessment.
July 1993	EPA holds a public information meeting to discuss the Fact Sheet.
July-August 1993	EPA holds a thirty day public comment period for the non-time-critical removal action.
August - October 1993	DSI Landfill regraded.
September 1993	EPA issued an Action Memorandum requesting that a non-time-critical removal action be conducted at the DSI Landfill.
September 1993	An Administrative Order, EPA Docket No. I-93-1099, for non-time-critical removal action design and construction activities was entered into by EPA, DSI and BFIVT.
September 1993	EPA awards a Technical Assistance Grant to the Vermont Public Interest Education Fund.
October 1993	Design of the non-time-critical removal action initiated.
January 1994	Submittal of the Supplemental Remedial Investigation Report to the EPA.
March 1994	Ecological Risk Assessment Released by EPA.
April 1994	EPA issues a Fact Sheet discussing the the cap construction and updating RI/FS activities.
April 1994	EPA hold a public meeting to discuss Fact Sheet.

April 1994	Landfill gas collection and treatment system is expanded as part of the non-time-critical removal action.

Date	Site-Related Activity
April 1994	Supplemental Remedial Investigation Report is released.
May 1994	EPA issues Press Release Summarizing the Long-Term Monitoring Program.
May 1994	EPA holds a public meeting to discuss the Long-Term Monitoring Program.
May 1994	Residential wells sampled by BFI.
May 1994	Draft Feasibility Study Report released.
June 1994	Design completed for non-time-critical removal action and construction initiated.
June 1994	EPA releases Proposed Plan for ground water action.
June 1994	EPA holds public information meeting for Proposed Plan.
June/July 1994	EPA holds thirty day public comment period for the Proposed Plan and RI/FS.
July 1994	EPA holds public hearing for Proposed Plan.
September 1994	EPA signs Record of Decision for ground water action and released Responsiveness Summary.

Table 2

Compounds	Reference Criteria (federal and state ambient water quality criteria) (ug/l)	Maximum Value Detected in Connecticiut River Based Upon 10/92, 8/93, and 5/94 Sampling Events (ug/l)
Arsenic	190	<1.2
Cadmium	1.79	<0.5
Chromium	11	<4
Copper	6.54	4.3
Lead	1.32	<1
Mercury	0.012	<.2
Nickel	87	<8
Silver	1.23	0.18
Zinc	58	7.2
Iron	1000	463
Aluminum	750	164

Table 11

SUMMARY OF AGGREGATE HAZARD INDICIES FOR ALL EXPOSURE ZONES
BFI-ROCKINGHAM LANDILL
ROCKINGHAM, VERMONT

Exposure Zones	Surface Water								Sediment							
	Average				Maximum				Average				Maximum			
	acute		chronic		acute		chronic		ER-L		ER-M		ER-L		ER-M	
	Baseem	ADL	Baseem	ADL	Baseem	ADL	Baseem	ADL	Baseem	ADL	Baseem	ADL	Baseem	ADL	Baseem	ADL
Connecticut River																
River	0.7	0.07	18	3	3	-	100	-	2	1	0.8	0.6	2	-	1	-
River Background	0.3	0.04*	5	3*	0.4	0.07	13	4	2	3	0.9	1	3	-	1	-
Ponds																
Pond 1	4	-	37	-	7	-	57	-	3	-	1	-	5	-	2	-
Pond 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pond 3	0.005	-	3	-	0.009	-	7	-	2	-	0.7	-	2	-	0.9	-
Seeps																
Seep A	75	-	655	-	142	-	1171	-	3	-	1	-	5	-	1	-
Seep B	4	5	64	2	6	-	155	-	15	54	4	8	21	-	6	-
Seep C	9	19	312	592	15	-	548	-	11	12*	2	2*	15	19	3	3
Seep D	0.4	-	22	-	0.7	-	34	-	2	-	0.6	-	3	-	1	-
Seep E	2	2	31	8	4	-	59	-	23	-	4	-	30	-	6	-
Seep F	5	-	101	-	11	-	247	-	0.5	-	0.2	-	0.5	-	0.2	-
Seep G	8	1*	20	12*	23	2	50	19	1	1*	0.5	0.7*	1	1	0.7	0.7
Seep H	19	-	71	-	38	-	772	-	1	-	0.5	-	2	-	0.5	-
Seep Background	-	-	-	-	-	-	-	-	9	-	2	-	9	-	2	-
SW-35	-	1	-	9	-	-	-	-	-	-	-	-	-	-	-	-

Notes

1. "-" indicates that samples were not obtained from these locations
2. The values listed under ADL average are the point specific risk estimates for Round 3 oversite sampling, and not true averages.
3. * indicates that a duplicate was taken or that more than one oversite sampling location corresponds to this exposure zone.

Table 12

REMEDIAL TECHNOLOGY IDENTIFICATION AND SCREENING FOR GROUND WATER

FEASIBILITY STUDY - DISPOSAL SPECIALISTS, INC.
ROCKINGHAM,VERMONT

Response Measure/Technology	Process Option	Description	Effectiveness	Implementability	Cost (1)	Status/Justification
Containment Passive Hydraulic Gradient Control	Slurry Walls, Sheet Piling, Grout Curtains, or Other Vertical Barriers	Containment by the control of ground water movement in the horizontal direction through the construction of passive subsurface hydraulic barriers such as slurry walls, sheet piles, and/or grout curtains.	Vertical barriers would be not effective at containing shallow or bedrock ground water due to steep overburden topography and ground water gradients.	Easily implementable in shallow overburden for containing shallow ground water. Depth to bedrock at the site is greater than 100 feet. Not feasibly constructable in bedrock.	High capital Low O&M	Eliminated due to: - Technology is not effective due to site conditions - Not feasibly constructable in bedrock.
	Low Permeability Liners	Containment by control of the movement of ground water in the vertical direction through the construction of passive, subsurface, hydraulic barriers such as low permeability liners.	Not effective for ground water. Capping of the disposal area will be more effective at controlling contaminant migration.	Depth to bedrock at the site is greater than 100 feet. Not feasibly constructable in bedrock.	High capital Low O&M	Eliminated due to: - Technology is not effective to treat ground water - Not feasibly constructable in bedrock.
Active Hydraulic Gradient Control	Injection Wells	Containment by control of the movement of ground water in the horizontal and/or vertical directions through construction of active, subsurface, hydraulic barriers such as injection wells.	Not effective in bedrock due to low permeability and the proximity of the Connecticut River.	Installation of injection wells may be difficult to implement due to the depth of bedrock at greater than 100 feet.	High capital High O&M	Eliminated due to: - Effectiveness and implementability

Notes:
1 Cost relative to other process options within the same technology type.
2 Shading denotes eliminated technology.

Table 12

REMEDIAL TECHNOLOGY IDENTIFICATION AND SCREENING FOR GROUND WATER

FEASIBILITY STUDY - DISPOSAL SPECIALISTS, INC.
ROCKINGHAM,VERMONT

Response Measure/Technology	Process Option	Description	Effectiveness	Implementability	Cost (1)	Status/Justification
Withdrawal/Collection	Interceptor Trench	An interceptor trench within or downgradient of impacted area to collect bedrock ground water.	Ineffective for intercepting contaminated bedrock ground water due to an overburden thickness of greater than 100 feet.	Not technically feasible to construct bedrock trench. Requires coordination with state and local utilities	Moderate Capital Moderate O&M	Eliminated due to: - Technology is not effective due to site conditions.
	Extraction Wells	Install one or more wells to extract contaminated bedrock ground water.	Effectiveness likely to be significantly limited due to bedrock permeability and non-uniform nature of bedrock ground water flow.	Difficult to effectively intercept impacted bedrock ground water due to nature of bedrock and difficulty in locating extraction wells due to surface topograghy. Downgradient bedrock wells may induce flow from Connecticut River.	Moderate capital Moderate O&M	Retained due to: - Best available technology to extract bedrock ground water.

Notes:
1. Cost relative to other process options within the same technology type.
2. Shading denotes eliminated technology.

5/26/94
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Table 12

REMEDIAL TECHNOLOGY IDENTIFICATION AND SCREENING FOR GROUND WATER

FEASIBILITY STUDY - DISPOSAL SPECIALISTS, INC.
ROCKINGHAM,VERMONT

Response Measure/Technology	Process Option	Description	Effectiveness	Implementability	Cost (1)	Status/Justification
Treatment Biological Treatment Ground Water	In Situ Biological Methods	Environmental conditions are altered to introduce or enhance waste degrading microbes using a nutrient and an oxygen source to breakdown contaminants.	Most effective in degrading simple organic compounds in water; however site contaminants include complex organic compounds and inorganic compounds (e.g., arsenic). Cold climate not conducive to effective treatment.	Bioremediation can be a relatively fast method of clean-up; however the process will be inefficient due to complex mixture of organic compounds and inorganic compounds present.	Moderate to high capital Moderate O&M	Eliminated due to: - Inappropriate technology due to effectiveness
	Aerobic Biological Methods	Extracted ground water will be pumped to above ground bioreactors where microbes metabolize constituents into innocious end products (e.g., cellular material, carbon dioxide, water).	Most effective in degrading simple organic compounds in water; however contaminants include complex organic compounds and inorganic compounds (e.g., arsenic).	Disinfection of the treated water may be required for a NPDES permit to discharge into the Connecticut River.	Moderate to high capital Moderate to high O&M	Eliminated due to: - Inappropriate technology due to effectiveness

Notes:
1. Cost relative to other process options within the same technology type.
2. Shading denotes eliminated technology.

Table 12

REMEDIAL TECHNOLOGY IDENTIFICATION AND SCREENING FOR GROUND WATER

FEASIBILITY STUDY - DISPOSAL SPECIALISTS, INC.
ROCKINGHAM,VERMONT

Response Measure/Technology	Process Option	Description	Effectiveness	Implementability	Cost (1)	Status/Justification
Treatment Physical Treatment of Ground Water	Air Stripping	Extracted ground water will be pumped through a countercurrent, packed tower aeration system or an induced draft air stripper. If off-gasses were to exceed the Vermont DEC action levels, treatment (polishing) with vapor phase activated carbon will be required.	Air stripping may remove the organic constituents of concern. Not effective in removing inorganic constituents of concern. Will require an inorganic treatment technology to remove inorganic constituents of concern. Also will require iron and manganese removal to prevent system fouling.	Air stripping is commonly used to remove VOCs from ground water. Air strippers are widely available. Air controls may be required if constituents in off- gasses exceed state action levels.	Low to Moderate capital. Low to Moderate O&M	Retained due to: - Applicable technology - May be used in conjunction with other technologies
	Carbon Absorption	Extracted ground water will be pumped through a series of packed bed reactors containing granular activated carbon (GAC). The GAC absorbs organic constituents by surface attraction. The GAC will require periodic replacement or regeneration.	Carbon absorption will effectively remove constituents of concern. Due to low levels of some inorganic constituents, pretreatment may not be required. May also be effective for use as a post-treatment polishing process.	Carbon absorption is commonly used for the removal of organic constituents from waste water and drinking water. Full scale and pilot scale systems are readily and widely available.	Moderate capital. Moderate to High O&M	Retained due to: - Applicable technology - May be used in conjunction with other technologies
	Centrifugation	Centrifugation is a physical separation process in which the components of a fluid mixture are separated mechanically, based upon their density, by rapidly rotating the mass of fluid within a rigid vessel.	Centrifugation is applicable to liquid-liquid mixtures where the liquids are immiscible. Not effective at treating low concentrations of constituents of concern. Not applicable to mixture of constituents at site.	Most advantageous when the clarified liquid can be reused, recycled, or resold. Mobile units are available.	Moderate capital Moderate O&M	Eliminated due to: - Not effective and not a proven technology in site remediation projects.

Notes:
1. Cost relative to other process options within the same technology type.
2. Shading denotes eliminated technology.

Table 12

REMEDIAL TECHNOLOGY IDENTIFICATION AND SCREENING FOR GROUND WATER

FEASIBILITY STUDY - DISPOSAL SPECIALISTS, INC.
ROCKINGHAM,VERMONT

Response Measure/Technology	Process Option	Description	Effectiveness	Implementability	Cost (1)	Status/Justification
Treatment Physical Treatment of Ground Water (cont.)	Crystallization	Contaminated aqueous waste is passed through a refrigerated chamber where certain constituents are selectively crystallized out of solution.	The technology has not been demonstrated at full scale for the treatment of hazardous waste.	The crystallization process requires a constant waste feed and very highly controlled operating conditions.	Moderate capital Moderate O&M	Eliminated due to: - Not a proven technology in site remediation projects
	Dialysis/ Electodialysis	Dialysis/Electrodialysis uses the application of a difference in electric potential to selectively concentrate metals on one side of a semi-permeable membrane. Currently, the technology is used to recover high concentrations of dissolved salts for process reuse.	This technology is not well suited for application to mixed waste streams with high solids content. The technology has not been demonstrated at full scale for the treatment of hazardous waste.	The technology has not been implemented at full scale for the treatment of hazardous waste.	Moderate capital Moderate O&M	Eliminated due to: - Not a proven technology in site remediation projects
	Distillation	Distillation separates miscible organics by the fractional distillation of the individual compounds of a mixture. This technology is applicable to liquid organic waste streams with more than one constituent and high concentrations of volatile contaminants.	This technology is only applicable for solutions with high concentrations of organics. Would not be effective at removing low concentrations of the constituents of concern.	Distillation is not applicable to on-site situations.	Moderate capital Moderate O&M	Eliminated due to: - Not effective or applicable to Site conditions.

Notes:
1. Cost relative to other process options within the same technology type.
2. Shading denotes eliminated technology.

Table 12

REMEDIAL TECHNOLOGY IDENTIFICATION AND SCREENING FOR GROUND WATER

FEASIBILITY STUDY - DISPOSAL SPECIALISTS, INC.
ROCKINGHAM,VERMONT

Response Measure/Technology	Process Option	Description	Effectiveness	Implementability	Cost (1)	Status/Justification
Treatment Physical Treatment of Ground Water (cont.)	Thin Film Evaporation	The thin film evaporation process is based on evaporating vapor from a thin film of water flowing across a heat transfer surface. The vapor is then condensed and recovered as pure water.	Contaminants remain in the water and are discharged as a concentrated brine. VOCs are released in a gaseous state.	Air controls may be needed if the components of the gasses released exceed State action levels.	Moderate capital Moderate O&M	Eliminated due to: - Not effective at treating all constituents of concern. - Requires experienced operators.
	Fabric Filtration	Fabric filtration involves the passage of the waste stream through a fabric to filter out the solid materials.	Filtration separates the solids and liquids in the waste stream. Fabric filtration will not remove all the constituents of concern from the waste stream, especially those in dissolved phase. May be used as a pretreatment process to remove solids from the waste stream.	Technology is commercially available and easily mobilized to the site.	Low capital Moderate O&M	Eliminated due to: - Not effective at treating the constituents of concern
	Chemical Precipitation/ Flocculation	Chemical precipitation removes dissolved metals and suspended solids from aqueous wastes by chemically combining them into heavy, insoluble forms that precipitate out of solution.	Effective in removing dissolved metals. Organics associated with suspended solids may also be removed. Effective for removing a variety of heavy metals at varying concentrations.	Well proven technology for the treatment of industrial waste water. Effluent must comply with NPDES standards which may result in secondary treatment (polishing). Resulting sludge/solids must be dewatered, treated, and disposed of. Mobile units available.	Moderate capital. Moderate O&M	Retained due to: - Applicable Technology - Effective in removing metals.

Notes:
1. Cost relative to other process options within the same technology type.
2. Shading denotes eliminated technology.

Table 12

REMEDIAL TECHNOLOGY IDENTIFICATION AND SCREENING FOR GROUND WATER

FEASIBILITY STUDY - DISPOSAL SPECIALISTS, INC.
ROCKINGHAM,VERMONT

Response Measure/Technology	Process Option	Description	Effectiveness	Implementability	Cost (1)	Status/Justification
Treatment Physical Treatment of Ground Water (cont.)	Granular Media Filtration	Granular media filtration removes solids from an aqueous waste stream by passing the fluid through a bed of granular material.	Effective in the removal of suspended solids. Would not be effective in removing constituents of concern from the waste stream. May be used as a pretreatment process to remove solids from the waste stream.	Process is commercially available and easily mobilized to the site.	Low capital Moderate O&M	Eliminated due to: - Not effective at removing constituents of concern
	In-Situ Adsorption	Sorbants can be imbedded in an excavated trench to intercept organics in ground water.	In-situ adsorption has proven effective for VOC removal from ground water in extremely low permeable soils and is best suited to sites with small to moderate contaminant plumes. May not be effective at treating the constituents of concern.	This technology has not been extensively used to date.	High to moderate capital Moderate O&M	Eliminated due to: - Technology not demonstrated at full scale - Technology may not treat constituents of concern
	Ion Exchange	This process removes toxic metal ions from solution by ion exchange with a non-toxic material. The resulting residuals include spent resins and regenerants.	Ion exchange would not be effective in treating the organic constituents of concern but may be effective in capturing arsenic. Technology may not be effective due to high ion concentrations and potentially high suspended solids and dissolved solid concentrations in the waste stream causing fouling.	This technology is relatively specific in treating different types of waste.	High capital High O&M	Retained due to: - Effective as a inorganic post-treatment polishing process.
	Particle Radiation	Clear liquid waste is bombarded with high energy particle to destroy organics.	Unknown	The process is currently under development and has not been used for hazardous waste treatment.	Unknown	Eliminated due to: - Not a proven technology in ground water treatment projects

Notes:
1. Cost relative to other process options within the same technology type.
2. Shading denotes eliminated technology.

Table 12

REMEDIAL TECHNOLOGY IDENTIFICATION AND SCREENING FOR GROUND WATER

FEASIBILITY STUDY - DISPOSAL SPECIALISTS, INC.
ROCKINGHAM,VERMONT

Response Measure/Technology	Process Option	Description	Effectiveness	Implementability	Cost (1)	Status/Justification
Treatment Physical Treatment of Ground Water (cont.)	Reverse Osmosis	Reverse osmosis involves separating an aqueous solution into solvent and solute using a pressure-driven membrane system.	The process results in highly purified water and a concentrated waste stream. Chemical constituents present in the ground water may create fouling of the membrane. Not effective in treating the chemicals of concern.	Process is commercially available.	High capital High O&M	Eliminated due to: - Constituents present in the ground water not conducive to effective treatment
	Steam Stripping	Extracted ground water is fed through the top of a stripping tower filled with a packing material. Steam is forced upward through the packing to induce volatilization of organic compounds while the liquid waste stream flows down through the packing. If effluent gasses were to exceed state action levels vapor phase treatment (polishing) would be required.	Steam stripping may remove the organic constituents of concern. Not effective in removing inorganic constituents of concern. May require an inorganic treatment technology to remove inorganic constituents of concern. Also may require iron and manganese removal to prevent system fouling.	Steam stripping has been well demonstrated for the removal of a variety of organics from ground water. Effluent air controls may be required if constituents in the discharged steam exceed state action levels.	High capital High O&M	Eliminated due to: - Costs are an order of magnitud higher than air stripping without steam.
	Supercritical Fluid Extraction	Supercritical fluid extraction uses the enhanced properties of fluids under high pressure and temperature to act as a solvent to extract organics from aqueous waste streams.	This application has been demonstrated for concentrated aqueous waste streams on the pilot scale level for PCBs and at full scale for oils.	Supercritical fluid extraction i only recently available for on-site application.	Not available	Eliminated due to: - Not a proven technology for constituents of concern.

Notes:
1. Cost relative to other process options within the same technology type.
2. Shading denotes eliminated technology.

Table 12

REMEDIAL TECHNOLOGY IDENTIFICATION AND SCREENING FOR GROUND WATER

FEASIBILITY STUDY - DISPOSAL SPECIALISTS, INC.
ROCKINGHAM, VERMONT

Response Measure/Technology	Process Option	Description	Effectiveness	Implementability	Cost (1)	Status/Justification
Treatment Physical Treatment of Ground Water (cont.)	Ultrafiltration	Ultrafiltration is a specialized process that removes oil and grease from aqueous waste streams.	This technology is primarily for separating greases and oils from aqueous waste streams.	Suspended solids have a tendency to clog the membrane.	High capital High O&M	Eliminated due to: - Not effective in treating constituents of concern
Treatment Chemical Treatment of Ground Water	Ozonation	The reactive oxidant, ozone, is used to oxidize organic compounds in aqueous waste streams with an organic content of less than 1.0% (<10,000 ppm). The by-products created are carbon dioxide, hydrochloric acid and water. Ozone contact with the ground water occurs within a multi-stage baffled reactor. Basic systems typically consist of the baffled reactor, air or oxygen compressor, air dryer and an ozone generator (2-5%). UV light in combination with the ozonation system can significantly increase degradation of some organic compounds.	Pilot and full scale applications of ozonation to aqueous waste streams is well documented. Organics containing constituents of concern may be effectively treated. Removal of inorganic constituents of concern (e.g., arsenic) may not be effectively treated. Ozone has been proven to be more effective in combination with UV photolysis and hydrogen peroxide oxidation.	Process is commercially available and easily implementable. Used for many years by European communities for the treatment of drinking water.	Moderate capital Moderate to High O&M	Retained due to: - Applicable and demonstrated technology, particularly in combination with UV photolysis. - Other possible combinations such as ozone with hydrogen peroxide may be combined with UV photolysis to effectively treat constituents of concern.

Notes:
1. Cost relative to other process options within the same technology type.
2. Shading denotes eliminated technology.

Table 12

REMEDIAL TECHNOLOGY IDENTIFICATION AND SCREENING FOR GROUND WATER

FEASIBILITY STUDY - DISPOSAL SPECIALISTS, INC.
ROCKINGHAM, VERMONT

Response Measure/Technology	Process Option	Description	Effectiveness	Implementability	Cost (1)	Status/Justification
Treatment Chemical Treatment of Ground Water (cont.)	Hydrogen Peroxide Oxidation	Hydrogen peroxide is used to oxidize organic compounds in aqueous waste streams. Major by-products of the reaction are carbon dioxide and water. Basic system components typically include the oxidation chamber, chemical storage vessel and metering pump. UV light in combination with the system can significantly increase degradation, reaction rates and overall destruction efficiency.	Pilot and full scale application of hydrogen peroxide oxidation technology systems to aqueous waste streams is well documented and demonstrated. Organic constituents of concern may be effectively treated. Removal of inorganic constituents of concern (e.g., arsenic) may not be effectively treated. Hydrogen peroxide oxidation has been proven to be more effective in combination with UV photolysis and UV photolysis and ozonation.	Process is commercially available and easily implementable. Less toxic than ozone. Explosion potential is a consideration in the presence of combustible materials.	Low capital Low O&M	Retained due to: - Applicable and demonstrated technology, particularly in combination with UV photolysis. - Other possible combinations such as ozone with hydrogen peroxide may be combined with UV photolysis to effectively treat constituents of concern.
	Hydrolysis	Accelerates the acid or base catalyzed hydrolysis pH variation, which causes an increase in the cleavage rates of complex organics to simpler organic compounds. Systems can be designed for flow through or batch style operations. Basic system components typically include a reaction vessel, a chemical (acid or base) storage tank and metering pump.	Full scale application of hydrolysis systems to aqueous waste streams for the treatment of inorganics and to a lesser extent VOCs and SVOCs is well documented. Not effective for the constituents of concern at the site.	Applicable to a variety of inorganic compounds. A common industrial treatment process.	Moderate capital Moderate O&M	Eliminated due to: - Not effective in treating the constituents of concern

Notes:
1. Cost relative to other process options within the same technology type.
2. Shading denotes eliminated technology.

5/25/94
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Table 12

REMEDIAL TECHNOLOGY IDENTIFICATION AND SCREENING FOR GROUND WATER

FEASIBILITY STUDY - DISPOSAL SPECIALISTS, INC.
ROCKINGHAM, VERMONT

Response Measure/Technology	Process Option	Description	Effectiveness	Implementability	Cost (1)	Status/Justification
Treatment Thermal Treatment of Ground Water	On-site Incineration	Destruction of constituents of concern using incineration of ground water/seepe via rotary kiln, fluidized bed reactors, fuel blending infrared pyrolysis, supercritical waste oxidation or plasma arc.	On-site technologies are not effective at full scale for the treatment of ground water with low BTU content.	May be difficult to implement due to limited space available at the site.	Very High capital High O&M	Eliminated due to: - Technology not effective for ground water with low BTU content. - Space limitations at the site.
	Off-site Incineration	Destruction of constituents of concern using incineration of ground water via a rotary kiln, fluidized bed reactors, fuel blending or industrial boiler.	Not an effective technology due to the low BTU content of ground water.	Technology is commercially available. Advanced scheduling must be conducted due to capacity problems at existing facilities.	Low capital Very High O&M	Eliminated due to: - Not effective in treating dilu constituents of concern (i.e., low BTU content) and the large volume of ground wat

Notes:
1 Cost relative to other process options within the same technology type.
2 Shading denotes eliminated technology.

Table 12

REMEDIAL TECHNOLOGY IDENTIFICATION AND SCREENING FOR GROUND WATER

FEASIBILITY STUDY - DISPOSAL SPECIALISTS, INC.
ROCKINGHAM,VERMONT

Response Measure/Technology	Process Option	Description	Effectiveness	Implementability	Cost (1)	Status/Justification
Treated Water On-site (cont.)	Off-site Disposal through Pipeline to nearest Treatment Facility	Treated ground water is piped off-site to nearest treatment facility.	Effectiveness is dependent on treatment facility permit requirements. Pipeline construction is required.	Requires approximately 7 miles of pipeline to be constructed. Springfield POTW not equipped to handle increased truck traffic. Existing utilities and space restrictions made construction of a 7 mile pipeline not implementable.	High capital Moderate O&M	Eliminated due to: - Implementability. - Pipeline construction difficult.
	On-site Discharge to Surface Water	Treated ground water is discharged to Connecticut River through pipeline.	Effective in removing treated water from site. River has large assimilative capacity.	Requires discharge permit.	Low capital Low O&M	Retained due to: - Effectiveness and implementability.

Notes:
1. Cost relative to other process options within the same technology type.
2. Shading denotes eliminated technology.

Table 14

SITE WIDE ALTERNATIVE SW-2 MAINTAINANCE AND NATURAL ATTENUATION

ARARS FOR COMPLIANCE
DISPOSAL SPECIALISTS, INC. FEASIBILITY STUDY
ROCKINGHAM, VERMONT

Medium/Authority	Requirement	Status	Requirement Synopsis	Action To Be Taken To Attain ARARs SW-2: Management and Natural Attenuation
Ground Water				
Chemical-Specific (Federal)	SDWA - Maximum Contaminant Levels (MCLs) (40 CFR 141.11-141.16)	Relevant and Appropriate	MCLs have been promulgated for a number of common organic and inorganic constituents. This requirement establishes acceptable constituents in public drinking water supplies, but may also be considered relevant and appropriate for ground water aquifers potentially used for drinking water.	Through a combination of reduction in landfill infiltration, continued O&M of NTCRA activities, and ground water extraction and treatment, this ARAR would be attained. Long-term monitoring will be performed to ensure that these standards are met.
Chemical-Specific (Federal)	SDWA - Maximum Contaminant Level Goals (MCLGs)	Relevant and Appropriate	MCLGs are not legally enforceable standards, but have been established by the EPA as guidance levels. MCLGs set above zero may be considered relevant and appropriate depending upon the circumstances and conditions of the release. MCLGs set at zero are not ARARs.	MCLGs were considered during the FS for establishment of TCGs. However, except for manganese (which was calculated in the HHRA), TCGs were established based upon state and federal MCLs. Since MCLGs were not used in establishing TCGs and non-zero MCLG compounds do not present an unacceptable risk, no further actions are necessary to attain this ARAR.
Chemical-Specific (Federal)	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR 264.90-264.101) (Subpart F)	Relevant and Appropriate	These regulations set concentration limits for hazardous constituents.	Through a combination of reduction in landfill infiltration, continued O&M of NTCRA activities, and ground water extraction and treatment, constituents of concern will meet RCRA standards, and therefore this ARAR would be attained. Long-term monitoring will be performed to ensure that these standards are met.
Chemical-Specific (Federal)	SDWA - Proposed MCLs	To be considered	Proposed MCLs are not legally enforceable standards, but have been established by the EPA as guidance levels prior to promulgation.	Proposed MCLs were considered during the FS for establishment of TCGs. However, except for manganese (which was calculated in the HHRA), TCGs were established based upon state and federal MCLs. Since Proposed MCLs were not used in establishing TCGs and compounds listed as proposed MCLs do not present an unacceptable risk, no further actions are necessary to attain this ARAR.
Chemical-Specific (Federal)	SDWA - Secondary MCLs (40 CFR 143)	To be considered	Secondary MCLs have been promulgated for welfare-based standards (e.g., color). These criteria are aesthetic based and are not risk based. Secondary MCLs are therefore not considered ARARs.	Secondary MCLs were considered during the FS for establishment of TCGs. However, except for manganese (which was calculated in the HHRA), TCGs were established based upon state and federal MCLs. Since Secondary MCLs were not used in establishing TCGs and compounds listed as secondary MCLs do not pose an unacceptable risk, no further actions are necessary to attain this ARAR.

Table 14

ARARS FOR COMPLIANCE
SITE WIDE ALTERNATIVE SW-2 MAINTAINANCE AND NATURAL ATTENUATION DISPOSAL SPECIALISTS, INC. FEASIBILITY STUDY
ROCKINGHAM, VERMONT

Medium/Authority	Requirement	Status	Requirement Synopsis	Action To Be Taken To Attain ARARs SW-2: Management and Natural Attenuation
Chemical-Specific (Federal)	EPA Human Health Assessment Cancer Slope Factors (CSFs)	To be considered	EPA develops CSFs for health effects assessments for evaluation by the Human Health Assessment Group	These values present up to date cancer risk potency information and were used during the HHRA to establish site risk. No further action is necessary to attain the TBC.
Chemical-Specific (Federal)	EPA Reference Doses (RfDs)	To be considered	RfDs are dose levels developed by the EPA for use in the characterization of risks due to non-carcinogens in various media.	Because this alternative provides for maintenance of the low permeability landfill cap, continued operation of the Route 5 slope stabilization and seepage control system, and continued operation of the gas management system, this TBC which was used to establish the TCG for manganese will be met.
Chemical-Specific (State)	Vermont Ground Water Protection Rule and Strategy (10 V.S.A. Chapter 48)	Applicable	These regulations include a ground water protection rule and strategy, a ground water classification scheme, and ground water quality standards. Ground water standards include enforcement standards and preventive action limits. The regulations also include specific notification and response procedures for situations in which ground water quality standards are exceeded.	Through a combination of reduction in landfill infiltration, and continued O&M of NTCRA activities, Vermont water quality standards, and ground water protection strategies will be attained. Long-term monitoring will be performed to ensure that these standards and strategies are met.
Chemical-Specific (State)	Vermont Ground Water Quality Standards (10 V.S. A., Chapter 47)	Applicable	Vermont adopts Federal MCLs, ambient water quality criteria, or no adverse effect levels, whichever is more stringent, as it's drinking water standard for a specific chemical. Like MCLs, these levels regulate the concentration of constituents in public drinking water supplies. Limits for non-listed constituents (i.e., constituents which do not have Federal criteria or standards) are developed on a case-by-case basis.	Through a combination of reduction in landfill infiltration, and continued O&M of NTCRA activities, Vermont water quality standards will be attained. Long-term monitoring will be performed to ensure that these standards are met.

Table 14

ARARS FOR COMPLIANCE
SITE WIDE ALTERNATIVE SW-2 MAINTAINANCE AND NATURAL ATTENUATION DISPOSAL SPECIALISTS, INC. FEASIBILITY STUDY
ROCKINGHAM, VERMONT

Medium/Authority	Requirement	Status	Requirement Synopsis	Action To Be Taken To Attain ARARs SW-2: Management and Natural Attenuation
Chemical-Specific (State)	Vermont Health Advisories	To be considered	Vermont developed health advisories as guidance criteria for drinking water in the absence of MCLs.	Health advisories were considered during the the HHRA and FS for establishment of TCGs. However, except for manganese (which was calculated in the HHRA), TCGs were established based upon state and federal MCLs. Since health advisories were not used in establishing TCGs and compound listed as health advisories do not pose an unacceptable health risk at the site, no further actions are necessary to attain this ARAR.
Surface Water				
Chemical-Specific (Federal)	Federal Ambient Water Quality Criteria (AWQC) (CWA Section 304(a)(1) and 40 CFR 120	To be considered	Federal AWQC are health-based criteria which have been developed for 96 carcinogenic and noncarcinogenic compounds. The criteria for the protection of ecological receptors from acute and chronic impacts are being used to evaluate potential impacts to the Connecticut River.	Through a combination of reduction in landfill infiltration, and continued O&M of NTCRA activities, constituents of concern will meet AWQCs, and therefore this TBC would be attained. Long-term monitoring will be performed to ensure that these standards are met.
Sediment				
Chemical-Specific (Federal)	National Oceanic and Atmospheric Administration Sediment Guidelines (ER-L and ER-M)	To be considered	These guidelines were established by NOAA as effective range-low (ER-L) and effective range-median (ER-M) endpoints for toxicity assessment for pelagic biota.	Based upon the ecological risk assessment, current sediment constituent concentrations do not pose an ecological risk. Through a combination of reduction in landfill infiltration, and continued O&M of NTCRA activities, constituents of concern in sediment will be maintained at levels below those posing an ecological risk. Therefore, no furhter action is necessary to attain this TBC.
Air				
Chemical-Specific (Federal)	Threshold Limit Values (TLVs)	To be considered	These standards were issued as consensus standards for controlling air quality in work place environment.	Through maintenance of the landfill cap and gas collection system, it is expected that TLVs will not be exceeded and this TBC will be attained.
Ground Water/Surface Water				
Location-Specific (Federal)	Federal Ground Water Classification Strategy (EPA, August 1984)	To be considered	Ground water classification guidelines to distinguish between different ground water systems meriting different levels of protection.	Through a combination of reduction in landfill infiltration and continued operation of NTCRA activities, site ground water will meet Federal ground water protection strategies. Therefore, this TBC will be attained.

Table 14

ARARS FOR COMPLIANCE
SITE WIDE ALTERNATIVE SW-2 MAINTAINANCE AND NATURAL ATTENUATION DISPOSAL SPECIALISTS, INC. FEASIBILITY STUDY
ROCKINGHAM, VERMONT

Medium/Authority	Requirement	Status	Requirement Synopsis	Action To Be Taken To Attain ARARs SW-2: Management and Natural Attenuation
Wetlands/Floodplains				
Location-Specific (Federal)	Fish and Wildlife Coordination Act (16 U.S.C. 661)	Applicable	Under this regulation, any modification of a water body requires consultation with the U.S. Fish and Wildlife Services, to develop measures to prevent, mitigate, or compensate for loss to fish and wildlife. This requirement is addressed under CWA Section 404.	Discharge of treated water under this alternative would not occur. Therefore, no further actions are necessary to attain this ARAR.
Location-Specific (Federal)	Protection of Flood Plains Executive Order 11988 (40 CFR 6, Appendix A)	Applicable	Under this regulation, Federal agencies are required to avoid adverse effects, minimize potential harm, restore and preserve the natural and beneficial values of flood plains.	Under this alternative, surface water seeps that may adversely affect wetlands adjacent to the landfill will be reduced. Discharge of treated water under this alternative would not occur. Therefore, no further actions are necessary to attain this ARAR.
Location-Specific (Federal)	Protection of Wetlands Executive Order 11990 (40 CFR 6, Appendix A)	Applicable	Requires Federal agencies to avoid impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands if a practical alternative exists.	Under this alternative, surface water seeps that may adversely affect wetlands adjacent to the landfill will be reduced through operation of the Route 5 slope stabilization and seepage control system and maintenance of the landfill cap. If these requirements are adhered to, this ARAR will be attained.
Location-Specific (Federal)	Clean Water Act (CWA) (33 U.S.C. Sec. 1344) and U.S. Army Corp of Engineers Nationwide Permit Program (33 CFR Part 330)	Relevant and Appropriate	Under this requirement, no activiity that adversely affects a wetland shall be permitted if a practicable alternative that has less effect is available.	Under this alternative, surface water seeps that may adversely affect wetlands adjacent to the landfill will be reduced through operation of the Route 5 slope stabilization and seepage control system and maintenance of the landfill cap. If these requirements are adhered to, this ARAR will be attained.
Location-Specific (Federal)	CWA 404--Dredge and Fill Activities (40 CFR Part 230; 33 CFR Parts 320-328)	Relevant and Appropriate	Requires that no practicable alternative exists before dredging and filling wetlands. The activity will not cause a violation of state water quality standards or significant degradation of the water, and adverse effects will be minimized.	Under this alternative, modification of wetlands will not be necessary. Therefore, no further actions are required to attain this ARAR.

Table 14

ARARS FOR COMPLIANCE
SITE WIDE ALTERNATIVE SW-2 MAINTAINANCE AND NATURAL ATTENUATION DISPOSAL SPECIALISTS, INC. FEASIBILITY STUDY
ROCKINGHAM, VERMONT

Medium/Authority	Requirement	Status	Requirement Synopsis	Action To Be Taken To Attain ARARs SW-2: Management and Natural Attenuation
Location-Specific (State)	Vermont Wetlands Rule (10 V.S.A. Chapter 37)	Applicable	These regulations include procedures for the identification, classification, and protection of significant wetlands.	Under this alternative, surface water seeps that may adversely affect wetlands adjacent to the landfill will bereduced. This ARAR would be attained under this alternative.
Operation and Maintenance of the NTCRA				
Action-Specific (Federal)	National Pollution Discharge Elimination System (NPDES) (40 CFR 122)	Applicable	Regulates the discharge of water into public surface waters. Major requirements include use of best available treatment technology, attainment of applicable discharge water quality standards, and monitoring of discharge quality. A permit is typcially required prior to discharge; however, in accordance with Section 121(d) of the NCP, only the technical requirements apply to CERCLA sites.	Maintenance and monitoring activities under this alternative including control of surface water releases and limiting sediment loading will ensure compliance with the substantive requirements of this ARAR.
Action-Specific (Federal)	RCRA Criteria for Municipal Solid Waste Landfills (40 CFR 258,Subpart F)	Applicable	These regulations address closure and post-closure requirements.	Under this alternative, landfill maintenance activities will meet the requirements of this ARAR.
Action-Specific (Federal)	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR 264.90-264.101) Subparts G, N	Relevant and Appropriate	These regulations address closure and post-closure requirements.	The continued operation and maintenance of the cap, leachate collection system, Route 5 slope stabilization and seepage control system, and treatment, gas collection and treatment system, and surface water management systems will satisfy this requirement.
Action-Specific (Federal)	SDWA - National Primary Drinking Water Standards (40 CFR 141 Subparts B, C, and D)	Relevant and Appropriate	These regulations apply to water quality monitoring and reporting for public drinking water supplies.	Operation and maintenance of the well supplying residences in the vicinity of the landfill will include compliance with application monitoring and reporting requirements.
Action-Specific (Federal)	EPA 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 multilayer covers at landfills where hazardous substances were disposed of.	Construction and maintenance of the cap will be consistent with these guidelines.

Table 14

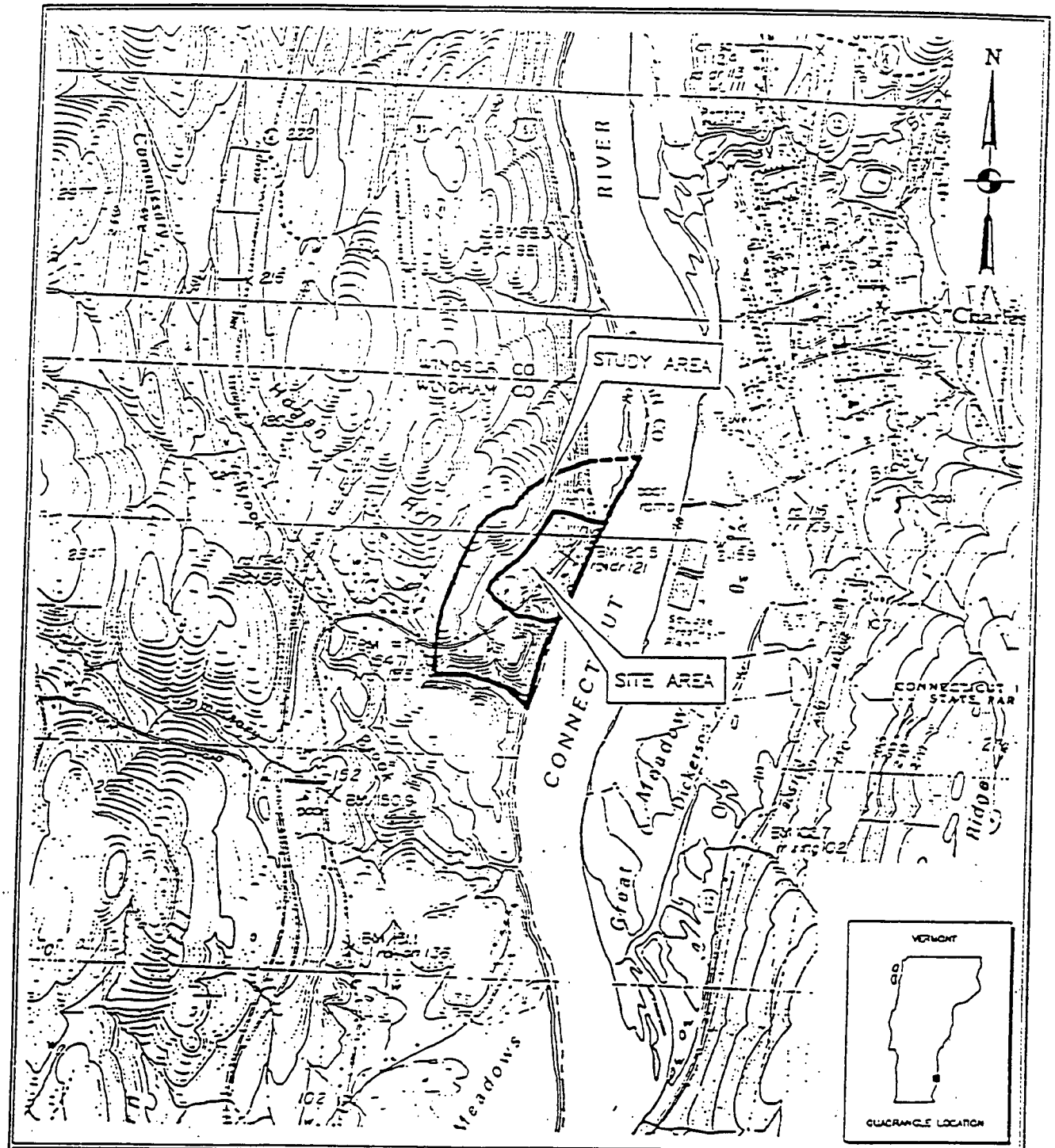
ARARS FOR COMPLIANCE
SITE WIDE ALTERNATIVE SW-2 MAINTAINANCE AND NATURAL ATTENUATION DISPOSAL SPECIALISTS, INC. FEASIBILITY STUDY
ROCKINGHAM, VERMONT

Medium/Authority	Requirement	Status	Requirement Synopsis	Action To Be Taken To Attain ARARs SW-2: Management and Natural Attenuation
Action-Specific (State)	Vermont National Pollution Discharge Elimination System (NPDES) Regulations (EPR Chapter 13)	Applicable	Regulates the discharge of stormwater into the waters of Vermont, and the terms and conditions of permits. Requirements include monitoring, recording, and reporting compliance.	Maintenance and monitoring activities under this alternative including control of surface water releases and limiting sediment loading will ensure compliance with the substantive requirements of this ARAR.
Action-Specific (State)	Vermont Air Pollution Control Regulations (10 V.S.A. Chapter 23, Section 564)	Applicable	These standards were primarily developed to regulate stack and automobile emissions.	Operation and maintenance of the gas management system will include compliance with these regulations.

APPENDIX B

FIGURES

Figure 1



PREPARED FOR: EPA REGION 1 – BFI–ROCKINGHAM	SOURCE: USGS BELLOWS FALLS, VERMONT – NEW HAMPSIRE 7.5 X 15 MINUTE SERIES TOPOGRAPHICS 1985 CONTOUR INTERVALS IN METERS MSL	TITLE: Figure 1 SITE LOCUS MAP
DATE: 10/93 / DWG. NO.: 645862		
SCALE: 0 2100 4200 FT		

Figure 2

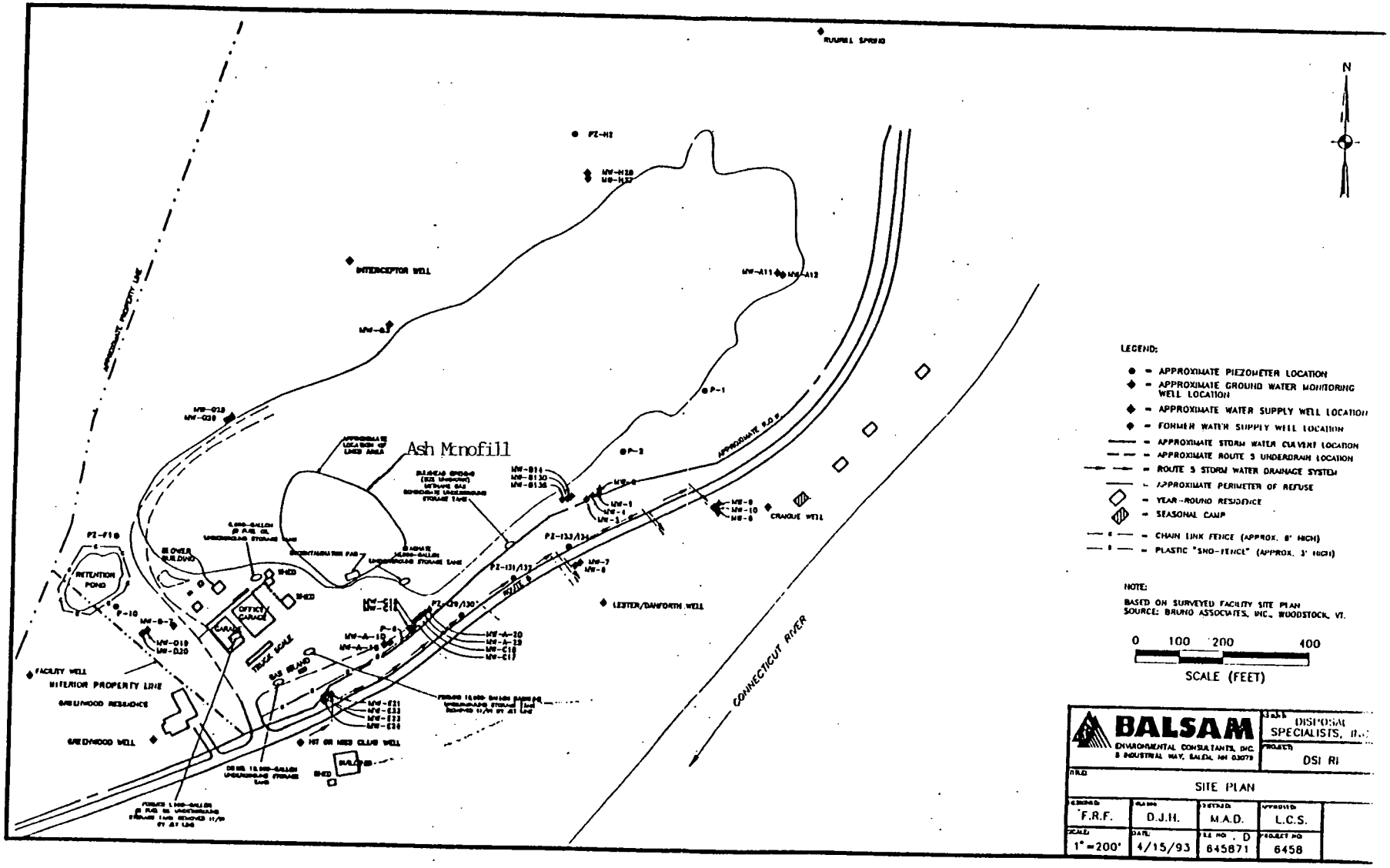

Ash Monofill
INTERCEPTOR WELL
RETENTION POND
OFFICE/GARAGE
TRUCK SCALE
BIG BLUE HOUSE
FACILITY WELL
INTERIOR PROPERTY LINE
GREENWOOD RESIDENCE
GREENWOOD WELL
HOT OR MED CLUB WELL
LESTER/DANFORTH WELL
CRAIGUE WELL
CONNECTICUT RIVER
APPROXIMATE PROPERTY LINE
APPROXIMATE 8.0 ac
ROUTE 5
N
LEGEND:
= APPROXIMATE PIEZOMETER LOCATION
= APPROXIMATE GROUND WATER MONITORING WELL LOCATION
= APPROXIMATE WATER SUPPLY WELL LOCATION
= FORMER WATER SUPPLY WELL LOCATION
= APPROXIMATE STORM WATER CULVERT LOCATION
= APPROXIMATE ROUTE 5 UNDERDRAIN LOCATION
= ROUTE 5 STORM WATER DRAINAGE SYSTEM
= APPROXIMATE PERIMETER OF REFUSE
= YEAR-ROUND RESIDENCE
= SEASONAL CAMP
= CHAIN LINK FENCE (APPROX. 6' HIGH)
= PLASTIC "SNO-FENCE" (APPROX. 3' HIGH)
NOTE:
BASED ON SURVEYED FACILITY SITE PLAN
SOURCE: BRUNO ASSOCIATES, INC., WOODSTOCK, VT.
0 100 200 400
SCALE (FEET)
BALSAM
ENVIRONMENTAL CONSULTANTS, INC.
DISPOSAL SPECIALISTS, II...
DSI RI
SITE PLAN
F.R.F.
D.J.H.
M.A.D.
L.C.S.
1"=200'
4/15/93
645871
6458

Figure 3

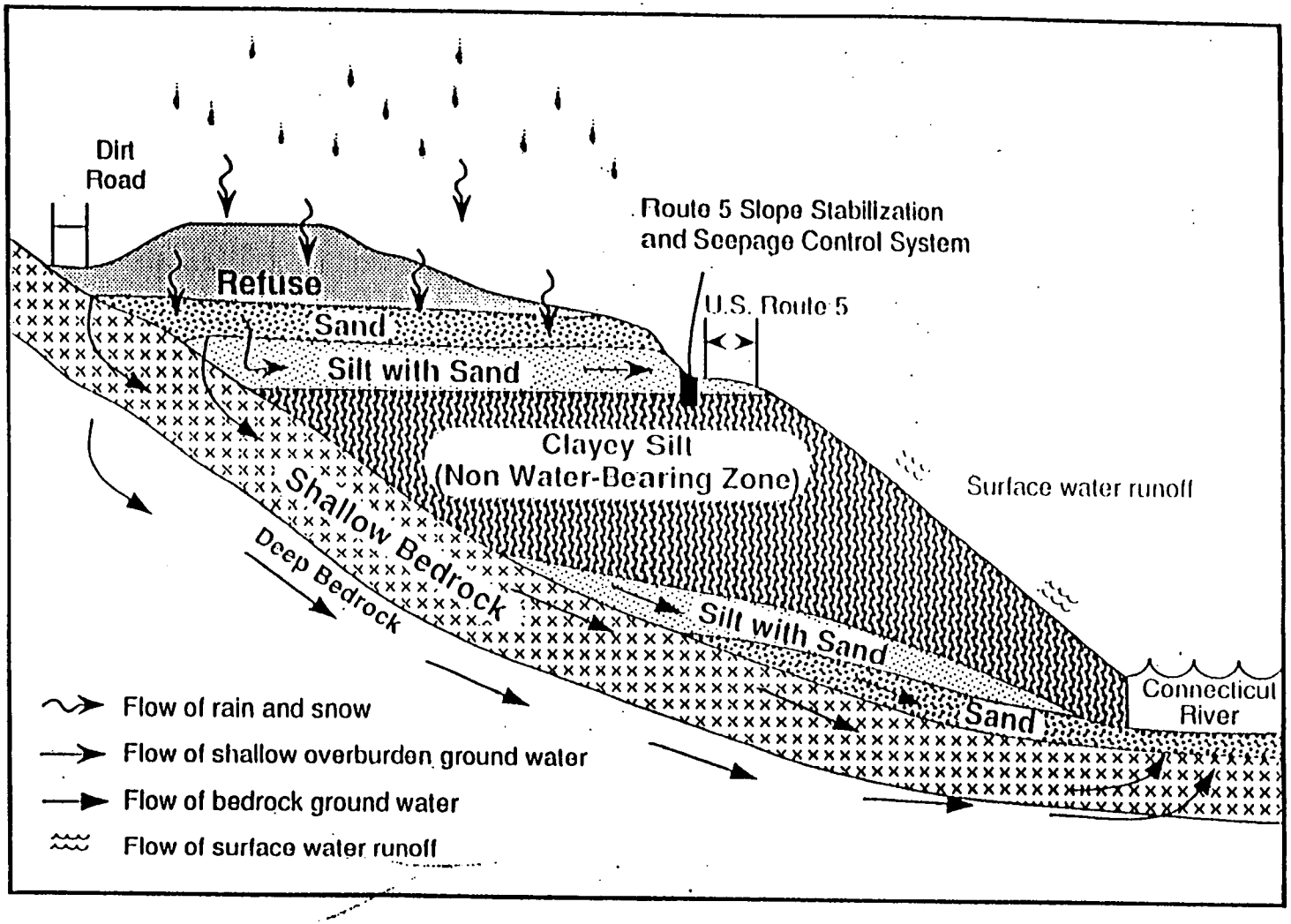

Dirt Road
Route 5 Slope Stabilization and Seepage Control System
Refuse
Sand
Silt with Sand
U.S. Route 5
Clayey Silt (Non Water-Bearing Zone)
Surface water runoff
Shallow Bedrock
Deep Bedrock
Silt with Sand
Sand
Connecticut River
Flow of rain and snow
Flow of shallow overburden ground water
Flow of bedrock ground water
Flow of surface water runoff

Figure 4

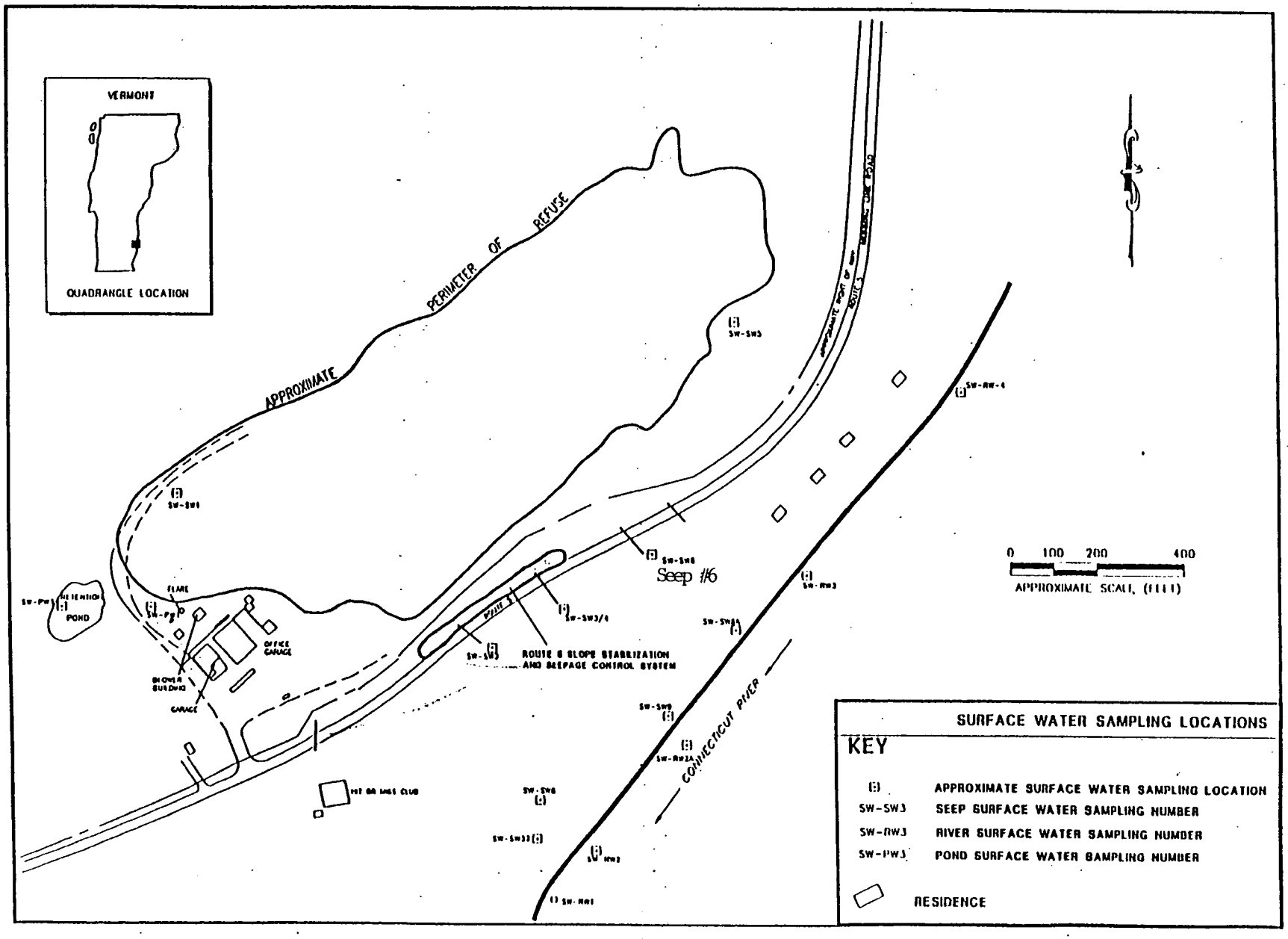

VERMONT
QUADRANGLE LOCATION
APPROXIMATE PERIMETER OF REFUSE
APPROXIMATE PORT OF ROUTE 5 BRIDGE ONE POND
SW-SW5
SW-SW1
SW-SW6
Seep #6
SW-SW3/4
SW-SW4
SW-RW-4
SW-RW3
SW-PW1
POND
FLARE
SW-PW
OFFICE
GARAGE
GARAGE
ROUTE 5 SLOPE STABILIZATION AND SEEPAGE CONTROL SYSTEM
SW-SW9
SW-RW2A
CONNECTICUT RIVER
SW-SW8
SW-SW33
SW-RW2
SW-RW1
0 100 200 400
APPROXIMATE SCALE, (FEET)
SURFACE WATER SAMPLING LOCATIONS
KEY
APPROXIMATE SURFACE WATER SAMPLING LOCATION
SW-SW3 SEEP SURFACE WATER SAMPLING NUMBER
SW-RW3 RIVER SURFACE WATER SAMPLING NUMBER
SW-PW3 POND SURFACE WATER SAMPLING NUMBER
RESIDENCE

Figure 5

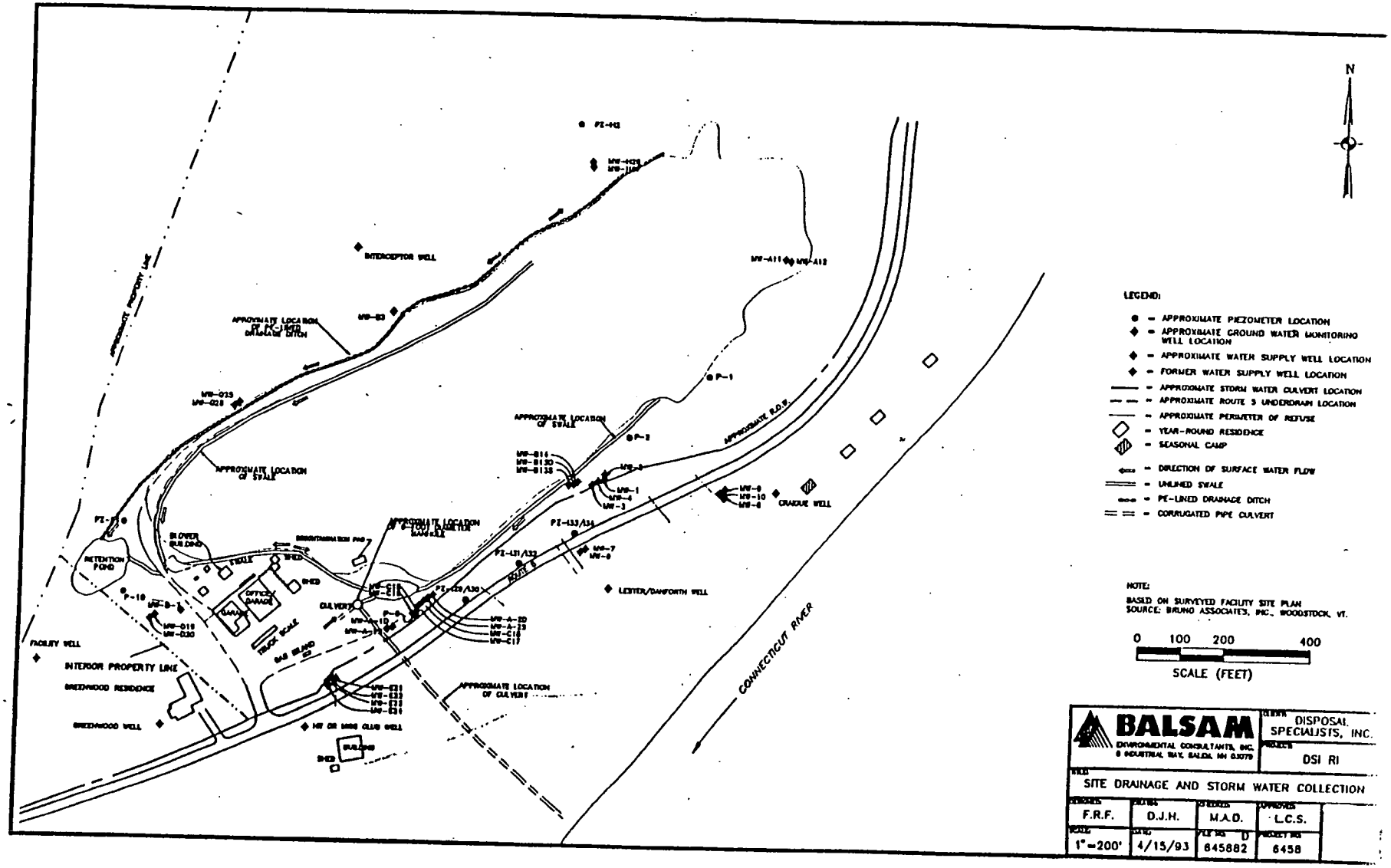

N
LEGEND:
= APPROXIMATE PIEZOMETER LOCATION
= APPROXIMATE GROUND WATER MONITORING WELL LOCATION
= APPROXIMATE WATER SUPPLY WELL LOCATION
= FORMER WATER SUPPLY WELL LOCATION
= APPROXIMATE STORM WATER CULVERT LOCATION
= APPROXIMATE ROUTE 5 UNDERDRAIN LOCATION
= APPROXIMATE PERIMETER OF REFUSE
= YEAR-ROUND RESIDENCE
= SEASONAL CAMP
= DIRECTION OF SURFACE WATER FLOW
= UNLINED SWALE
= PE-LINED DRAINAGE DITCH
= CORRUGATED PIPE CULVERT
NOTE:
BASED ON SURVEYED FACILITY SITE PLAN
SOURCE: BRUNO ASSOCIATES, INC., WOODSTOCK, VT.
0 100 200 400
SCALE (FEET)
BALSAM
ENVIRONMENTAL CONSULTANTS, INC.
DISPOSAL SPECIALISTS, INC.
DSI RI
SITE DRAINAGE AND STORM WATER COLLECTION
F.R.F.
D.J.H.
M.A.D.
L.C.S.
1"=200'
4/15/93
645882 D
6458
INTERCEPTOR WELL
APPROXIMATE LOCATION OF PC-1 AND DRAINAGE DITCH
APPROXIMATE LOCATION OF SWALE
APPROXIMATE R.O.W.
CRADDUE WELL
LESTER/DANFORTH WELL
RETENTION POND
BLOWER BUILDING
FIELD
SHED
OFFICE/GARAGE
TRUCK SCALE
GAS ISLAND
CULVERT
FACILITY WELL
INTERIOR PROPERTY LINE
GREENWOOD RESIDENCE
GREENWOOD WELL
HAY OR MINE CLUB WELL
BUILDING
SHED
CONNECTICUT RIVER
APPROXIMATE LOCATION OF CULVERT

Figure 6

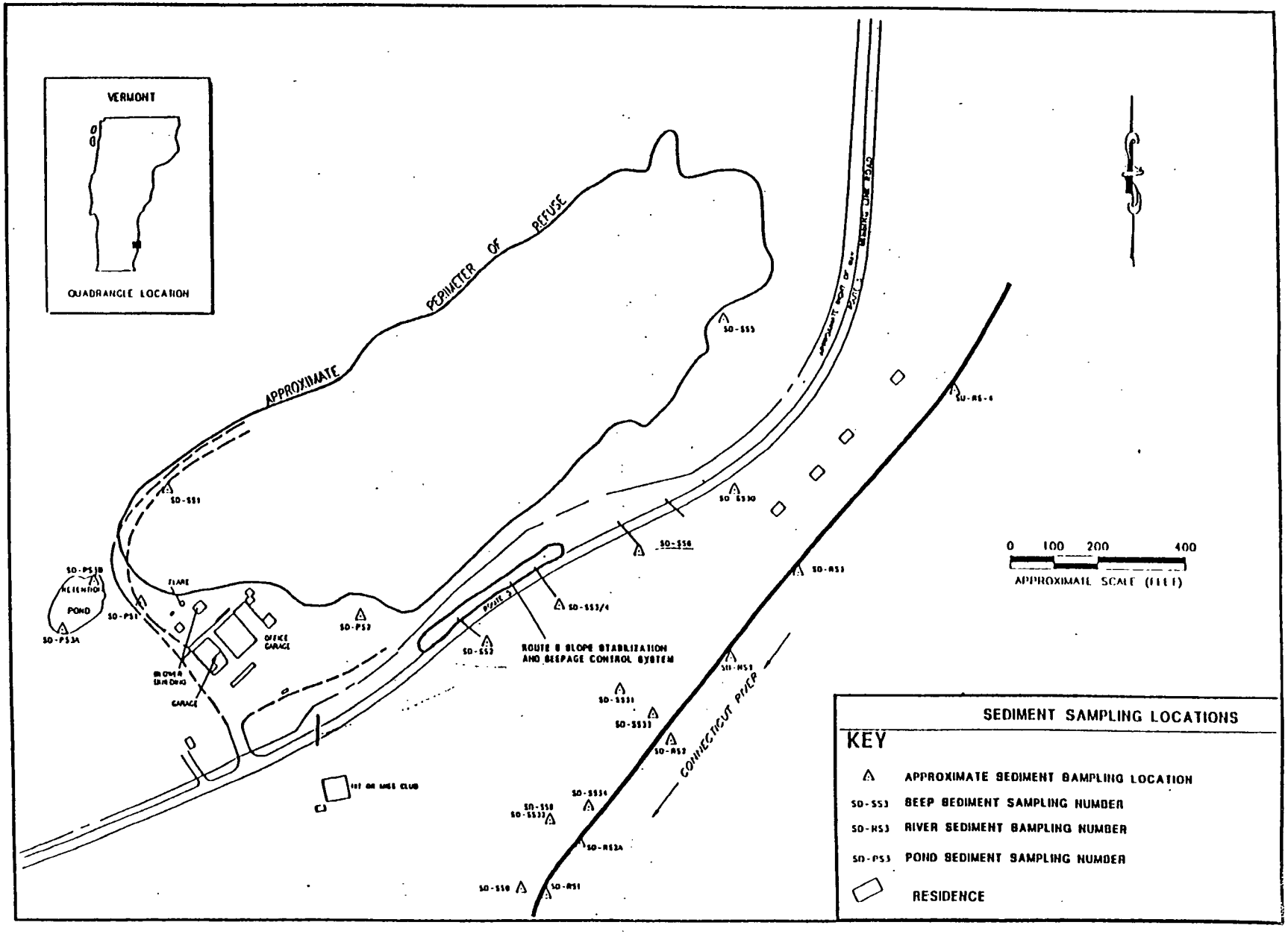

VERMONT
QUADRANGLE LOCATION
APPROXIMATE PERIMETER OF REFUSE
SD-SS5
SD-SS1
SD-SS3/4
SD-SS6
SD-SS2
SD-PS1
SD-PS2
SD-PS3A
SD-PS3B
RETENTION POND
FLARE
OFFICE GARAGE
GARAGE
ROUTE 5
ROUTE 5 SLOPE STABILIZATION AND SEEPAGE CONTROL SYSTEM
SD-SS31
SD-SS33
SD-RS2
SD-SS34
SD-SS32
SD-RS3A
SD-SS8
SD-RS1
SD-RS3
SD-RS4
CONNECTICUT RIVER
0 100 200 400
APPROXIMATE SCALE (FEET)
SEDIMENT SAMPLING LOCATIONS
KEY
APPROXIMATE SEDIMENT SAMPLING LOCATION
SD-SS3 SEEP SEDIMENT SAMPLING NUMBER
SD-RS3 RIVER SEDIMENT SAMPLING NUMBER
SD-PS3 POND SEDIMENT SAMPLING NUMBER
RESIDENCE

Figure 7

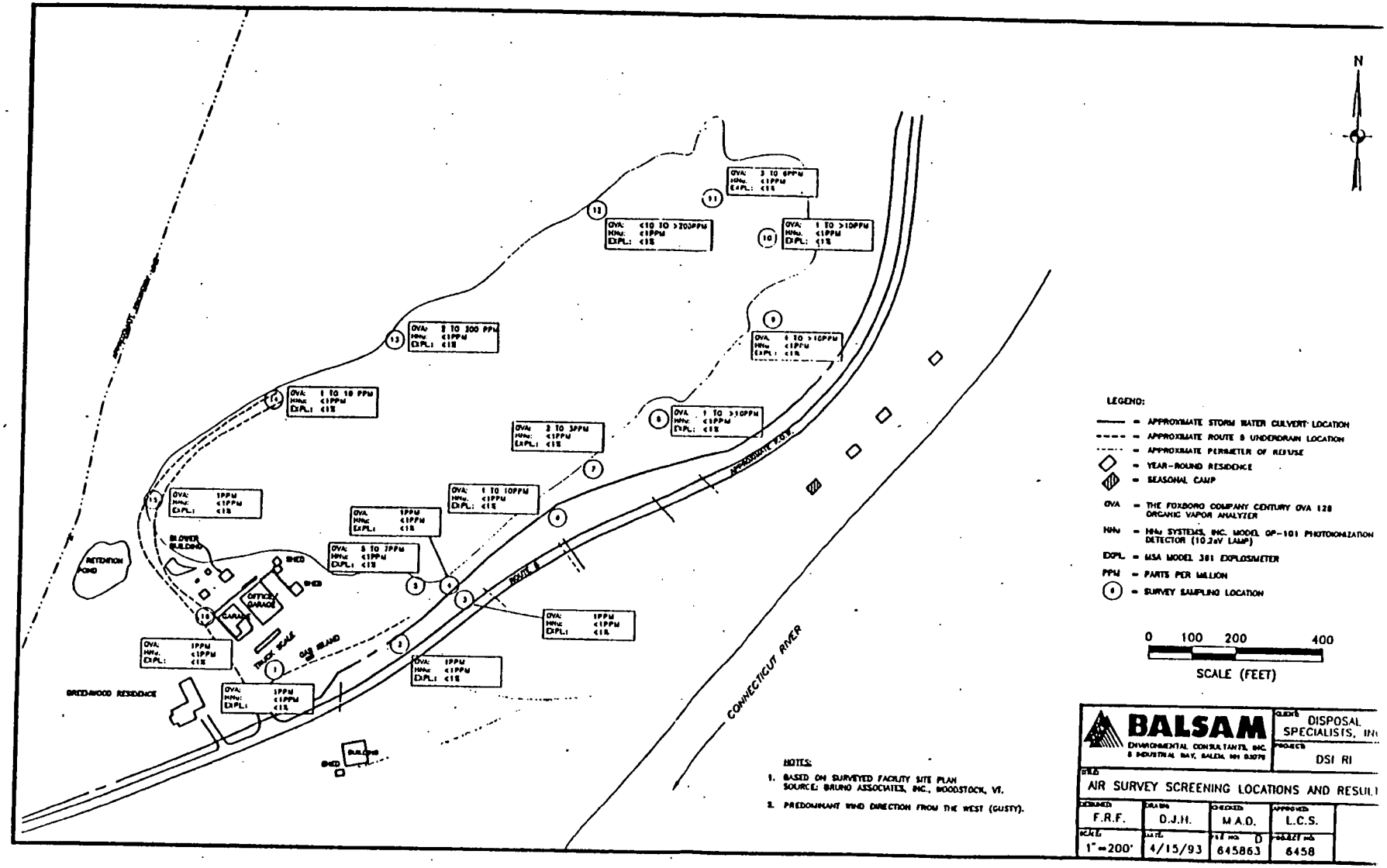

N
LEGEND:
= APPROXIMATE STORM WATER CULVERT LOCATION
= APPROXIMATE ROUTE 8 UNDERDRAIN LOCATION
= APPROXIMATE PERIMETER OF REFUSE
= YEAR-ROUND RESIDENCE
= SEASONAL CAMP
OVA = THE FOXBORO COMPANY CENTURY OVA 128 ORGANIC VAPOR ANALYZER
HNu = HNu SYSTEMS, INC. MODEL GP-101 PHOTOIONIZATION DETECTOR (10.2eV LAMP)
EXPL. = MSA MODEL 361 EXPLOSIMETER
PPM = PARTS PER MILLION
= SURVEY SAMPLING LOCATION
0 100 200 400
SCALE (FEET)
NOTES:
1. BASED ON SURVEYED FACILITY SITE PLAN SOURCE: BRUNO ASSOCIATES, INC., WOODSTOCK, VT.
2. PREDOMINANT WIND DIRECTION FROM THE WEST (GUSTY).
BALSAM
ENVIRONMENTAL CONSULTANTS, INC.
DISPOSAL SPECIALISTS, IN
DSI RI
AIR SURVEY SCREENING LOCATIONS AND RESUL
F.R.F.
D.J.H.
M.A.D.
L.C.S.
1"=200'
4/15/93
645863
D
6458
RETENTION POND
BLOWER BUILDING
OFFICE/ GARAGE
SHED
SALT SHED
OIL STAND
TRUCK SCALE
BREED-WOOD RESIDENCE
BUILDING
CONNECTICUT RIVER
ROUTE 5

Figure 8

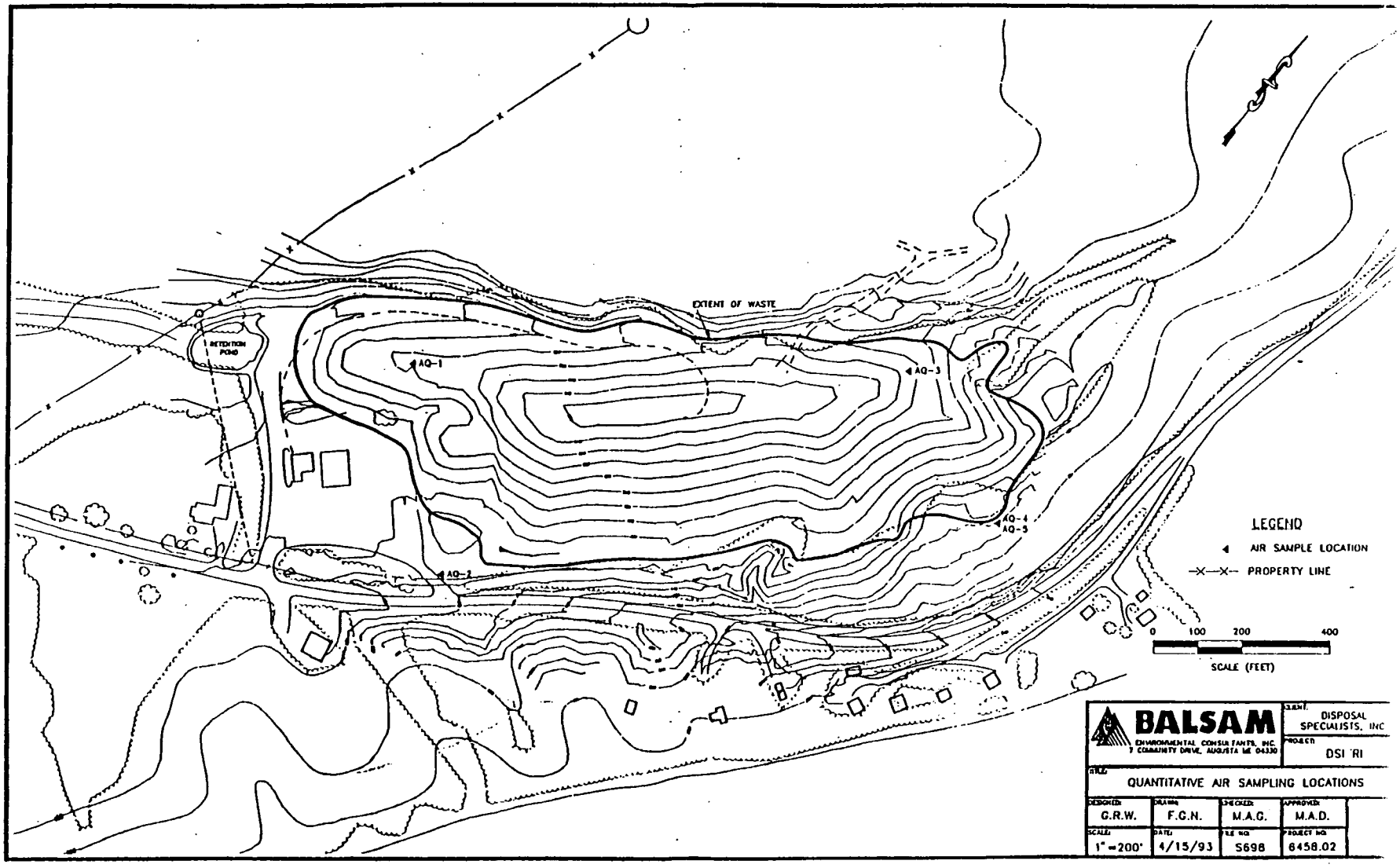

EXTENT OF WASTE
RETENTION POND
AQ-1
AQ-2
AQ-3
AQ-4
AQ-5
LEGEND
AIR SAMPLE LOCATION
PROPERTY LINE
0 100 200 400
SCALE (FEET)
BALSAM
ENVIRONMENTAL CONSULTANTS, INC.
7 COMMUNITY DRIVE, AUGUSTA ME 04330
CLIENT: DISPOSAL SPECIALISTS, INC
PROJECT: DSI RI
TITLE: QUANTITATIVE AIR SAMPLING LOCATIONS
DESIGNED: G.R.W.
DRAWN: F.C.N.
CHECKED: M.A.G.
APPROVED: M.A.D.
SCALE: 1"=200'
DATE: 4/15/93
FILE NO: S698
PROJECT NO: 6458.02

Figure 9

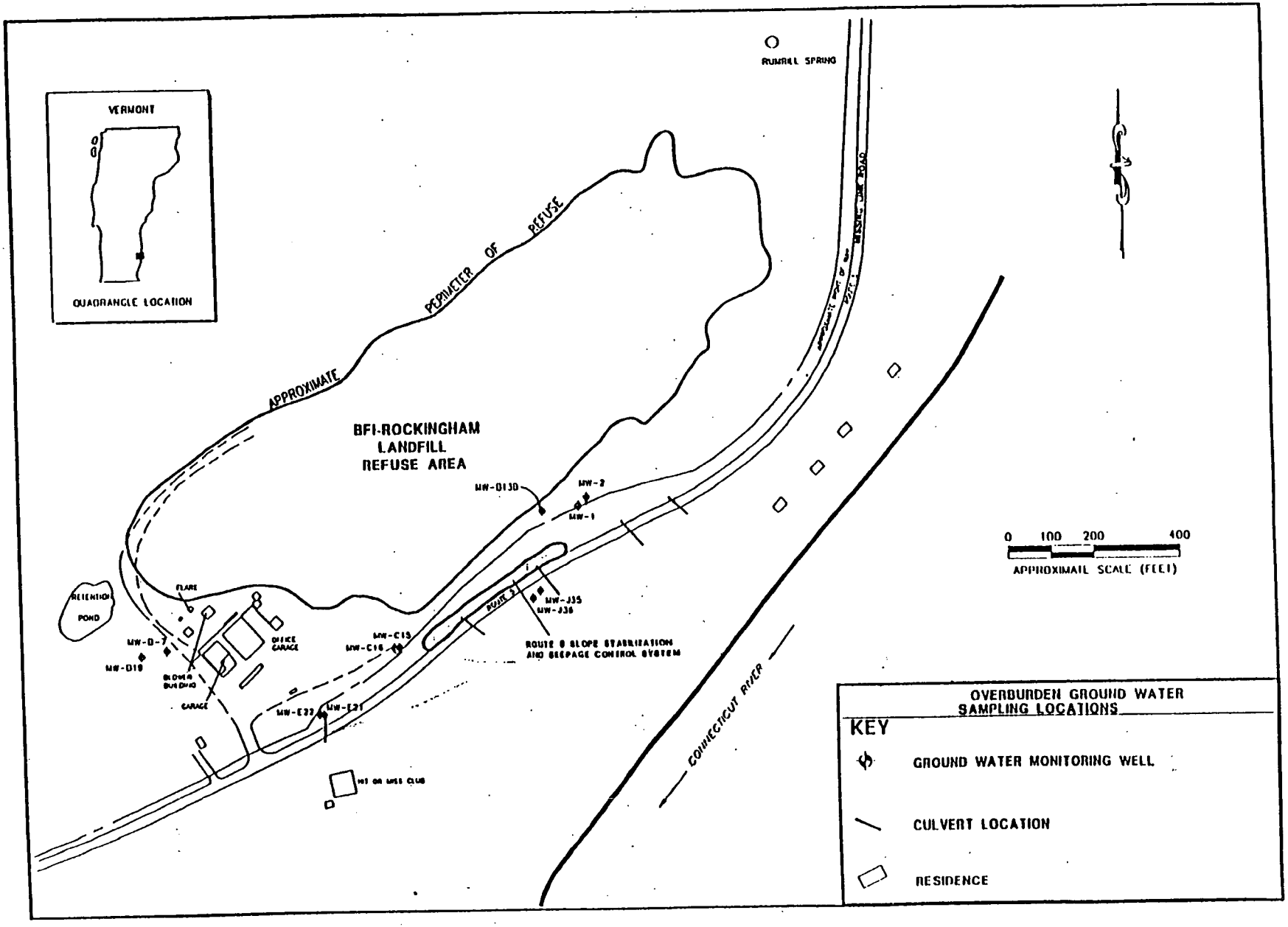

VERMONT
QUADRANGLE LOCATION
RUMRILL SPRING
PERIMETER OF REFUSE
APPROXIMATE
BFI-ROCKINGHAM
LANDFILL
REFUSE AREA
MW-D13D
MW-2
MW-1
MW-J35
MW-J36
ROUTE 9 SLOPE STABILIZATION
AND SEEPAGE CONTROL SYSTEM
RETENTION
POND
FLARE
OFFICE
GARAGE
MW-D-7
MW-D18
MW-C15
MW-C16
MW-E22
MW-E21
CONNECTICUT RIVER
0 100 200 400
APPROXIMATE SCALE (FEET)
OVERBURDEN GROUND WATER
SAMPLING LOCATIONS
KEY
GROUND WATER MONITORING WELL
CULVERT LOCATION
RESIDENCE

Figure 10

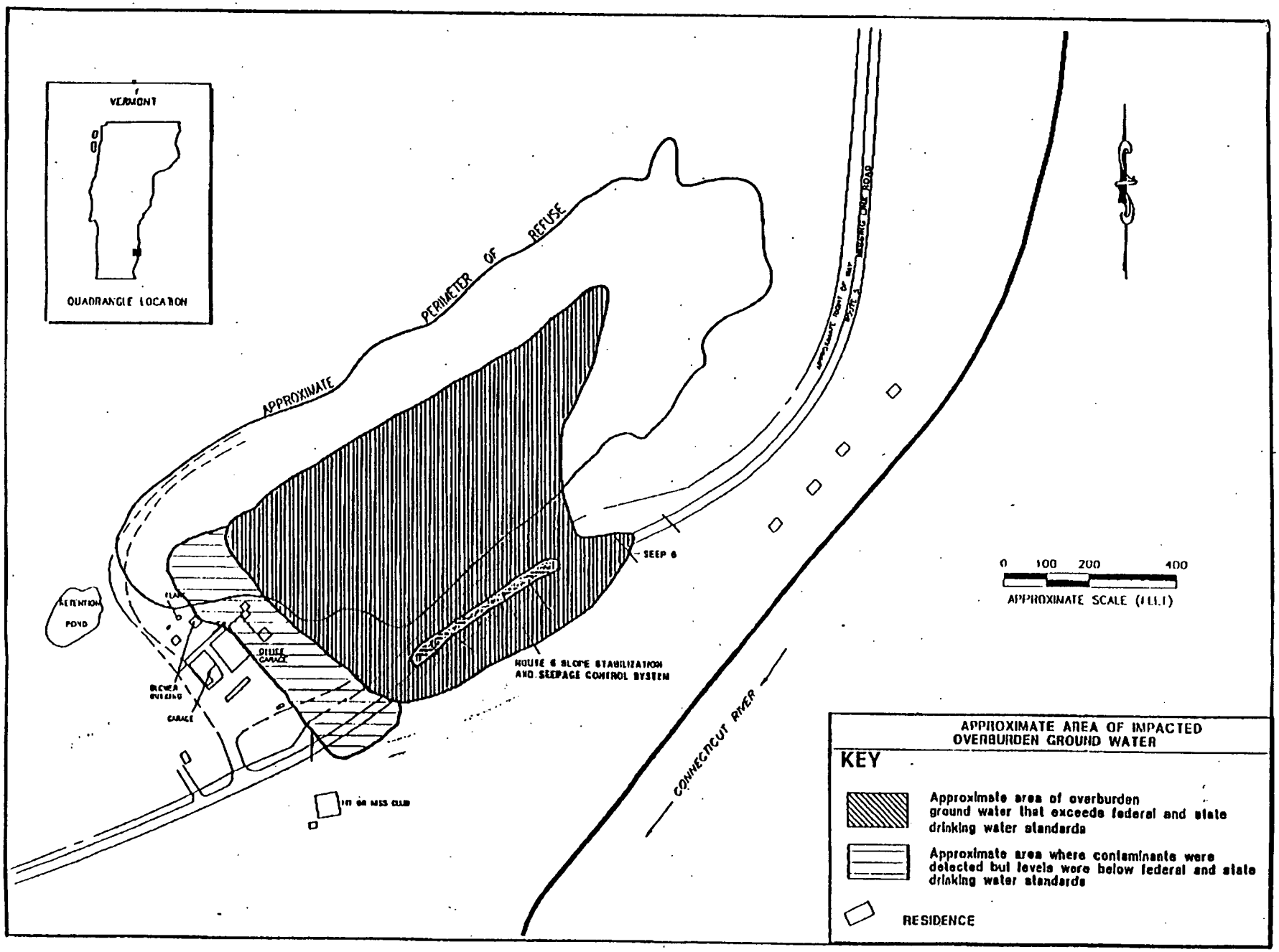
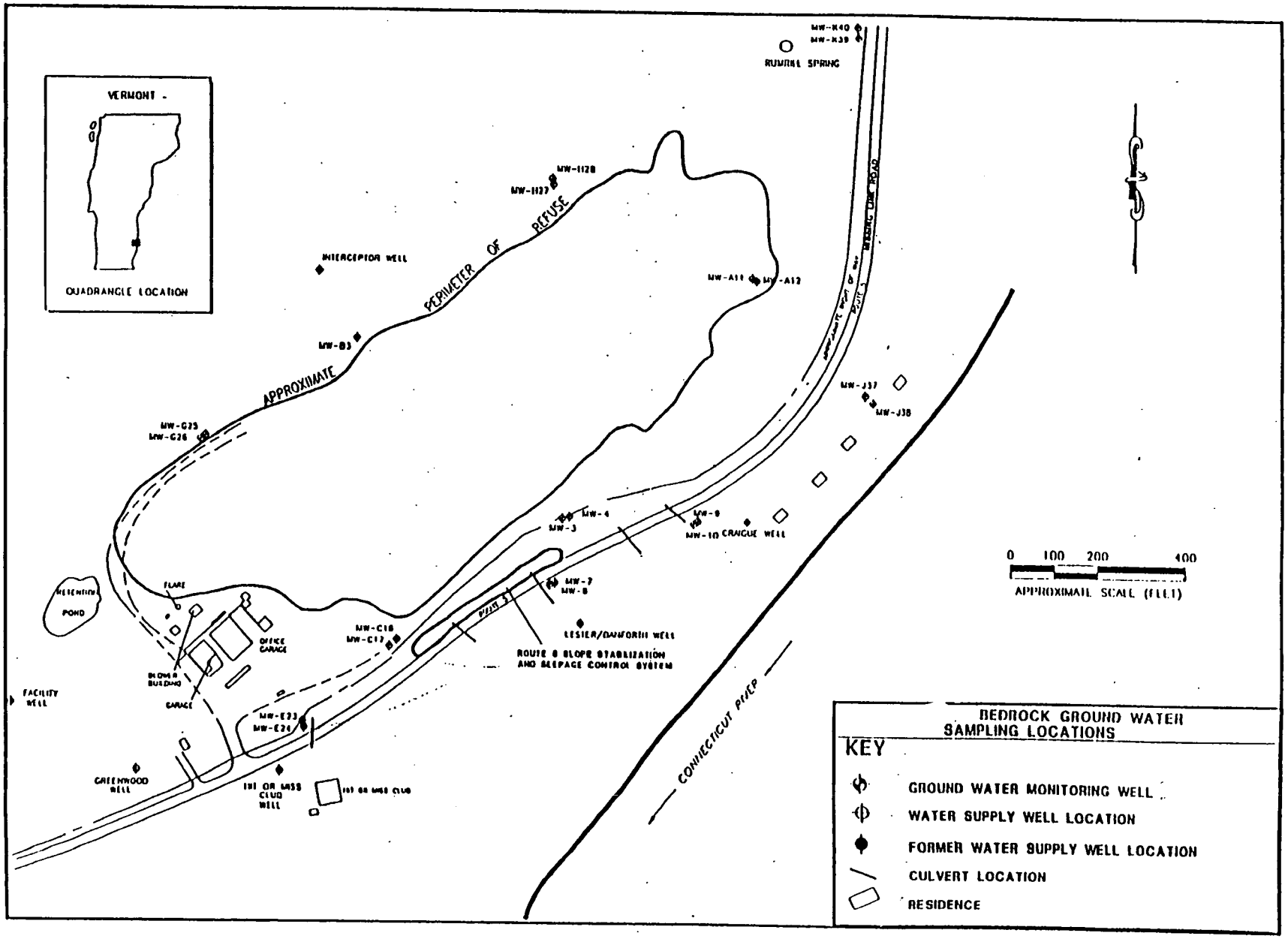

VERMONT
QUADRANGLE LOCATION
APPROXIMATE PERIMETER OF REFUSE
SEEP 6
HOUSE 6 SLOPE STABILIZATION AND SEEPAGE CONTROL SYSTEM
RETENTION POND
OFFICE
GARAGE
CONNECTICUT RIVER
0 100 200 400
APPROXIMATE SCALE (FEET)
APPROXIMATE AREA OF IMPACTED OVERBURDEN GROUND WATER
KEY
Approximate area of overburden ground water that exceeds federal and state drinking water standards
Approximate area where contaminants were detected but levels were below federal and state drinking water standards
RESIDENCE

Figure 11


VERMONT
QUADRANGLE LOCATION
RUMRILL SPRING
MW-H40
MW-H39
MW-H28
MW-H27
INTERCEPTOR WELL
PERIMETER OF REFUSE
APPROXIMATE
MW-A11
MW-A12
MW-B3
MW-G25
MW-G26
MW-J37
MW-J38
MW-4
MW-3
MW-8
MW-10
CRAIGUE WELL
MW-7
MW-9
LESIER/DANFORTH WELL
ROUTE 8 SLOPE STABILIZATION AND SEEPAGE CONTROL SYSTEM
RETENTION POND
FLARE
OFFICE GARAGE
MW-C16
MW-C17
GARAGE
FACILITY WELL
MW-E23
MW-E24
GREENWOOD WELL
CONNECTICUT PUMP
0 100 200 400
APPROXIMATE SCALE (FEET)
BEDROCK GROUND WATER SAMPLING LOCATIONS
KEY
GROUND WATER MONITORING WELL
WATER SUPPLY WELL LOCATION
FORMER WATER SUPPLY WELL LOCATION
CULVERT LOCATION
RESIDENCE

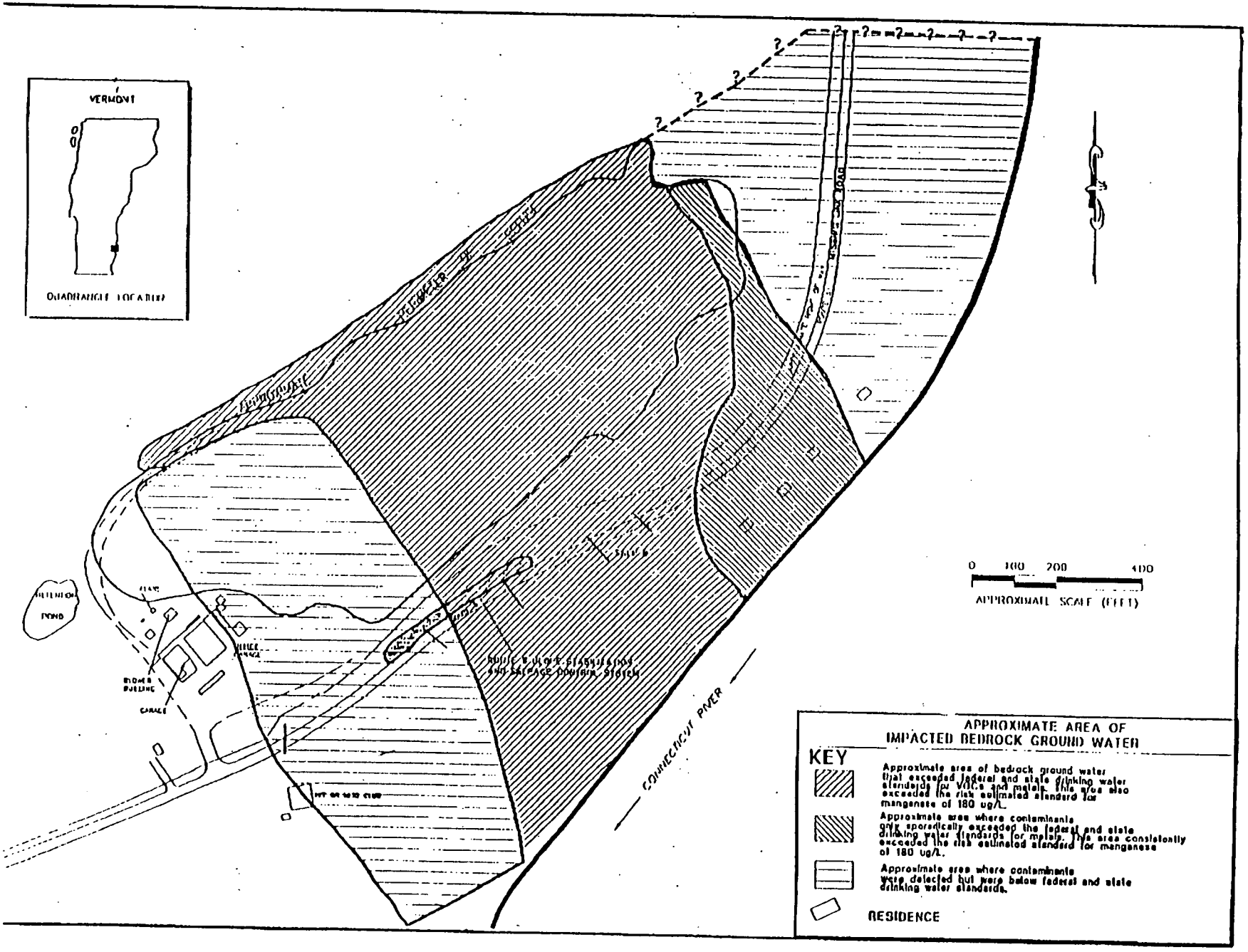
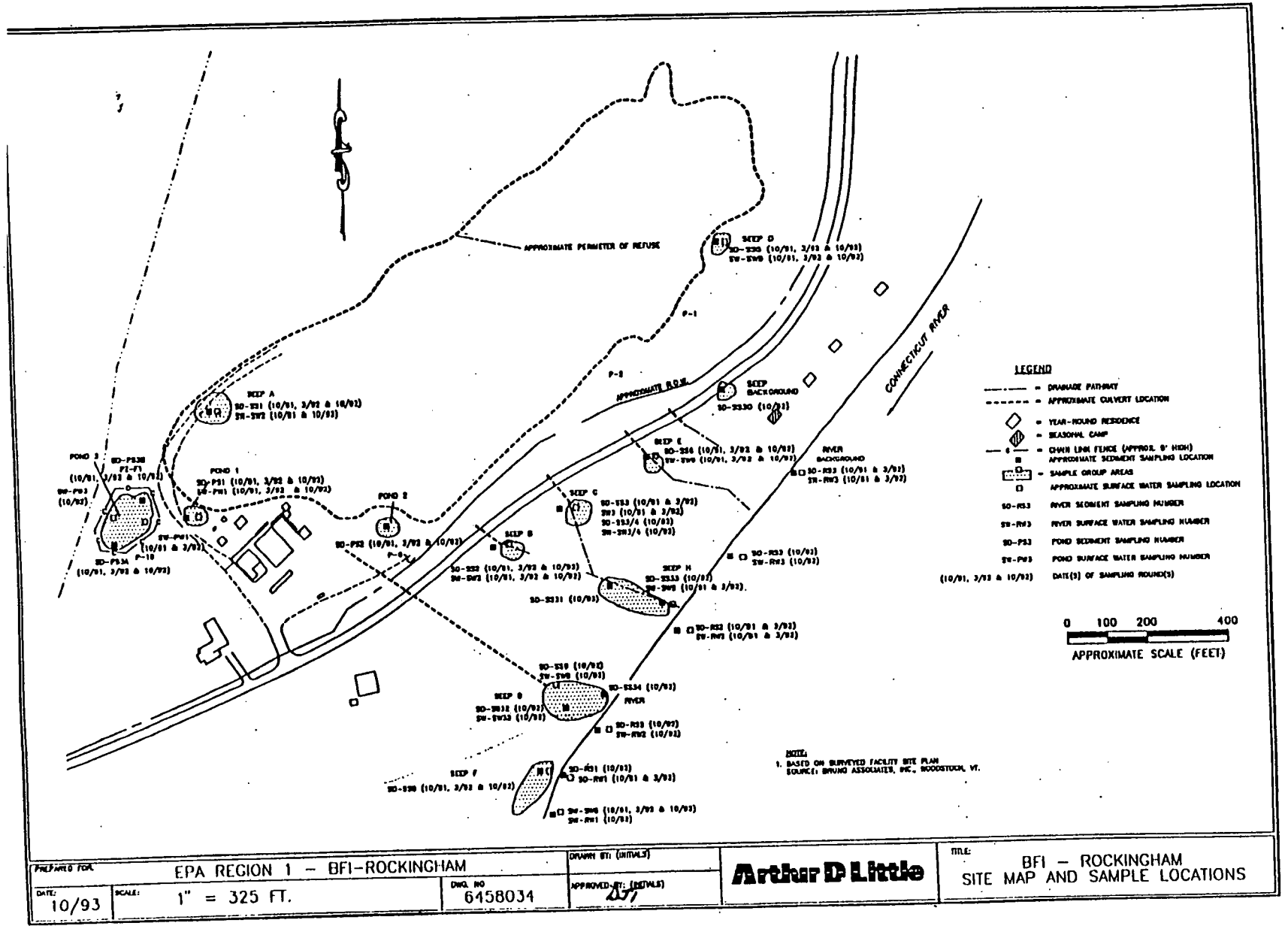

VERMONT
QUADRANGLE LOCATION
APPROXIMATE AREA OF
IMPACTED BEDROCK GROUND WATER
KEY
Approximate area of bedrock ground water that exceeded federal and state drinking water standards for VOCs and metals. This area also exceeded the risk estimated standard for manganese of 180 ug/L.
Approximate area where contaminants only sporadically exceeded the federal and state drinking water standards for metals. This area consistently exceeded the risk estimated standard for manganese of 180 ug/L.
Approximate area where contaminants were detected but were below federal and state drinking water standards.
RESIDENCE
0 100 200 400
APPROXIMATE SCALE (FEET)
CONNECTICUT RIVER
RETENTION POND
GARAGE

Figure 13



PREPARED FOR: EPA REGION 1 – BFI-ROCKINGHAM		DRAWN BY: (INITIALS)	Arthur D Little	TITLE: BFI – ROCKINGHAM SITE MAP AND SAMPLE LOCATIONS
DATE: 10/93	SCALE: 1" = 325 FT.	DWG. NO 6458034	APPROVED BY: (INITIALS)	

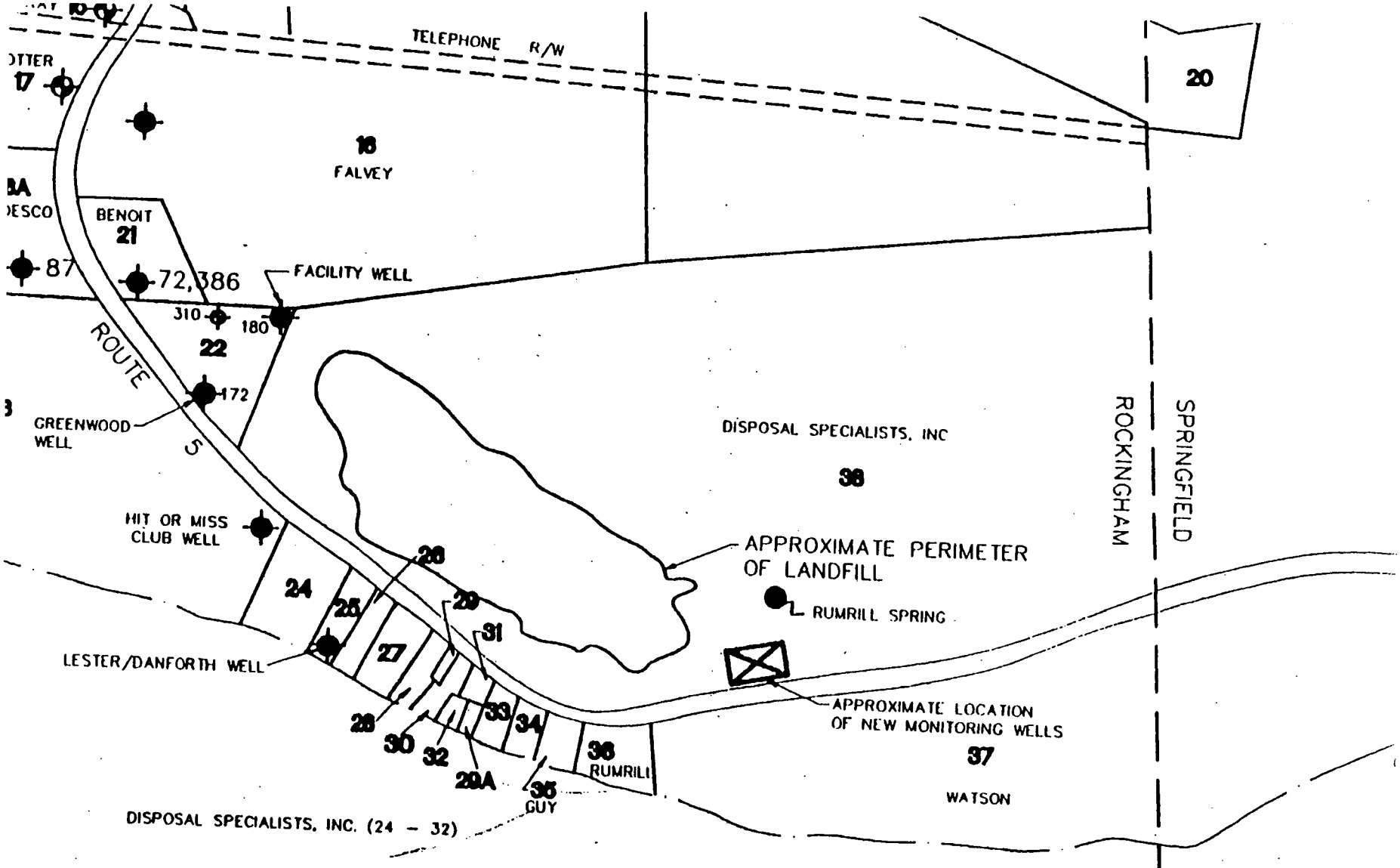

TELEPHONE R/W
OTTER
17
16
FALVEY
20
BA
DESCO
BENOIT
21
87
72,386
FACILITY WELL
310
180
22
ROUTE
5
172
GREENWOOD
WELL
DISPOSAL SPECIALISTS, INC
38
ROCKINGHAM
SPRINGFIELD
HIT OR MISS
CLUB WELL
APPROXIMATE PERIMETER
OF LANDFILL
24
25
26
27
28
29
30
31
32
33
34
29A
35
GUY
36
RUMRILL
RUMRILL SPRING
LESTER/DANFORTH WELL
APPROXIMATE LOCATION
OF NEW MONITORING WELLS
37
WATSON
DISPOSAL SPECIALISTS, INC. (24 – 32)

Figure 14

APPENDIX C

STATE OF VERMONT CONCURRENCE LETTER

State of Vermont

AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

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

Commissioner's Office
103 South Main Street
Waterbury, Vermont 05671-0401
802-241-3800
FAX 802-241-5141

September 12, 1994

John DeVillars, Regional Administrator
USEPA, New England Region
JFK Federal Building
Boston, Massachusetts 02203

RE: BFI-Rockingham Landfill Site

Dear Mr. DeVillars; John

The Vermont Department of Environmental Conservation (VTDEC) has reviewed the various remedial alternatives developed for this site, and we support the selected remedy, which is operation and maintenance of the multi-layer landfill cap; continued operation and maintenance of the existing leachate collection system and ground water interception trench; continued operation and maintenance of the landfill gas collection and treatment system; maintenance of institutional controls; continued long-term monitoring; and a review of site conditions every five years. The VTDEC has also reviewed the Remedial Investigation report, the Risk Assessment, and the Feasibility Study, and determined that 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 BFI-Rockingham Landfill Site.

Sincerely,

Jack Long, Commissioner
Department of Environmental Conservation

cc: Edward Hathaway, USEPA
Bryan Harrington, VTDEC
Brian Woods, VTDEC

APPENDIX D -

RESPONSIVENESS SUMMARY

TABLE OF CONTENTS

BFI-ROCKINGHAM LANDFILL SUPERFUND SITE
RESPONSIVENESS SUMMARY
PREFACE

The U.S. Environmental Protection Agency (EPA) held a 30-day comment period from June 30, 1994 to July 30, 1994 to provide an opportunity for the public to comment on the Remedial Investigation (RI), Supplemental Remedial Investigation (SRI), Human Health Risk Assessment, Ecological Risk Assessment, Feasibility Study, Long-Term Monitoring Plan, and Proposed Plan for the BFI-Rockingham Landfill Superfund Site (the "Site") located in Rockingham, Vermont. In the Proposed Plan, issued on June 15, 1994, the EPA announced a preference for the Natural Restoration and Management of Existing Site Controls Alternative. A collection of all documents used by the EPA in choosing this alternative were made available for review at the EPA Records Center (90 Canal Street, Boston) and the Rockingham Free Library (65 Westminster Street, Bellows Falls). These documents are known collectively as the Administrative Record.

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 and included in the Administrative Record before selecting a final remedial alternative to address the contamination at the Site.

This Responsiveness Summary is organized into the following sections:

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

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

III. Summary of Concerns Received During the Public Comment Period and EPA Responses To These Comments - This section summarizes and provides the EPA's responses to the comments received from residents and other interested parties during the public comment period. Additionally, comments received from the Potentially Responsible Parties (PRPs) are summarized and the EPA's responses to the comments are provided.

IV. Remaining Concerns - This section summarizes comments raised during the public comment period that cannot be fully addressed at this stage of the Superfund process

but which will continue to be of concern during the implementation and monitoring of the EPA's selected remedy for the Site. The EPA responds to these comments and will address these concerns during the development of the Long-Term Monitoring Program and Operation and Maintenance Plans for the Site.

In addition, two attachments are included with this Responsiveness Summary.

Attachment A - List of community relations activities that EPA has conducted at the Site.

Attachment B - Transcript of the July 20, 1994 public hearing regarding the Site, held at the Hit or Miss Club in Rockingham, Vermont.

All comments received during the public comment period have been included in the Administrative Record.

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

Using information gathered from the Remedial Investigation (RI), Supplemental Remedial Investigation (SRI), Human Health Risk Assessment, and Ecological Risk Assessment, EPA identified remedial action objectives for the cleanup of the Site.

The remedial action objectives for the Site cleanup are to control the source of ground water and surface water contamination, control the release of landfill gas, prevent contact with the landfill debris, protect the Connecticut River, and restore bedrock ground water to drinking water standards. EPA has established cleanup goals for the bedrock ground water at levels that EPA considers to be protective of public health and the environment.

EPA initiated a non-time-critical removal action (NTCRA) in February 1993 to address the control of the source of contamination. Under the NTCRA, EPA selected an action that included constructing a multi-layer low permeability cap over the landfill to control the release of leachate and prevent direct contact with the debris mass. The NTCRA also included measures to control of the release of landfill gas and to prevent contaminated surface water seeps from flowing into the Connecticut River. Institutional controls were included in the NTCRA to prevent an actions that might reduce the effective of the cap. The NTCRA institutional controls also prevent ground water use on the facility property. The control of the source of contamination also contributes to the restoration of ground water.

After identifying the remedial action objectives and cleanup levels for the Site and considering the extent to which the NTCRA addressed these objectives and cleanup levels, EPA developed and evaluated potential cleanup alternatives, called remedial alternatives. The Feasibility Study (FS) describes the remedial alternatives considered to address the bedrock ground water contamination and to maintain the effectiveness of the actions implemented under the NTCRA. The FS also describes the process used to narrow the range of alternatives to three remedial alternatives. The FS also provides a detailed evaluation and comparative analysis of the three remedial alternatives based upon nine evaluation criteria established in the National Contingency Plan.

EPA's preliminary recommendation of a preferred alternative to address Site contamination and meet the remedial action objectives and cleanup levels involves relying on natural restoration processes and the management of existing Site controls to restore bedrock ground water within 15 years of the completion of the landfill cap installed under the NTCRA and prevent the generation of surface water seeps that could flow into the Connecticut River.

The preliminary recommendation included:

- continued maintenance of the multi-layer cap currently under construction;
- continued operation and maintenance of the existing leachate collection system and ground water collection trench. The collected leachate and ground water will be shipped to an off-site facility for treatment and disposal;
- continued operation and maintenance of the gas collection and treatment system;
- maintenance of institutional controls: to prevent future use of the landfill that would damage the multi-layer cap; to prevent ground water use throughout the area of Site-related contamination; and to assure a water supply to residents with Site-related contaminated ground water beneath their residence.
- continued long-term monitoring of the seeps, ground water, collected ground water and leachate, Connecticut River surface water and sediments, and storm water run-off to confirm the nature and extent of contamination and confirm the restoration of the ground water; and
- a review of Site conditions every five years.

REMEDIAL ALTERNATIVES EVALUATED IN THE FS

The three remedial alternatives considered by EPA are listed below. The June 1994 Proposed Plan and Feasibility Study should be consulted for a detailed explanation of these remedial alternatives as well as EPA's preferred alternative.

ALTERNATIVES CONSIDERED

Alternative SW-1: No Further Action

Alternative SW-2: Natural Restoration and Management of Existing Site Controls

Alternative SW-3: Ground Water Extraction and Treatment and Management of Existing Site Controls

II. SITE HISTORY AND BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

The Site is located in southeastern Vermont on the west side of U.S. Route 5 in Rockingham, Vermont on a terrace overlooking the Connecticut River. The Site is bounded by undeveloped woodland to the north and west, Route 5 to the east, and a residence and a private club to the south. Across the river is Charleston, NH and a publicly-owned treatment works (POTW). The surrounding area is rural residential property and undeveloped woodland, with approximately 17 residences located within 1/2 mile of the Site. The area between the Site and the Connecticut River has a very steep grade and thus is likely not suitable land for development purposes. There is a substantial wetland along the edge of the Connecticut River below the Site.

The Site consists primarily of a 17 acre sanitary landfill. The landfill and associated facilities occupy 25 acres of approximately 120 acres owned by Disposal Specialists Inc. (DSI). From 1968 until 1991, the landfill received residential, commercial, and industrial solid and liquid waste. Industrial waste was only accepted during the 1960s and 1970s. Approximately 1.2 million cubic yards of solid waste and an unknown quantity of industrial waste were disposed of in the landfill during its operation.

Prior to the 1960s, the Site was undeveloped woodland. During the early 1960s it was used as embankment fill for the construction of Interstate 91. In 1968, Harry K. Shepard received approval from the Vermont Department of Health to operate a municipal solid waste landfill at this location. In 1969, Harry K. Shepard, Inc. deeded the landfill property to DSI. The landfill was operated by DSI, and Harry K. Shepard, Inc. continued as a solid and industrial waste hauling company. In

1973, Browning-Ferris Industries, Inc. purchased DSI and Harry K. Shepard, Inc. and continued operation of the landfill as DSI. In that same year, Harry K. Shepard, Inc. changes its name to Browning-Ferris Industries of Vermont, Inc. (BFI-VT).

The Site was proposed for inclusion on the National Priorities List (NPL) on June 24, 1988 (NPL update #7, 53 Fed. Reg. 23988-98). The Site was listed for final inclusion on the NPL on October 4, 1989 (NPL final rule update #7, 54 Fed. Reg. 41020).

The State of Vermont has regulated the landfill's operations under its solid waste management program since 1968. In 1979, the Vermont Department of Environmental Conservation (VTDEC) collected and analyzed groundwater samples from six bedrock wells in the vicinity of the landfill. Based upon the results of those samples, the VTDEC required DSI to supply nearby residents with bottled water. In 1980, a new water supply well was installed on the DSI property to service the facility and the residences. This new water supply eliminated the need to provide bottled water to the residents. DSI entered into an agreement with the residents to maintain the water line for twenty years.

As a result of the contamination of the bedrock drinking water wells the VTDEC required DSI to perform several hydrogeologic investigations. The results of these studies were presented in a series of reports. The VTDEC also required sampling of monitoring wells and of the Connecticut River twice per year.

In 1989, DSI installed an active gas collection system in order to comply with the Vermont air pollution control regulations and prevent methane problems in the facility buildings. The system includes 28 gas extraction wells installed into the landfill solid waste material. The collected gas is burned in a flare.

In August 1992, DSI and BFI-VT entered into an Administrative Order by Consent (AOC) with EPA for the performance of a remedial investigation and feasibility study. This Site was also selected for use as a national pilot for the implementation of the EPA municipal landfill guidance. The pilot program involved the use of the landfill guidance to streamline the remedial investigation and feasibility study for landfill sites.

In October 1993, BFI-VT and DSI proposed to install a ground water interceptor trench to collect overburden ground water to prevent landfill-impacted seeps from flowing into the Connecticut River. This trench was completed in January 1993. The water collected in the trench is shipped to an off-site facility for treatment.

In February 1993, EPA initiated an action to cap the landfill as part of the EPA Superfund Accelerated Cleanup Model (SACM). SACM encourages EPA to use experience from other sites and EPA's non-

time-critical removal authority to expedite the Superfund process. Information Update #2, issued in July 1993, provided an explanation of the SACM process.

In July 1993, EPA issued a fact sheet describing EPA's proposal to cap the landfill as part of the SACM. In addition to the construction of a multi-layer cap, the proposal included the expansion of the active gas collection system, deed restrictions to prevent disturbance of the cap, and continued operation and maintenance of the leachate and ground water collection systems with treatment of the collected water at an off-site facility. A 30 day public comment period with two public meetings were held during July - August 1993.

In September 1993, EPA signed an Action Memorandum finalizing the decision to cap the landfill as a SACM action. On September 24, 1993, EPA entered into an AOC with BFI-VT and DSI to complete the design and implementation of the multi-layer cap.

In April 1994, the design of the multi-layer cap was complete and construction activities were initiated. The installation of 11 additional gas extraction wells was completed by the end of May. Construction of the multi-layer cap is expected to begin in July and to be completed by November 1994.

History of Community Involvement

The Site has been subject to moderate to high levels of community involvement through its history. Several local residents objected to the development of the landfill in 1968. Several residents between the Site and the Connecticut River are supplied water due to contamination of several drinking water wells by the landfill. Past public concerns have focused on: overflow of liquid wastes from the landfill onto adjacent properties during the early 1970's; drinking water supplies; the receipt of municipal incineration ash by the landfill; and expansion of the landfill. The State of Vermont held public meetings and was responsible for community involvement prior to the Site being placed on the NPL.

Since placement on the NPL in 1989, the public has been interested in the Superfund process at the Site. Attachment A provides a chronology of public involvement since EPA began formal involvement in the Site in 1992.

A technical assistance grant (TAG) was provided to the Vermont Public Interest Research Education Fund (VPIREF) as part of the Superfund process. This group has reviewed the Site documents and provided comments to EPA. Citizen concerns throughout the process have focussed primarily on water quality, Site access control, and surface water run-off. Public meeting attendance

has been quite variable with only one person attending the public hearing for the NTCRA to 15-20 persons attending later meetings.

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

This Responsiveness Summary summarizes the comments received during the public comment period held from June 30, 1994 to July 30, 1994. Two sets of written comments were received: one from the TAG Group, VPIREF, and their technical advisors, and one from the PRPs. Two individuals and the TAG Group, VPIREF, also provided oral comments at the public hearing held July 20, 1994. A copy of all written comments received is included in the Administrative Record and a copy of the transcript from the public hearing is attached to this Responsiveness Summary.

1. Comments Regarding the Superfund Process
2. Comments Regarding the RI/FS
   - PRP Comments
   - TAG Group and Citizen Comments
3. Comments Regarding the Human Health and Ecological Risk Assessments
   - PRP Comments
   - TAG Group and Citizen Comments
4. Comments Regarding the Proposed Plan
   - PRP Comments
   - TAG Group and Citizen Comments
5. Comments Regarding the current NTCRA Activities
6. Comments Regarding Long-Term Monitoring Plan
   - TAG Group and Citizen Comments

1. Comments Regarding the Superfund Process

Comment a: A comment was submitted stating that the public has not had a sufficient role in the process due to the SACM approach and that no changes should be made to any Site related design, document, or action without public comment.

Response: There has been significant opportunity for public involvement at the Site. There have been seven public meetings in less than two years at the Site. All major Site reports, including the Remedial Investigation, Human Health Risk Assessment, Supplemental Remedial Investigation, Ecological Risk Assessment, Feasibility Study, and Design Reports, have been placed in the Site information repository as soon as they were available. EPA and VTDEC have continually indicated a willingness to meet with the public over any issues raised for concern.

The Superfund Accelerated Cleanup Model (SACM) and EPA guidance, Conducting Remedial Investigation and Feasibility Studies at Municipal Landfill, promote the streamlining of the Site

activities to initiate source control actions as quickly as possible. This Site has made use of SACM and EPA guidance to make a decision to cap the landfill within one year of the initiation of the RI/FS and to initiate cap construction within two years of initiation of the RI/FS. EPA believes control of the source of contamination should be achieved as quickly as possible. However, EPA also provide the public with significant opportunity to participate in the SACM process. Two facts sheets were issued prior to the initiation of the comment period for the SACM action, which was to cap the landfill. A public information meeting was held to initiate a thirty day comment period and a transcribed public hearing was held during the comment period. After the selecting of the cap as the SACM action, EPA placed each draft of the design in the Site repository. EPA also issued a fact sheet discussing the final design and describing construction activities prior to the start of construction. A public meeting was held to discuss this Fact Sheet.

Once a remedy or removal action is selected for implementation, the design process must be implemented. There are often changes to the alternative described in the decision document during design. The vast majority of these changes are not significant and do not change the ability of the action to meet the performance standards. Significant changes in scope, cost, or performance are documented by an explanation of significant difference. This document, if it were to be prepared, would be placed in the site repository with a notice in the press. Fundamental changes in scope, cost, or performance must undergo public comment. No significant or fundamental changes were made to the NTCRA as a result of the design. The consideration of alternative materials would not be a significant or fundamental change. EPA risk assessment guidance requires that the human health or ecological impact of any action be evaluated as part of the FS or design. EPA had evaluated the potential impact of the potential design changes (sewage sludge and shredded tires) and determined that no unacceptable public health risk would result from the use of these materials. To provide the public with an opportunity for involvement in the design, the EPA placed all design documents in the Rockingham Free Public Library as soon as each document was released.

Comment b: A comment was provided stating that the TAG program must be modified to work more quickly based on SACM. In addition, VPIREF indicated that VPIREF and their technical advisors had only been re-imbursed $611 from EPA as of the date of the comments. VPIREF also questioned the responsiveness of the TAG program in responding to these concerns.

Response: VPIREF had submitted two additional requests for reimbursement totaling $18,645. Both of these requests had to be returned to VPIREF due to errors in their preparation. EPA assisted VPIREF in the corrections that had to be made in an

effort to expedite the payment process. On July 28, 1994 EPA approved and processed for payment $11,160 in Technical Advisor costs, the balance of $7,485 in costs incurred by VPIREF & VPIRG have been temporarilly suspended due to a lack of documentation.

EPA had previously meet with VPIREF & VPIRG and provided instructions and manuals on the proper way to file requests as well as other required reporting documents. Additionally, EPA staff have made themselves available to the VPIREF to assist them in any way needed.

EPA awarded the TAG to the VPIREF on September 27, 1993. VPIREF chose to hire the services of a Grant Administrator to manage the TAG as allowed by the regulations. VPIREF did not enter into a contract with a technical advisor until March 20, 1994, a timeframe that is excessive with the assistance of a Grant Administrator. The TAG Program acknowledges that SACM strains the limits of TAG's in the ability to procure the services of a Technical Advisor and keep pace with the activity at the site. This is being addressed in the changes to be made when Superfund is re-authorized.

Comment c: A comment was submitted stating that the public participation has not been adequate and that documents were received too late. In addition, a comment was provided on the difficulty in completing TAG applications and obtaining funding.

Response: EPA believes that documents have been available in a timely manner for the Site. The initial Remedial Investigation Report and Human Health Risk Assessment were released to the public in May and June of 1993, one year before the release of the Proposed Plan. The Ecological Risk Assessment and Supplemental Remedial Investigation Report were released in March and April, 1994 respectively. The Feasibility Study was released at the end of May 1994, a full month prior to the start of the public comment process. EPA has made every effort to provide the TAG group with timely and complete information. The seven public meetings, four facts sheets, and several press releases are strong indications of the opportunity for public involvement at the Site.

2. COMMENTS REGARDING THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY

PRP Comments

Comment a: A comment was received stating that RI and SRI supports that bedrock ground water interaction with the east (New Hampshire) side of the Connecticut River is unlikely. This is further supported by large upward gradients in bedrock wells (K-39 and K-40) near the Connecticut River on the west side.

Response: EPA agrees that the RI and SRI support the discharge of ground water into the Connecticut River and that bedrock flow into New Hampshire is unlikely.

Comment b: A comment was received stating that ground water had been adequately characterized and that addition field investigations are not necessary.

Response: The EPA agrees that the current site characterization was adequate for the completion of the RI/FS and selection of the remedy. However, further data collection will be necessary to track the ground water restoration. In addition, the northern extent of the bedrock plume must be characterized to provide a complete delineation of the extent of ground water contamination. The Long-Term Monitoring Plan will evaluate the need for additional studies to confirm the conceptual hydrogeologic model and track ground water restoration.

TAG Group and Citizen Comments

Comment a : A local resident requested the installation of a monitoring well in the parking lot sub base and more monitoring wells to the south of the landfill due to the number of residences south of the landfill.

Response: A monitoring well in the sub base of the parking lot is not necessary. Several excavations have been performed through the parking lot which confirm the lack of water moving through the sub base. In addition, the parking lot contains an underdrain to remove storm water which would catch any seasonal flow. There are several wells that monitor ground water quality south of the landfill. The E cluster of monitoring wells is near the entrance to the facility and defines the southern extent of the plume. In addition, three bedrock water supply wells directly south of the landfill are sampled twice per year. These wells have not detected any contamination. Finally, the bedrock ground water contours, which show the direction of bedrock ground water flow, indicate that the bedrock ground water is moving towards the Connecticut River and not in the direction of the

parking lot.

Comment b: A local resident questioned the lack of water quality testing in Charlestown, NH.

Response: Discussions with the Town of Charlestown N.H. indicate that residents north of the Charlestown POTW, across the Connecticut River from the Site are on public water. The Charlestown water supply is upgradient of the river and is not hydraulically connected to the Site. Residences immediately south of the Charlestown POTW have dug wells adjacent to the Connecticut River which are not connected to the same flow regime as the Site. In addition, all of the hydrogeologic data for the Site supports the discharge of bedrock ground water to the Connecticut River.

Comment c: A comment was made that the FS does not address the continued flow at seep 6.

Response: The conceptual model for the capping of the landfill estimates a substantial drop in leachate generation within five years of the cap construction. This should result in an elimination of flow at seep 6. In addition, recent observations of seep 6 in July and August indicate that seep 6 is not flowing into the Connecticut River, but rather the water is lost to infiltration and evapo-transpiration. This supports the conclusion in the FS that seep 6 is contributing seasonal flow to the Connecticut River. Also, it is important to note that samples taken from the Connecticut River do not support a continued impact to the River. Seep 6 flows at less than 1 gpm during the majority of the time. This low level of flow would be substantially diluted by the Connecticut River, further reducing the potential for impact. Finally, seep 6 is being addressed as part of the non-time-critical removal action (NTCRA). Current NTCRA actions include a design of an extension to the ground water trench to collect the water that is discharging at seep #6.

Comment d: A comment was made stating that measurable impacts have occurred in the Connecticut River.

Response: Current sampling data does not support the conclusion that measurable impacts are occuring in the Connecticut River. The historical data base does show that levels of certain metals, including aluminum, iron, and lead, have been periodically detected above ambient water quality criteria in samples from the Connecticut River. However, there is no data to support that measurable impacts to the Connecticut River occured during the time period these samples were obtained. In addition, levels of aluminum, lead and iron were not detected above federal or state ambient water quality criteria in the October 1992, August 1993, and May 1994 sampling events. The sediment samples of the areas of the Connecticut River adjacent to the Site did not show a

long-term loading of contamination to the Connecticut River from the Site.

Comment e: A comment was provided on the selection of target cleanup levels for the Connecticut River and the definition of significant impact to the Connecticut River and landfill related impacts.

Response: The SRI data support that significant impacts are not occurring in the Connecticut River. There have not been any exceedances of ambient water quality criteria in the Connecticut River detected since March 1992. Significant impacts are those that have the potential to adversely effect human health or ecological receptors. Consistent levels of contaminants above reference standards (ambient water quality criteria or sediment quality criteria) would be considered a significant impact. Target cleanup levels for the Connecticut River were not specified because Vermont water quality standards will be used as the reference criteria. Using these criteria will assure that the Connecticut River is adequately protected. Landfill related impacts are defined as those impacts that are caused by the release of contamination from the landfill.

Comment f: A comment was made stating that the FS should state that sampling was often limited, with respect to locations and analyses run.

Response: EPA consideres the sampling efforts at the Site to be satisfactory. While not all parameters were sampled during each sampling event, the list of parameters was focussed on those compounds that would best track the extent of contamination and which represented the most significant risk assessment concerns. The RI and SRI and data tables provide the reader with an understanding of the analyses run.

Comment g: A comment was made that the overburden contamination extends beyond the edge of Route 5.

Response: The overburden contamination does currently extend across Route 5 to the edge of the drainages along Route 5. While some of this water contains residual contamination from former seeps and the existing flow at seep #6, only seep #6 is currently observed to discharge this overburden ground water to the ground surface. Even if the plume is extended across Route 5, the overburden plume still exists in a very narrow area between the landfill and the edge of the drainages along Route 5. Data collected as part of the Long-Term Monitoring Program will further delineate the overburden contamination.

Comment h: A comment was made stating that there is no evidence that the residences below the landfill are not using their wells or that other bedrock water supplies have not been contaminated.

Response: Two of the three residential wells east of the landfill have been observed to be in disrepair by EPA. The condition of the third well is unknown. EPA will seek to obtain permission from the property owners to formally abandon the former water supply wells by grouting. There is a substantial data base to support that other water supplies have not been contaminated. In addition, ground water flow contours do not support the movement of contamination towards residences with current water supplies. Three water supply wells on the south side of the landfill and one on the north side of the landfill have been sampled twice per year for 10 years. Two of the wells on the south side of the landfill are active pumping wells in close proximity to the landfill. These wells have not been impacted. In addition, several residential water supplies in the area were sampled twice during the 1980's and have been sampled twice, in 1993 and 1994, during the RI/FS. No contamination has been detected in any of the existing water supply wells in the area of the landfill. The elevated arsenic levels in one well north of the landfill are not considered Site related as the monitoring wells on the north side of the landfill do not have elevated arsenic concentrations.

Comment i: A comment was made that the unquantified risks from dermal contact and inhalation of bedrock ground water should have been discussed in the FS.

Response: The potential risk from inhalation of vapors from ground water was qualitatively addressed in the Human Health Risk Assessment. Risks that were qualitatively discussed in the Human Health Risk Assessment, such as ambient air, were addressed in the Remedial Action Objectives. See the Human Health Risk Assessment responses for additional response to this comment.

Comment j: A comment was submitted stating that the assumption that bedrock ground water will be used as a water supply is not conservative as indicated by the FS due to previous use of the bedrock ground water.

Response: Former residential water use in the area of the landfill was the basis for selecting this pathway for evaluation in the Human Health Risk Assessment. The future use of the bedrock ground water is considered conservative based upon the limited potential for a future water supply well being installed given the availability of a water line.

Comment k: A comment was submitted that both unquantified and quantified risks should be discussed in the FS and that total risk at a location should be evaluated.

Response: The Human Health Risk Assessment is the most appropriate forum for discussing unquantified risks. EPA considers both quantified and unquantified risks in developing the Record of Decision. The FS did address unquantified risks as part of the remedial action objectives. Total risk for the swimming pathways was presented in the ROD.

Comment l: A comment was submitted stating that institutional controls in the FS are not adequately characterized.

Response: As stated in the ROD, DSI is implementing institutional controls on its property to prohibit use of the property in a way that would be detrimental to the response actions and to prohibit use of contaminated ground water. In addition, BFI-VT has agreed to provide a water supply to owners of the contaminated wells for twenty years after full and final closure of the solid waste facility and to convey the system to those owners free at the end of that period. EPA will evaluate the need for, an if it deems appropriate, require additional institutional controls if these prove ineffective in preventing the extraction of contaminated ground water or altering the migration patterns of contaminated ground water.

Comment m: A comment was received regarding consideration of sewage sludge in the FS.

Response: Sewage sludge will not be used at the Site. However, the EPA Section 503 sewage sludge land application regulations were designed for the surface application of sewage sludge.

Comment n: A comment was submitted stating that the ecological risks should be described in the same manner as the human health risks.

Response: Ecological risks are not as strictly defined as human health risks. The actual impact of a concentration in a surface water sample may represent a potential concern, but estimating the actual impact is often not possible. Ecological risks are discussed more qualitatively for this reason.

Comment o: A comment was submitted that moderate risks were estimated in the Ecological Risk Assessment (ERA) for the Connecticut River surface water. That the Connecticut River is discussed as an after thought on page 82.

Response: The protection of the Connecticut River is one of the primary objectives of the remedial action. EPA established a set of remedial action objectives, which are presented on page 56 of the FS, regarding the protection of the Connecticut River. While moderate risks were estimated as a results of the evaluation of the October 1991 and March 1992 data, there were no elevated levels of chemicals and elements in the Connecticut River detected in the October 1992, August 1993, and May 1994 sampling events. The FS focussed on actions beyond the source control actions previously implemented or under construction. In addition, the control of seep 6 is being addressed under the NTCRA not the FS.

Comment p: A comment was submitted stating that two of the four justifications for generating cleanup goals only for bedrock are in error. The comment also questioned why background data was not used to establish cleanup goals.

Response: The question regarding background data has been addressed in other responses. The comment is correct in stating that all seeps have not been addressed. However, target cleanup levels were not established by EPA for the Connecticut River because the Vermont water quality standards will be compared with the data from surface water results to determine if future impacts are occurring and the last three rounds of samples from the Connecticut River do not support a current impact. Following the completion of the cap the only surface water discharge from the Site will be snow melt and storm water run-off.

Comment q: A comment was submitted stating that the arsenic found in the bedrock results from the landfill.

Response: Chapter 4 of the FS provides a detailed discussion of the occurrence of arsenic in the bedrock ground water. The FS concluded the arsenic, while mobilized by the landfill leachate, is contributed by the naturally occurring arsenic in the bedrock fractures. This is supported by the low levels of arsenic in the overburden and the highly variable levels of arsenic across the Site. The elevation of arsenic in some Site wells as compared to off-site wells also supports this conclusion. The detection of arsenic in many wells outside the plume supports the presence of arsenic in the bedrock. The landfill leachate has caused the mobilization of this arsenic. Regardless of the source of arsenic, the remedial action objective is to restore affected bedrock ground water to drinking water standard for all compounds and to levels protective of human health.

comment r: A comment was submitted stating that the description of the screening of technologies was limited.

Response: Table 3-3 of the FS provides the basis for the screening of technologies. This table provides a comprehensive evaluation of all the technologies evaluating in the screening. The limited number of alternatives developed at the Site was based upon the limited options available to address bedrock ground water contamination and the actions included in the NTCRA.

Comment s: A comment was submitted stating that monitoring of the Connecticut River is not listed in the bullets on page 86 for SC-2. The comment also noted that not addressing the ground water objectives is not a parenthetical issue and that alternative SC-2 did not address seep 6.

Response: Alternative SC-2 did not include surface water sampling. However, sampling of the Connecticut River will be included in the Long-term Monitoring Program under the selected remedy. Not addressing ground water objectives was listed as a parenthetical because source control actions directly addressed the other remedial action objectives but only indirectly addressed the ground water objectives. However, ground water remedial action objectives are very important components of the source control action and should not be considered less important by the use of the parenthetical. Seep 6 is being addressed under the NTCRA.

Comment t: A comment was submitted stating that under MOM-1 institutional controls for the BFI property are not the same as institutional controls for the entire Site. Also, this alternative did not include surface water and sediment sampling.

Response: It is appropriate that institutional controls be different for the BFI property and other properties given the differing response objectives for those properties. The ROD clearly makes this distinction. Surface water and sediment sampling is included in Table 3 of Appendix E of the FS which discusses the monitoring program and costing for each alternative in detail.

Comment u: A comment was submitted requesting clarification regarding the applicability of the study by Matisoff and Associates (1982).

Response: The Matisoff study was an evaluation of the occurrence of arsenic in the drinking water of a residential area of Ohio. The relevant aspects of the study were the support of the relationship between elevated arsenic concentrations and reducing conditions in a natural system with no outside source of arsenic. The study also suggests a relationship between arsenic and iron.

Comment v: A comment was submitted stating that Section 5.1.2 failed to indicate that alternative SW-1, No Further Action, does not meet the baseline assumption in the HHRA and ERA that the landfill will be capped and the cap maintained.

Response: The comment is correct. SW-1 could not be selected as the remedial action based upon the HHRA and ERA. The EPA Guidance: Conducting Remedial Investigation/Feasibility Studies for CERCLA Municipal Landfill Sites and the Presumptive Remedy for Municipal Landfill Sites allow the HHRA and ERA to be streamlined. The streamlining of these documents based upon the presumption that the landfill will be capped results in an insufficient data base to select a No Action alternative. Therefore, a more detailed HHRA would be required before SW-1 could be selected. A statement was included in the HHRA that it would not support a complete no action decision for the Site.

Comment w: A comment was submitted questioning whether it would be feasible to treat the collected ground water and leachate in addition to the bedrock ground water. The combination of the treatment of the overburden ground water and leachate with the treatment of the bedrock ground water could make SW-3 more cost effective.

Response: The cost savings by treating the collected leachate and overburden ground water on-site would reduce the cost of SW-3. However, SW-3 would still be significantly more expensive than SW-2. While there is a benefit of eliminating the need to transport the collected leachate and overburden ground water off-site, the technical concerns regarding the ability to successfully implement SW-3 must also be considered. Also, SW-3 does not achieve ground water restoration in a time period significantly different from SW-2. In addition, the negotiation, design, construction, and start-up testing for the ground water extraction system would require 3-5 years. By the time the pump and treat system was ready to treat the collected leachate and ground water the cleanup model predicts that the water levels in these systems will have decrease significantly. This decrease in volume will decrease the costs savings of treating this water on-site. The costs for transporting and disposing the water during the 3-5 year period would still be incurred even if alternative SW-3 had been selected.

Comment x: A comment was submitted stating that the FS does not clearly state that SW-3 involves treatment of the bedrock ground water and SW-2 does not. In addition, the comment requested additional clarification of the short term impacts of SW-3.

Response: The comment is correct in stating that SW-2 does not involve treatment of the bedrock ground water. However, the natural discharge of bedrock ground water under alternative SW-2 does not impact the Connecticut River. In addition, discharge of the nonhazardous water to an off-site facility is considered treatment. The ROD clearly identifies SW-3 as providing treatment of the bedrock ground water.

The short term human impacts under SW-3 are minimal and could be successfully prevented using good construction practices and proper industrial hygiene. The habitat impacts under SW-3 referred to the disturbance caused by clearing and grubbing woodland for space for the treatment plant. The retention pond washout in June 1994 did not adversely impact habitat.

Comment y: A comment was made questioning what would happen after thirty years and how will the decision be made to stop remediation. The comment also stated that the 24 point-of-compliance wells should be sampled until compliance is reached. Additionally the comment questioned how long-term monitoring data will be evaluated to insure that remediation is being achieved. How will new constituents be monitored?

Response: The selected remedy requires the cap be continuously maintained to sustain the protection achieved, even beyond the thirty years used to cost the alternatives. The ground water collection trench and leachate collection system will be sampled and maintained until they are dry. The gas management system will be operated and maintained as long as the cap, unless a determination is made to EPA and VTDEC that the system can be shut down without impact to public health or the environment. Sampling of the point of compliance wells will occur until the ground water has been at or below cleanup levels for three consecutive years. Long-term monitoring data will be observed to check trends in ground water flow and concentration levels. Periodic reports will be produced to compare expected values with actual levels. Additional parameters, SVOC and pesticides, will periodically be included in the sampling program to check the levels of these constituents. The landfill is currently considered anaerobic. The Long-Term Monitoring Program is not expected to identify any new constituents. However, the data will be reviewed to check for changes in the occurrence and distribution of compounds.

Comment z: A comment was submitted stating that additional data must be collected to evaluate the effectiveness of the cap and that the FS does not demonstrate that capping will adequately prevent exposure by off-site receptors to Site-related contaminants.

Response: EPA believes that sufficient data was presented in the RI, SRI, and FS to determine that the cap and other existing controls should be capable of the restoration of bedrock ground water. However, the collection of Long-Term Monitoring data to confirm this hypothesis is critical. If the Long-Term Monitoring data does not support the hypothesis regarding the ground water restoration, then further actions need to be evaluated. EPA considers all off-site exposure pathways to be satisfactorily addressed by the selected remedy.

Comment aa. A comment was submitted stating that the cap planned and work associated with the CAP, due to its close proximity to Route 5, could impact Route 5. As recently demonstrated by a retention pond failure, it is essential that all regulations regarding work at or around public roadways be considered. The comment recommended that ARAR's other than "environmental" ARAR's be included in the Feasibility Study (FS). Local, state, and federal regulations should be considered. Also, as the CAP material is from offsite sources and will need to be transported onsite (as well as leachate being trucked offsite) regulations promulgated by the United States Department of Transportation should be included under the Operation and Maintenance section of table 5 "ARAR"S for Compliance".

Response: Every effort is being made as part of the on-going activities at the Site to minimize the impact of the construction and the long-term action on Route 5 and local residents. EPA, VTDEC, VTAOT, and the PRPs contractor, Dames and Moore, have been working cooperatively to design a drainage system that will not adversely impact Route 5 or the residences along Riverfront Road. The contractor performing work at the Site is responsible for complying with all applicable regulations, including VTAOT and USDOT. This also applies to the transportation of material to and from the Site. It is not the purpose or intent of the FS to provide a detailed listing of all local, state, and federal regulations that apply to an activity. The contractor is expected to be knowledgeable of local and state construction requirements. In addition, EPA and the State review the project to ensure compliance. ARARs, by definition, are federal or state environmental or facility siting laws that are applicable or relevant and appropriate under the circumstances at the site. ARARs apply to the on-site aspect of a remedial action. Any off-site action must comply with all existing federal, state, and local regulations. On-site actions must be performed in a manner consistent with all ARARs and other applicable federal, state,

and local regulations that are not included in the definition of ARARs. A permit is not required for any activity performed entirely on-site as defined by the National Contingency Plan. While the Site activities have caused excess run-off onto the road during a few storm events, several of the Site actions, particularly the ground water trench, have improved the stability of the road.

Comment ab. A comment was submitted questioning whether the cost estimate presented in Table 5-4 for site wide alternative SW-2 under "Operation and Maintenance, Landfill Leachate Collection System" was updated to include changes due to an alternative disposal site being required? How do these changes, if any, effect the present worth cost using a 7% discount rate before taxes and after inflation?

Response: The non-hazardous waste water is currently being shipped to a commercial industrial waste facility. This shipment will likely continue until another POTW has been determined to be acceptable for receipt of the waste water. The cost of the industrial facility does increase the cost of SW-2. However, both SW-2 and SW-3 would be equally effected for the first three years when the costs are highest. Thereafter, the costs will be less due to a reduced volume. The cost of using an industrial waste facility doubles the treatment cost under SW-2 adding approximately $70,000 per year in cost. This would not be a significant change to the cost estimate.

Comment ac. A comment was made stating that the leachate collection trench will likely be expanded due to continued discharges at seep 6, the costs for this additional work should be included in all the appropriate cost estimates.

Response: The control of seep #6 is being performed as part of the non-time-critical removal action at the Site. These costs are independent from the costs of the alternatives evaluated in the FS and should not be included. However, there will be an additional costs due to the increase in flow to the ground water collection trench.

Comment ad. A comment was made stating that "Site Chronology, Disposal Specialists, Inc. Feasibility Study, Rockingham, Vermont, Table 1-1" doe not present any "Site Related Activities" other than the January 1992 entry "Supplemental Remedial Investigation Report to the EPA" in 1994. As the Feasibility Study is signed and dated May 27, 1994, the F.S. should include all activities, include onsite meetings, sampling related to cap material alternatives, all sampling events, the Palmer Plant issues, and public meetings, both formal and informal.

- Additionally, no where in the chronology is the issue of exploring and sampling alternative cap materials presented.
- A detailed chronology will provide useful information for

all citizens and interested parties.

Response: A detailed chronology of Site activities is attached to the ROD and a detailed chronology of community relations activities is attached to the responsiveness summary.

Comment ae. A comment was made that alternatives SW-2 and SW-3 presented should have considered incorporating aspects of both SW-3 and SW-2. For instance, should the landfill cap fail to eliminate overburden groundwater flow under the cap, then consideration should be given to pumping "clean" groundwater from strategically placed wells immediately upgradient of the landfill footprint. The technical feasibility as well as an estimate of costs should be presented in all appropriate sections of the feasibility study.

Response: Upgradient pumping wells were eliminated from consideration due to the limited effectiveness of pumping the fractured bedrock in the past. However, if the actions implemented as part of the NTCRA and ROD do not achieve ground restoration, then additional actions will be considered. The additional investigations and corresponding decision is outside the scope of this action.

Comment af. Several comments were made that questioned the identification of the extent of bedrock ground water contamination due to the detection of low levels of VOCs in the new K cluster.

Response: The detection of low level VOCs in the K well cluster in the north east section of the Site indicates that the VOC portion of the plume may extend north of the current delineation. However, the natural gradients in the area would do not support contamination extending much further north. Additional monitoring wells will be installed as part of the long-term monitoring program to define the north east extent of the plume. It should be noted that only very low concentrations of VOCs were detected at the K cluster. The arsenic and manganese concentrations were much lower at the K cluster than other wells in the plume. The arsenic concentrations were well below the cleanup standard and the MCL. The manganese level was higher than the cleanup level, but it was not significantly different from the level detected in some background wells (e.g.interceptor well).

Comment ag. Several comments requested further information and/or modeling to support that discharge to the Connecticut River by the ground water does not have any impact on the river. In addition, further sampling of sediments along a cross-section of the river was recommended.

Response : First, sampling of the Connecticut River sediments and surface water do not indicate a significant impact from ground water contamination. (also see response to comments c and d) The limited areas of elevated iron levels in the river were a result of surface water discharge from seeps along Route 5. Two of the three seeps have been eliminated and the third seep will be controlled as part of the NTCRA. Second, the volume of ground water flow from the bedrock to the Connecticut River is very small in comparison to the overall flow in the river. Section 5.3 of the RI included a calculation of the total flow of contaminated water from the Site to the Connecticut River and the potential resulting maximum contaminant levels in the river. Based upon Site data and calculations presented in Appendix B of the FS, the range of bedrock flow from the Site drainage area into the Connecticut River is between .08 cfs and 6 cfs. Based upon data from the RI, the average flow in the Connecticut River is 9330 cfs and the 7Q10 mean low flow rate calculated for the river is 993 cfs. The 7Q10 mean low flow rate is a standard calculation used in surface water hydrology and water resource planning to provide an estimate of the lowest flow levels that can conservatively be expected over time. Using the average flow rate of the Connecticut River, the ratio of bedrock ground water flow to the total Connecticut River flow ranges from 1:1,555 to 1:116,625. Use of the 7Q10 low flow rate results in a ratio ranging from 1:166 to 1:12,412. Use of either the average flow or the 7Q10 mean low flow values in a calculation of the maximum concentration of contaminants in the river resulting from discharge of bedrock ground water to the river indicates that such concentrations would be substantially below federal and state drinking water and surface water standards. Cross-sectional sampling of the Connecticut River will be evaluated as part of the long-term monitoring program. However, given the very low levels predicted by the dilution factor, the value of this sampling is uncertain. The majority of the bedrock recharge to the Connecticut River is likely occurring in the area adjacent to the Site where the bedrock is in close proximity to the river. The depth of overburden increases substantially across the river. This decreases the potential for discrete break-out areas in the river.

Comment ah: Comments were made regarding the 15 year estimate for cleanup.

Response: The 15 year time frame for ground water cleanup is described in Section 4 of the FS. The time frame was based upon the time required to drain the unsaturated waste to field capacity following capping (approx. 50 days), the time required to drain the saturated waste to a level resulting in 98% reduction of the former leachate contribution to bedrock (14 years), and the additional time required to flush the bedrock (1 year). The monitoring wells used for the estimation are listed in table 4-7 of the FS. All wells outside the Waste Management Unit, which is defined as the edge of the landfill, are expected to meet the cleanup levels within this time period. In addition, a substantial reduction in concentrations, approaching 90%, is expected within 5 years of the completion of the landfill cap.

Comment ai: A comment was received requesting information regarding the predicted and actual trench flow.

Response: The predicted trench flow was 2 gpm and the actual flow varies from 1.8 to 3 gpm. An increase in trench flow was observed early this year due to the reduction in vegetation over the landfill following the regrading project in 1993. Section 3.5.2 of the Remedial Investigation Report presents the initial flow estimates for the overburden ground water.

Comment aj: A comments was made regarding the recharge of overburden by bedrock and the potential for an exposure pathway.

Response: In areas with an upward gradient, the bedrock may discharge into the overburden. The potential for an overburden pathway is small due to the limited area of potential recharge of overburden from contaminated bedrock ground water, the limited potential for access or use of this overburden ground water, and the relatively low levels of contaminants. Several factors influence the extent to which the overburden, whether recharged by the bedrock or the landfill leachate, is an exposure pathway. The overburden is made of fine silts, sand, and clay and has a very low permeability. In areas where the overburden contains ground water, the yield is very low. The overburden ground water that is highly contaminated exists in an area adjacent to the Site between the landfill and the slopes of the ravines along Route 5. This area has a very steep topography an is unsuitable for development of a residence or a water supply. The overburden ground water is of limited extent as indicated by the lack of overburden ground water in piezometers P-1, P-2, MW-1, and MW-2. In addition, two borings along Route 5 did not encounter overburden ground water until the bedrock interface. The new K well cluster did not detect a zone of saturated soil in the overburden. If the overburden in the area suitable for

development was recharged by the bedrock, there would not be an exposure pathway due to the low yield of the overburden and the availability of bedrock as a water supply. Finally, neither the bedrock nor the overburden contain levels of VOCs that could represent a indoor air concern in the areas suitable for development. The VOC levels in the ground water in this area are in the low parts per billion range.

Comment ak: A comment was made requesting an increase in the sampling frequency of immediately downgradient wells and the trench to detect the possible increase in contaminant levels due to a reduced dilution factor.

Response: EPA agrees that an increased frequency of monitoring may be necessary for the trench and leachate tank as the dilution factor is reduced. However, the need to sample other wells more frequently is less obvious. This comment will be considered during the development of the Long-Term Monitoring Program.

Comment al: A comment was made stating that a trail that starts approximately 1/2 mile south of the landfill and travel around the site, exiting on Rt. 5 just north of the site, be included in all maps for the site.

Response: EPA is not aware of such a trail. Areal photographs of the Site from 1963 to 1990 do not show the trail nor was the trail located in various EPA inspections of the area west of the landfill. However, if VPIREF will provide more information regarding the location of the trail, EPA will inspect the trail and consider the need to include the trail in future Site maps.

Comment am: A comment was made stating that sufficient information does not exists to confirm the discharge of Site contamination to the Connecticut River and that continued impact to the Connecticut River is unacceptable.

Response: The RI, SRI, and FS all provide hydrogeologic data support the conceptual model for the Site. Further information will be collected as part of the Long-Term Monitoring Program. The data and evaluations performed as part of the RI/FS support that no impact to the Connecticut River will occur under the selected alternative. EPA believes that sufficient information was presented in the administrative record to support the selected remedy.

Comment an: A comment was submitted stating that upgradient diversion should be evaluated in more detail.

Response: Upgradient diversion was attempted in the early eighties and found to be unsuccessful. Upgradient diversion in bedrock can be very expensive and difficult to implement. The current information in the RI/FS supports that the Site will be

successfully remediated under the existing controls and natural restoration. If the select remedial action does not achieve the restoration of ground water, then further studies would be implemented to determine the best mechanism for meeting the cleanup levels.

Comment ao: A comment was submitted stating that the Site's impact on the stability of Route 5 needs to be studied and that VT AOT ARARs should be researched.

Response: AOT regulations are not ARARs. They are applicable state standards that apply to any Site activity covered by the AOT regulations. The contractor working at the Site is required to comply with AOT regulations. The stability of Route 5 has been consistently evaluated throughout the RI/FS and NTCRA. One reason for the installation of the ground water trench was to stabilize Route 5 by reducing pore pressure. Forty foot sheet piles were left in the overburden to provide additional stabilization. The design of the NTCRA has also included an evaluation of Route 5. The decrease in overburden ground water resulting from the cap will stabilize Route 5 and a new drainage culvert to handle flow from the landfill will also improve Route 5. However, Route 5 was built in an unstable formation and the existing underdrain and storm drain systems are corroding. Unless the storm drain system is repaired, continued deterioration of the road will occur.

Comment ap: A comment was submitted stating that the residences along the river be referred to a "homes" as opposed to "camps".

Response: This change will be made in future documents.

Comment aq: A comment was submitted stating that pump and treat options for the overburden ground water and/or extending the existing trench along Route 5 should have been considered as part of the proposed remedy.

Response: Pump and treat options were not developed for the overburden ground water for several reasons. The control of the seeps along Route 5 was a NTCRA objective and this issue is being addressed as part of the current construction program. The leachate levels in the overburden ground water will be effectively reduced by the cap. The overburden ground water was not considered a realistic exposure pathway due to the limited extent of the contamination and steep slopes. The permeability of the overburden ground water would make pump and treat impractical. The Route 5 trench is being extended as part of the NTCRA. Further measures to control seep # 6 will be evaluated as part of the NTCRA if the trench extension is unsuccessful.

3.1 Comments Regarding the Human Health Risk Assessment

PRP Comments:

Comment a: A comment was submitted stating the EPA human health risk assessment was overly conservative. A human health risk assessment was independently prepared and submitted as a comment. This risk assessment does not consider the ingestion of bedrock ground water as a pathway. The risk assessment did evaluate and present similar conclusions to the other pathways evaluated in the EPA risk assessment.

Response: EPA believes that the EPA human health risk assessment provides a reasonable assessment of the potential for future human health risk at the Site in the absence of any action except capping. With respect to the risk assessment submitted as a comment, EPA does not agree with the elimination of the bedrock ground water ingestion pathway. EPA considers potential future use of bedrock ground water to be a historically documented and likely future pathway. The failure to include the ground water ingestion pathway limits the usefulness of the document. EPA has not reviewed this document in detail at this time.

TAG Group and Citizen Comments:

Comment a: A comment was made stating that Figure 1-1 does not accurately reflect the Site area and that the HHRA does not reference the presence of residences with the Site.

Response: "The exposure assessment section of the HHRA (Section 4) identifies the potentially exposed receptors and evaluates the corresponding exposure pathways. The text in this section includes the identification of all nearby receptors. In addition, all figures in the HHRA identify residences near the site except Figure 1-1. The goal of Figure 1-1 is to provide a perspective of the site's location within the State of Vermont."

Comment b: A comment was made stating that well B13D should be the middle of the plume, not the northeast edge.

Response: Section 3.4.4.1 of the RI provides a detailed explanation of the extent of overburden ground water. Well B13D is at the northeast corner of the southeast moving plume as indicated by the lack of overburden ground water in wells MW-1, MW-2, boring MW-5, the boring for MW-8, the boring for MW-A11, and piezometers 1 and 2. All of these data points support the current delineation of the overburden plume.

Comment c: A comment was made stating that the HHRA did not accurately present the bedrock plume. The HHRA stated that the bedrock plume does not lie beneath the current residences. The

comment further stated that the 1979 sampling confirmed the presence of VOC and elevated metals beneath these residences.

Response: The 1979 sampling confirmed contamination in the Lester/Danforth well south of the current residents. No VOCs or elevated metals were detected in the area of the current residences. The water line was extended to this area as a protective measure based upon the contamination at the Lester/Danforth well. The VOC and manganese plume in bedrock has increased since the HHRA. This expansion, however, would not change the outcome of the HHRA since maximum contaminant concentrations in the entire plume are already incorporated into the risk calculations. The outcome considering this new information, remains the same, that is that an unacceptable human health risk would result from a lifetime ingestion of bedrock groundwater in the area of the plume.

Comment d: A comment was made stating that only unfiltered samples should be used in the HHRA and that the use of filtered samples should have been more specifically mentioned in the HHRA.

Response: EPA typically seeks to use unfiltered samples to assess risk to public health from ingestion of groundwater. Samples collected by this method typically produce data which are the most representative of a resident's exposure to groundwater. The groundwater sampling at this site occurred prior to EPA's involvement and consisted of filtering the samples in the field prior to laboratory analysis. Near the completion of the HHRA, (October, 1992), EPA required that both filtered and unfiltered groundwater samples be collected from all monitoring wells to determine whether filtered data collected previously and during the same round would produce comparable results as unfiltered data. Both filtered and unfiltered rounds were found to have comparable results for all compounds detected. A slight increase in arsenic occurred in both filtered and unfiltered samples collected in October, 1992, but concentrations between both samples were similar and the filtered sample contained the highest arsenic concentration. Thus the use of filtered data at this site was considered appropriate for estimating exposure to groundwater. In addition, the use of filtered data allowed for the preparation of the risk assessment much sooner than would have occurred if EPA had waited for the unfiltered data. This provided the public with a basic presentation of the distribution of risk and the major contaminants of concern early in the process.

All groundwater data collected since October, 1992 has consisted of unfiltered samples. Compliance with cleanup levels will be measured with unfiltered samples.

Comment e: A comment was made stating that lead should have been included as a COC in Connecticut River Surface. The comment also stated that NH ARARs should have been used for the Connecticut River.

Response: Lead was excluded as a COC in Connecticut surface water because it was only detected once out of six times sampled and was well below levels of concern for the potential human health pathway. While the Connecticut River is within New Hampshire, Vermont provides the permit review and enforcement of discharges which originate in Vermont. New Hampshire ARARs are addressed through the Vermont review process. New Hampshire surface quality standards and classifications are included in the ROD.

Comment f: A comment was made stating that household vapors were quantified in the HHRA Report as indicated. The comment also stated that doubling the risk would not be appropriate if the toxicity factors for inhalation and ingestion were equivalent. The comment questioned whether just VOCs or other COCs were evaluated for inhalation.

Response: In 1991, the Risk Assessment Forum issued a memo entitled "Guidance on Estimating Exposure to VOCs during Showering." Based on the results of a colloquium sponsored by the Forum and a review of literature by the Forum Exposure Oversight Group, it was concluded that exposure to VOCs in tap water during showering was approximately equivalent to the exposure from ingestion of 2L/day of the same water. It follows that if the systemic dose is the same, then the total dose and risk could be estimated by multiplying the oral dose from ingestion by two. This method contains a fair amount of uncertainty and does not evaluate portal of entry effects, however, given the lack of a validated showering model at this time, this approach provides a reasonably conservative way of considering additional exposures from inhalation of VOCs.

Comment g: A comment was made stating that both basement vapors and household vapors from potable water use should have been evaluated as pathways. The comment also indicated that additional pathways for consideration should include: ingestion of game, inhalation of trench vapors, inhalation of basement vapors and dermal contact with basement seeps, ingestion of irrigated plants. The comment also suggested changing the titles of "ingestion of vapors" to "inhalation of outdoor vapors" and "ingestion of soil" to "ingestion of soil/sediment" and "dermal contact with soil" to "dermal contact with soil/sediment".

Response: EPA concluded that basement vapor were not a potential exposure pathway. Although the bedrock plume does extend beneath the residences, the levels of VOC in the bedrock are very low (16

parts per billion of TCE as the highest level). These levels would not represent a potential vapor threat. In addition, there is no evidence of contaminated overburden ground water beneath the residences. Bedrock outcrops are present in the yard for one of the residences and the basement of a second home is reported to have been built on bedrock. The lack of overburden ground water north of MW-8 also supports this conclusion. Further evaluations of the potential for overburden ground water in the area of the residents will be performed as part of the Long-Term Monitoring Program. Household vapors were considered in the risk assessment from a qualitative perspective. Page 6 of Section 5 presents the assumption that household vapors from the use of contaminated water could double the ground water ingestion risk for VOCs. The ingestion of game was not considered a viable exposure pathway due to the lack of occurrence and concentrations of contaminants that could bioaccumulate at the Site. The inhalation of trench vapors was a very low frequency exposure. Only Site workers would be exposed to these vapors. The health and safety plan for trench sampling will consider this issue. Ingestion of plants was not considered a complete exposure pathway as the former water supply wells are not in use and contaminants in ground water are unlikely to bioaccumulate in vegetables typically grown in backyard gardens due to their physical and chemical properties and low levels in ground water at the Site. The changes in titles suggested were considered in describing the risks in the ROD.

Comment h: A comment was made stating that the household vapor from overburden pathway was not properly evaluated. The comment stated that data from the Site, including well B-13D, the landfill gas screening data, high levels of contamination in the bedrock monitoring wells in the northeast section of the landfill and the inadequacy of monitoring wells MW-1, MW-2, and MW-8.

Response: MW-1, MW-2, MW-8, and the boring for MW-5 (next to MW-6), which was not installed due to a lack of overburden ground water, have not been sampled due to a lack of overburden ground water at these locations. These wells are adequate evaluations of the state of overburden ground water. Landfill gas levels in the northeast corner were much lower than on the west side of the landfill. In addition, the HNu readings were less than 1 ppm, indicating the presence of methane. The monitoring wells in the northeast corner of the landfill include wells A11 and A12. Well K39 and K40 are along the road northeast of the landfill and wells J37 and J38 are along the Riverfront Road adjacent to the residents. None of these wells detected high levels of VOCs. Even if the bedrock were to recharge the overburden seasonally, levels of contamination detected in the bedrock would not represent a vapor concern.

Comment i: A comment was made stating that data summary tables do

not include all the data used in the HHRA and this additional data should be included in the report.

Response: Data used in the HHRA is presented in Tables 2-1 through 2-14 in Section 2. No additional data was used to calculate exposure point concentrations for each media. This is stated in the text on page 31 of Section 2, " All statistical summary information is based on Round 1 and Round 2 data produced by Balsam Environmental Consultants, and was compiled in the same way for all media. All of the data collected and reported for the detected analytes in each exposure zone were used in determining spatial and temporal averages, and maxima." And later, on page 9 of Section 4, "The average and maximum exposure point concentrations as well as their method of calculation are presented in Section 2 of this report."

Comment j: A comment was made stating that the HHRA should show the trench and that the FS does not demonstrate that the trench collects the majority of the overburden ground water.

Response: Figures in the FS and ROD show the location of the trench. Based upon the correlation between estimated trench flow (2 gpm) and actual (1.5 - 3 gpm) and the lack of overburden ground water north of B13-D, the trench is assumed to be collecting the majority of the contaminated overburden ground water.

Comment k: A comment was made stating that the toxicological profiles are not understandable to the lay reader.

Response: The toxicological profiles contained in Section 2 represent a summary of all the information contained in the toxicological database for each chemical and are directed toward the lay reader. Some of this information may have been too technical in nature. EPA also attempts to address specific concerns about chemicals in fact sheets and in public meetings.

Comment l: A comment was made stating that the risks from inhalation and dermal contact with ground water should be discussed. In addition, exposure to seep water should be combined with seep sediments and surface water and sediment exposure at the drainage pond should be combined.

Response: The ROD presents the risk due to exposure to the drainage pond as a combined surface water and sediment risk. Inhalation and dermal contact with potable water are not included in the quantitative risk estimates due to the uncertainty in assessing this pathway (see comment f above). EPA policy is to discuss these risks in the text or uncertainty section. Exposure to seep surface water was not estimated due to the fact that there is not enough surface water present in the seeps to result in a significant exposure dose. Of the six seeps originally

identified at the site only one remains.

Comment m: A comment was made stating that the overburden ground water fate and transport was not accurately presented:

Response: As stated in previous comments, EPA believes the RI/FS to provides a sufficient characterization of the overburden ground water to support the selected remedy.

Comment n: A comment was made questioning whether the exceedance of AWQC for iron and nickel referred to the acute and chronic criteria or the human health criteria.

Response: The exceedance was based upon the acute and chronic criteria for aquatic life, not the human health criteria.

Comment o: A comment was made questioning the lack of established background concentrations.

Response: A conservative approach used at many sites is to assume all compounds and elements detected at the Site to be Site-related. If a compound identified as a COC appears to be at background concentrations, then a more complete background assessment is performed. At this Site, no compounds were eliminated from consideration based upon background levels, therefore, there was not a need to establish statistically based background levels.

Comment p: A comment was made questioning why iron was eliminated as a COC when it exceeded Vermont ground water standards.

Response: Iron levels in ground water only exceeded the Vermont secondary standards. The Vermont secondary standard are not health based standards. Therefore, the Vermont secondary standards were not used for establishing COCs and iron was eliminated as a COC.

Comment q: A comment was made identifying that the acronym CAS was not defined.

Response: CAS is Chemical Abstract Service Registry Number and it should have been defined. CAS will be defined in future references.

Comment r: A comment was made that the text and figures report different facts for the number of permanent residents below the landfill.

Response : At this time there are two of the four homes are permanent residents, one is a rental property, and the fourth is seasonally occupied.

Comment s: A comment was made stating that dermal exposure would represent an additional exposure and that could be significant.

Response: EPA does not currently estimate the risk from dermal exposure to potable water because this pathway is expected to be a minor source of exposure relative to the ingestion route. The risk based upon ingestion and inhalation of VOCs in groundwater greatly exceeds EPA's target risk range and consequentially contamination in bedrock groundwater will be addressed as part of the remedy.

Comment t: A comment was made stating that the HHRA did not consider the gas from the gas extraction unit.

Response: The gas extraction unit treats the landfill vapors by burning the gas at 1600 degrees. The landfill gas flare was performance tested by BFI and subsequently approved by the State of Vermont. Landfill gas in the area of the flare will be evaluated as part of the NTCRA.

Comment u: A comment was made questioning why the dermal exposure to the drainage pond and Connecticut River were evaluated together.

Response: The combination of the dermal pathways for the Connecticut River and drainage pond is an error. If dermal risk to the Connecticut River and drainage pond is calculated separately the cancer risks are 3E-08 and 6E-08, respectively based on the RME scenario. The hazard index for the RME for the Connecticut River and drainage pond would be 6E-04 and 5E-02, respectively. Both cancer and noncancer estimates are well below EPA's target risk range and the conclusions based upon the HHRA concerning surface water remain unchanged.

Comment v: A comment was made questioning the meaning of the word "threshold levels" on page 26 of Section 5.

Response: The threshold levels were considered the 10^{-4} - 10^{-6} target risk range.

Comment w: A comment was made stating that the uncertainty analysis should state that "additional risks are present" due to the lack of RFDs and CPFs for certain compounds.

Response: It is not known whether additional risks would occur due to compounds present that do not have RfDs or CPFs. Compounds without toxicity factors may not produce toxic effects at the concentrations detected in the groundwater at this site and not all chemicals cause cancer. Thus it cannot be determined that additional risks <u>will be</u> present only that they <u>may be</u> present.

Comment x: A comment was made suggesting that "the same chronic oral reference dose" should be substituted for "identical toxicity".

Response: EPA will consider making this change in future risk presentations.

3.2 Comments Regarding the Ecological Risk Assessment

Comment a: A comment was made questioning the selection of the background location used for the Ecological Risk Assessment. The comment also questioned the statement that no significant impacts to the Connecticut River were observed.

Response: The background sample used in the Ecological Risk Assessment has been replaced by a new location. However, there is no change in the conclusion that no significant impact is occurring. No samples collected since October 1992 show an impact to the Connecticut River. In addition, the elimination of two seeps and the control of seep 6 will eliminate the potential for future impact to the Connecticut River.

Comment b: A comment was made stating that the elevated levels of phosphorus should have been evaluated in the Ecological Risk Assessment.

Response: CERCLA only authorizes EPA to address releases of hazardous substances into the environment. The release of phosphorous into the environment does not fall under the CERCLA authority. However, the elimination of two seeps and the control of seep 6 will also eliminate the phosphorous loading to the Connecticut River.

Comment c: A comment was made stating that the Connecticut River is entirely within New Hampshire and that New Hampshire standards should be used.

Response: As stated by a previous comment, Vermont is the permitting authority for discharges from the Vermont side of the river.

Comment d: A comment was made stating that the Hazard Indices indicate moderate risk and that the risk should not be minimized.

Response: The risks to the Connecticut River were not minimized. The data collected at the Site and presented in the RI/FS do not support a significant risk or impact to the Connecticut River. In particular, the sediment evaluation did not support an adverse impact. The designation of the significance of the impact is due to an evaluation of the consistency of the impact and an evaluation of current conditions. In addition, EPA samples of

the background location used in the Ecological Risk Assessment did not detect levels of compounds or elements significantly above ambient water quality criteria.

Comment e: A comment was made stating that the Ecological Risk Assessment did not evaluate receptors, it only provided a comparison of reference criteria and concentrations detected.

Response: The comment is correct. The Ecological Risk Assessment performed an evaluation of the detected concentrations with reference criteria. Based upon the results of this evaluation, the data collected since October 1992, and the elimination of two seeps, it was determined that a receptor based Ecological Risk Assessment was not necessary. The locations which were used to evaluate the ecological risks were conservative. The river sample locations were directly adjacent to the seep discharges and were in an area that is above the water level when the river is drawn down. If the river samples had been at a further distance from the seeps, then even lower impacts would have been detected.

4. COMMENTS REGARDING THE PROPOSED PLAN

PRP Comments:

Comment a: A comment was submitted stating that SW-2 will achieve the remedial action objectives for source control, ground water and surface water, and provides the best balance among the criteria in the NCP.

Response: EPA agrees with this comment.

Comment b: A comment was submitted stating that SW-3 would be difficult to implement and has serious technical concerns. In particular, the steep topography surrounding the landfill, the variability of fracture system and hydraulic connections between fractures, the low probability of receptor exposure, and the high cost make SW-3 an unacceptable alternative.

Response: EPA generally agrees with this comment.

Comment c: A comment was submitted stating that other ground water controls, such as upgradient controls, have been shown to be unsuccessful at the Site. The comment also stated that the RI supports that ground water does not discharge to the waste.

Response: EPA agrees that previous attempts to control upgradient ground water have been unsuccessful and that the current Site hydrogeologic model does not support significant flow into the waste. However, if the selected remedy is not

fully successful at controlling the generation of leachate and the subsequent contamination of bedrock ground water, there may need to be further studies of the potential for additional ground water controls.

TAG Group and Citizen Comments:

Comment a: A comment was made questioning whether other Sites have been successful with a natural restoration approach.

Response: Other sites have selected natural restoration as the remedial action. However, the natural restoration process is still underway at most of these sites.

Comment b: A comment was made that capping alone will not significantly reduce the migration of chemicals from the landfill.

Response: The FS supports the conclusion that capping will significantly reduce the migration of chemicals by reducing the rate of infiltration through the landfill into underlying ground water and, in turn, by reducing the mobility of the chemicals in the landfill as well as chemicals in the bedrock which may be mobilized by leachate from the landfill. The Site hydrogeology, presented in the RI and SRI Reports, provides the basis for the conceptual hydrogeologic model for the Site. The cap will significantly reduce infiltration, which is the major component of flow into the waste. The model used to estimate ground water restoration included the potential for a small component of horizontal flow. Even with a small component of horizontal flow, the ground water should be restored within 15 years of cap completion. In addition, the gas collection and treatment system and ground water collection trench provide additional control over Site contamination.

Comment c: A comment was made that it is unacceptable to address the discharge of contaminants to the Connecticut River as a remedial action.

Response: Long-term discharge of contaminants to the Connecticut River is being controlled through the capping of the landfill and the natural restoration of the ground water. Substantial reductions in concentration levels are expected within five years of cap completion. In addition, discharge to a water body is an acceptable practice as long as the discharge does not impact the receiving water body. The discharge of the Site bedrock to the Connecticut River is a natural process. The current situation does not present any adverse public health or environmental threat. In addition, the Site cleanup model estimates that a 90 percent reduction of contaminant concentrations will be achieved within 5 years of cap completion. To negotiate, design, and construct a pump and treat system would require at least three

years. Given the difficulties associated with developing a pump and treat system that can capture a bedrock plume, the topographical limits regarding the installation of bedrock wells, and the limited benefit accomplished a bedrock pump and treat system was not considered to be a practical option and the natural restoration alternative was selected.

Comment d: A comment was submitted stating that the Safe Drinking Water Act Maximum Contaminant Level for Arsenic of 50 ug/l is not protective and that an alternative cleanup level, such as background, should be developed for Arsenic.

Response: Arsenic is a compound for which the excess cancer risk at the MCL is outside the risk range in the absence of any risk management factors. Recent studies indicate that many skin tumors arising from oral exposure to arsenic are non-lethal and that the dose-response curve for the skin cancers may be sublinear (in which case the cancer potency factor used to generate risk estimates may be overestimated). It is Agency policy to manage these risks downward by as much as a factor of ten. Therefore, the risk of the cleanup level is within the acceptable cancer risk range. The NCP allows for a reconsideration of cleanup levels if new information indicates that the current cleanup level is not protective. Therefore, if EPA were to lower the MCL for arsenic, the cleanup level would also be reconsidered. The ground water restoration model estimates final arsenic concentration in the ground water of 9 - 21 ppb. It is difficult to estimate the final arsenic concentration since naturally occurring background levels will set the lowest level than can be achieved. Background arsenic levels in the bedrock ground water in the vicinity of the Site range from nondetect at 1 ppb to 63 ppb in a residential well north of the landfill. Arsenic concentrations in bedrock ground water is often fracture specific and is controlled by the percentage of arsenic bearing minerals in the fracture. The spacial variation of arsenic concentration at the Site and in the residential wells supports this fact. Therefore, the only true background level for a given fracture is the upgradient ground water within that fracture. The range of background levels in non-impacted areas can be used to evaluate the Site cleanup levels. The cleanup level of 50 ppb and the predicted final levels of 9 - 21 ppb fall within the range on nondetect to 63 ppb seen in background wells. EPA will evaluate the risk posed by the ground water at the end of the restoration period before determining that the remedial action is complete. If the ground water represents an unacceptable risk, then further actions will be considered.

Comment e: A comment was submitted that EPA has not adequately defined the extent of contamination at the Site.

Response: The detection of low levels of VOC contamination in

well K40 indicates that the northern extent of the plume is not fully confirmed. However, the existence of contamination at this location does not change the basis for the selected remedy. It is not necessary to know the exact extent of the plume in each direction to evaluate the remedial alternatives for the Site. The basic remedial alternatives for ground water contamination, No Action, Natural Attenuation, and Pump and Treat were all included in the Proposed Plan and FS. The Long-Term Monitoring Program will provide additional data to further delineate the extent of contamination. The need to install additional wells will be evaluated in the Long-Term Monitoring Plan. EPA believes that the selected remedy addresses all contaminant exposure pathways at the Site in a manner that will successfully eliminate the potential for an unacceptable exposure to human health and the environment.

Comment f: A comment was made indicating that there is no mention of whether filtered or unfiltered data was used to estimate risk or establish cleanup levels.

Response: EPA typically seeks to use unfiltered samples to assess risk to public health from ingestion of groundwater. Samples collected by this method typically produce data which are the most representative of a resident's exposure to groundwater. The groundwater sampling at this site occurred prior to EPA's involvement and consisted of filtering the samples in the field prior to laboratory analysis. Near the completion of the HHRA, (October, 1992), EPA required that both filtered and unfiltered groundwater samples be collected from all monitoring wells to determine whether filtered data collected previously and during the same round would produce comparable results as unfiltered data. Both filtered and unfiltered rounds were found to have comparable results for all compounds detected. A slight increase in arsenic occurred in both filtered and unfiltered samples collected in October, 1992, but concentrations between both samples were similar and the filtered sample contained the highest arsenic concentration. Thus the use of filtered data at this site was considered appropriate for estimating exposure to groundwater. In addition, the use of filtered data allowed for the preparation of the risk assessment much sooner than would have occurred if EPA had waited for the unfiltered data. This provided the public with a basic presentation of the distribution of risk and the major contaminants of concern early in the process.

All groundwater data collected since October, 1992 has consisted of unfiltered samples. Compliance with cleanup levels will be measured with unfiltered samples.

Comment g: A comment was made that iron, aluminum, and lead should be included in Table 1 as ecological contaminants of concern based upon their threat to the Connecticut River.

Response: The ground water trench has been successful at reducing the impact of the Site on the Connecticut River. A review of the Connecticut River surface water results for sampling events 10/92, 8/93, and 5/94 do not show an exceedence of water quality standards for any compounds or elements. Aluminum levels were elevated in all sample rounds. The Connecticut River will be sampled under the Long-Term Monitoring Program. River samples will be compared with ambient water quality criteria to determine if a potential impact is occurring. However, given the result of the most recent sampling events, specific cleanup levels for the Connecticut River are not necessary.

Comment h: A comment was submitted that if there was a larger community impacted by the Site, the natural restoration alternative would not have been considered and that the remedial action would have focussed on treatment.

Response: EPA does not agree with this comment. EPA is committed to the protection of human health and the environment. The CERCLA Statute has a preference for treatment, but it also has a requirement for cost effectiveness. EPA has implemented pump and treat remedies for communities the same size as Rockingham. The major factors influencing the evaluation of the treatment alternatives at this Site where the uncertainty regarding the technical practicability of bedrock ground water extraction, the lack of current receptors, and the estimated time frame for achieving cleanup levels under the natural restoration approach. In addition, a significant amount of source control will have been implemented at the Site with the completion of the cap. The 2 year differential in time frame for cleanup, the technical difficulties associated with implementation, and the substantial difference in cost made the pump and treat option the less preferred approach at this Site.

Comment i: A comment was submitted that the extent of BFI property is not indicated in the Proposed Plan.

Response: The extent of the BFI property is shown in figure 1-4 of the RI.

Comment j: A comment was submitted asking what deed restrictions are going to be in-place for the areas not within BFI property lines, but underlain by impacted ground water? Is a well advisory planned for the entire impacted area? Is this adequate to address contaminated property not owned by BFI?

Response: BFI-VT in under an existing agreement to provide a free supply of water to the affected residents and convey the water line to the residents twenty years after full and final closure of the solid waste facility. EPA will seek the permission of the property owners to remove the existing water supply wells, and will discuss with the town and state the necessity of a well use

advisory. If EPA determines that these institutional controls are ineffective at preventing future use of the impacted ground water it will evaluate and require additional measures.

Comment k: A comment was submitted that a fence is not included in the Proposed Plan.

Response: A fence will be installed as part of the NTCRA at the end of the construction activities. Activities implemented under the NTCRA were assumed in place under the Proposed Plan.

Comment l: A comment was submitted that access controls are needed for seep # 6.

Response: The EPA Human Health Risk Assessment did not show an unacceptable risk of exposure to the seeps. Therefore, EPA cannot require the area to be fenced. However, BFI has installed a permanent chain link fence to restrict access to seep 6.

Comment m: A comment was submitted that the FS did not evaluate risks from the proposed use of sewage sludge or paper sludge.

Response: Neither sewage sludge nor paper mill sludge is currently proposed for use at the landfill. However, under Part B of the EPA Risk Assessment Guidance, potential risks associated with a remedial action are evaluated in either the FS or design. EPA evaluated the potential exposure to sewage sludge as part of the design process and determined that no unacceptable exposure would have resulted from the use of the material. BFI withdrew the proposal for use of the material based upon schedule concerns.

Comment n: A comment was submitted that discharge of the Site overburden ground water to a POTW is not treatment, but rather dilution.

Response: Discharge of waste water to a POTW is an acceptable practice provided the discharge does not adversely impact the receiving body of water or the operational ability of the POTW. EPA performs an evaluation of the potential discharge based upon the EPA Guidance: CERCLA Discharge to POTWs and the FATE model. If no adverse impact is demonstrated by the evaluation, then the discharge may be considered acceptable.

Comment o: A comment was submitted that EPA should not have assumed that seep 6 only flows during the spring and that the current discharge at this seep represents an erroneous assumption in the Proposed Plan.

Response: Seep 6 became dry in 1993 during the summer following the construction of the ground water collection trench along Route 5. Based upon this observation, no further control of seep

6 was proposed. However, during 1994, seep 6 has continued to flow throughout the summer. Observation of this flow on July 20, 1994 indicated that the discharge did not reach the Connecticut River. Further control of seep 6 is being addressed as part of the NTCRA. An extension to the existing ground water collection trench will be installed during this fall in an attempt to eliminate the discharge of landfill impacted ground water at seep 6.

Comment p: A comment was submitted that the background location for the Connecticut River was within the area of impact and that site-related contaminants have impacted the Connecticut River.

Response: Data from 1991 and early 1992 suggests that elevated levels of some metals were detected in the Connecticut River. However, three subsequent rounds of data collection do not support an impact to the Connecticut River at any of the sample locations. EPA will re-evaluate the location of the background sample as part of the Long-Term Monitoring Program.

Comment q: A comment was submitted that vinyl chloride should be listed as a major contaminant.

Response: While vinyl chloride was not identified as a major contaminant in the FS, vinyl chloride is contaminant of concern and a cleanup level of 2 ppb has been established for this compound. The basis for stating that arsenic and manganese are the major contaminants at the Site is that arsenic represents 97 percent of the carcinogenic risk and arsenic and manganese represent the vast majority (97%) of the non-carcinogenic risk. EPA considers all contaminants detected above federal and state standards or acceptable risk levels to be of concern.

Comment r: A comment was submitted that the possibility of intermittent ground water in the vicinity of the residences between the landfill and the Connecticut River has not been addressed as evidenced by the continued flow of seep 6.

Response: Seep 6 is at a substantially higher elevation and is side gradient to the area of the residences. An overburden boring north of seep 6 did not encounter ground water until immediately above bedrock. Even if overburden in the area of the residences was recharged by the bedrock there would not be an exposure pathway due to the low levels of VOC in the bedrock ground water. The overburden is not a water supply and the VOC concentrations in the bedrock are not sufficient to support an inhalation pathway.

Comment s: A comment was submitted that "no effort" on page 8 of the Proposed Plan should include a statement that no effort includes an assumption that the cap and gas system are operated and maintained.

Response: The No Further Action alternative did not assume the successful operation and maintenance of cap and gas system. This assumption provided a major reason why the No Further Action alternative was not considered protective. In addition, the Human Health Risk Assessment was streamlined based upon the Presumptive Remedy and Landfill Guidance approach. As stated in the Limitations section of the Risk Assessment, the current Human Health Risk Assessment could not support a complete No Further Action alternative.

Comment t: A comment was submitted that the extent of bedrock contamination and the conceptual hydrogeologic model have changed since the Human Health Risk Assessment and Ecological Risk Assessment were completed.

Response: The Human Health Risk Assessment was completed after the October 1992 sampling event. This sampling event documented the contamination at the J well cluster. More recent data indicates the presence of low levels of VOC contamination at the K-40 well located northeast of the landfill. As stated in previous responses, the current extent of contamination to the north of the landfill will be defined in the Long-Term Monitoring Program. However, this does not change the basis for the selected remedy.

Comment u: A comment was submitted that iron, aluminum, and lead should be sampled in the Connecticut River. A comment also questioned whether additional parameters should be sampled as the landfill becomes anaerobic.

Response: The Connecticut River and any surface water discharges, storm water or seeps, will be sampled for the full target analyte list for metals. This will include aluminum, iron, and lead. The constituents listed in Table 1 of the Proposed Plan were developed to provide a focus to the ground water monitoring and more particularly, the tracking of ground water restoration. Additional parameters will be periodically added to the analyte list during the Long-Term Monitoring Program to confirm that new constituents are not present based upon changes to the Site as the effect of the cap and gas system are begin. The landfill is currently considered to be in an anaerobic state due to the high methane generation, the reducing conditions in the leachate, and the effect of the gas collection system.

Comment v: A comment submitted stated that additional studies are needed to address the effectiveness of the cap in reducing exposure via all relevant pathways; the risk assessment must be re-evaluated in light of the additional pathways; and the cleanup levels must be re-evaluated to look at background and the protection of human health.

Response: EPA believes that the controls previously implemented

and those being implemented as part of the NTCRA will fully address all relevant exposure pathways at the Site. EPA does not consider the inhalation of indoor vapors to be a complete exposure pathway due to the lack of significant VOC levels in the ground water in the vicinity of the residences. Seep 6 was not determined to represent an unacceptable risk to human health or the environment based upon the human health risk assessment and the Connecticut River sample results do not show any landfill related impacts. If the cap is not effective at restoring the ground water or if the Long-Term Monitoring indicates that the assumptions regarding additional pathways was incorrect, then a re-evaluation of the risk assessments would be considered. EPA considers all of the cleanup levels to be protective of human health. The cleanup levels for arsenic and manganese are within the range of concentrations detected in background wells. If new information is presented that indicates that any of the cleanup levels are not protective then the cleanup level will be changes. The final predicted arsenic concentration in the bedrock is expected to be well below the cleanup level for arsenic.

Comment w: A local resident who is supplied water due to contamination at the Site questioned whether a new water supply well would be installed for his residence when the ground water is restored.

Response: The selected remedy includes the replacement of the water line with water supply wells when the water beneath the residences is determined to be acceptable for use as a drinking water supply by EPA and VTDEC.

Comments x: A comment was submitted that seep #6 should have been included in the proposed remedy and that actions should be taken to collect the water in seep #6.

Response: EPA is addressing seep #6 as part of the non-time-critical removal action. The interceptor trench installed in January 1993 was designed to eliminate the flow in seeps 2, 3/4, and 6. Seep #6 still exhibited flow during the spring of 1993, with periodic flow after rain event. Seep #6 continued to exhibit flow during the spring and summer 1994. In July 1994, EPA required BFI-VT to prepare a plan to prevent the continued flow of seep# 6. An outline of the plan was delivered to EPA on July 29, 1994. The plan calls for an extension of the existing trench. If the trench extension is not successful, then a sump will be installed to intercept the flow underground.

EPA will continue to monitor the conditions at all former seep locations, including seep#6, as part of the selected remedy. It should also be noted that while seep #6 was flowing during July 1994, the seep water evaporated or infiltrated prior to reaching the Connecticut River and no flow into the Connecticut River was observed as of July 21, 1994.

Comment y: A comment was submitted requesting that interim target cleanup levels be developed to determine if the remedy is meeting its cleanup objectives.

Response: Final target cleanup levels have been established in the Record of Decision. Interim goals to track the restoration of ground water will be developed as part of the Long-Term Monitoring Plan. The interim goals will likely be based upon several factors. Water levels measurements, contaminant concentration levels, and trench flow volume will all be considered in evaluating the effectiveness of existing control. This information will be used to evaluate the conceptual model for the Site. If the collected information confirms that the selected remedy will not achieve the cleanup levels, then further actions will be considered.

Comment z: A comment was submitted stating that the volume of leachate will increase dramatically after the landfill closure is complete.

Response: EPA does not agree with this comment. All evaluations performed at the Site predict a steady decline in the volume of leachate generated by the landfill after the cap is installed. While the placement of the cap could cause a short term increase in leachate generation, this was not predicted to be substantial. A 90% drop in leachate generation is predicted after 5 years of cap completion.

Comment aa: A comment was submitted questioning whether ARARs other than environmental laws were considered.

Response: ARARs, by definition, are federal or state environmental or facility siting laws that are applicable or relevant and appropriate under the circumstances at the site. ARARs apply to the on-site aspect of a remedial action. Any off-site action must comply with all existing federal, state, and local regulations. On-site actions must be performed in a manner consistent with ARARs and all other applicable federal, state, and local regulations. A permit is not required for any activity performed entirely on-site, as defined by the National Contingency Plan. However, it is EPA practice to only list ARARs in the FS.

5. COMMENTS REGARDING NECRA ACTIVITIES

Comment a: A local resident questioned when sediment which washed onto his property after a rain event in June 30, 1994 would be removed.

Response: A rain event on June 30, 1994 caused a retention pond in the northeast section of the landfill to overflow. In addition, the drainage ditch along the landfill overflowed and caused water to run down Route 5. This water combined with the storm water drainage along Route 5 and caused several areas of soil to wash onto the residents properties. These areas were sampled for VOC, SVOC, Metals, and pesticides. The results demonstrated that no unacceptable levels of hazardous substances were in the soils deposited on the private property. Since the soils cover a very small area and are not contaminated, the soils will not be removed.

Comment b: A local resident stated that the recent wash out caused $3,500 damage to his property, that his property value has dropped, and that sink holes are a concern.

Response: EPA considers the protection of the private property adjacent to the Site to be a major concern. BFI has indicated to EPA that they will correct any damage caused by run-off from the Site. However, a significant portion of the problem in this area is the steep natural slopes and the Route 5 storm drainage system. There is no way to change the natural drainage from the slopes. The landfill construction project will involve a re-design of a substantial portion of the Route 5 drainage. A new culvert will be installed to direct landfill run-off and Route 5 run-off directly to the Connecticut River. This should decrease the chance for future washouts. In addition, soils or water that flow off the Site are clean rain water or cover soils. The area of the landfill facing Route 5 has been covered with at least 36 inches of cover material as of September 15, 1994. Property values are a common concern at CERCLA sites. EPA cannot change the real estate market, but EPA is willing to provide information or an explanation to any person considering the purchase of property near the landfill regarding the nature and extent of contamination at the Site. The sink hole along Route 5 that has appeared three times this year appears to be caused by a storm drain that is causing soil erosion. VT AOT is aware of this problem.

Comment c: A local resident stated that he opposed the use of shredded tires at the Site.

Response: Shredded tires are being used as drainage material on the west side of the landfill. This area does not drain directly

to the Connecticut River. There does not appear to be any human health risk concerns resulting from the use of shredded tires. EPA considered the use of shredded tires to be a beneficial use of a recycled material.

Comment d: A local resident expressed an opposition to the use of sewage sludge on the cap.

Response: Sewage sludge is no longer proposed for use.

Comment e: A local resident expressed concern over the lack of fencing and large obvious warning signs.

Response: A partial fence has been erected at the Site. A complete fence will be installed after construction is complete. Since the risk assessment concluded that the seeps along the landfill did not represent a public health threat and the landfill was covered with at least 10 inches of clean soil, it was considered acceptable to install the fence at the end of construction. The construction activities would have made installing a fence difficult. There are signs identifying the Site as a Superfund Site posted around the landfill. The phone number of state and federal contacts is listed on the signs.

Comment f: A comment was submitted requesting that a rapid response plan be developed to handle future Site washouts, that sampling be performed within 24 hours, and that EPA establish a forum for property compensation.

Response: A significant weather event plan has been developed for the landfill since the June 30, 1994 storm. A local individual is designated to observe conditions and mobilize contractors if a washout occurs. Sample bottles are available for sampling any soils or water requiring characterization. EPA and VTDEC official are notified of any event. EPA has the responsibility for notifying the press. Samples will be collected as soon as possible after the event. EPA does not become involved in financial settlements or discussions between parties outside of the CERCLA action. EPA's responsibility and authority is limited to controlling the release of hazardous substances from the Site.

Comment g: A comment was submitted stating that the cap should be desired to handle a 100 year storm event.

Response: Existing federal regulations for solid waste closure recommend a design storm of 25 year 24 hour event. The down chute and new drainage culvert are being designed to handle the 50 and 100 year storm events.

Comment h: Several comments were received indicating an opposition to the use of sewage sludge a fertilizer for the cap,

especially given the detection of dioxin in the sewage sludge.

Response: On August 1, 1994, EPA was notified by BFI that sewage sludge was no longer being proposed for use in the cap. Comments regarding the use and risk assessment of sewage sludge are no longer relevant to this decision. However, EPA continues to support the beneficial use of materials such a sewage sludge.

Comment i: A comment was made that the current fence is not sufficient and that the entire landfill should be fenced prior to the completion of construction.

Response: The immediate construction of a fence is not justified at this Site. Public access and trespass has not been a reported problem on the landfill in the past. The landfill is an operating facility with personnel on-site who would detect trespassers. The current construction program results in substantial activity at the landfill six days per week. The entire landfill has a one foot interim cover and the entire landfill will have five feet of material over the waste at the end of construction in November 1994. The EPA risk assessment does not support the need for a fence from an public health exposure pathway. The only basis for a fence now or in the future is to prevent public access that might result in damage to the cover or personal injury from a fall or from construction activities. The landfill will be fenced at the completion of construction.

The immediate installation of a fence is not justified based upon public health or trespass concerns. The landfill is currently posted with "No Trespassing" signs that indicate that the landfill is a Superfund Site. Furthermore, access to the site is currently limited by the Site topography and there have been no indication of trespassers. Construction of a fence would hamper the construction of the landfill cap.

Comment j: A comment was submitted that alternative method be explored to minimize the chance of washouts if a grass cover is not in place by winter.

Response: The landfill cap design approval requires that a plan be prepared and implemented to prevent erosion and protect the landfill cap during the winter/spring 1995. Preventing erosion and establishing a grass cover are major objectives of the landfill cap construction program. The installation of erosion control geotextiles, hay bales, silt fence, and erosion control blankets are all being considered as part of the erosion control strategy.

Comment k: A comment was submitted that a response plan to address major washouts at the landfill should be developed.

Response: A significant weather event response plan has been developed as part of the NTCRA activities. During the construction of the cap and the time period until vegetation is well established the cap is susceptible to erosion. Erosion control is a major objective of the Site activities. The significant weather event plan requires that individuals be on call to address Site related weather issues. The local press are notified of events as soon as possible. EPA contacts the effected residences to confirm that there concerns are being addressed. EPA does not make a determination regarding property damage. The property owners and the facility must discuss the potential for the recovery of damages between themselves. It should be noted that a factor contributing to the washout or deposition of soil on residential property is the poor condition of the Route 5 drainage system and the condition of Riverfront Road. Sampling of Site run-off, both water and sediments, will be performed based upon best professional judgement with input from the residences. Samples will obtained as soon as possible after the event. Sample results from the June 30, 1994 storm event confirmed EPA's initial position that Site released contamination is not present in the sediments that washed from the Site.

Comment 1: A comment was made regarding the capacity of the proposed down chute on the cap and the relationship between the down chute and the storm drain. A further comment also requested the design storm event.

Response: The proposed down chute will carry surface discharge from an approx. 1 acre area of the cap to the storm drain along Route 5. The current storm drain is not functioning properly. A new storm drain, designed by the Vermont AOT, will be installed to provide better water management and capacity for the water from the down chute and water draining along Route 5. The capacities of the down chute and the storm drain are being considered as part of a larger scheme to handle Site run-off. The design storm event required by the federal solid waste regulations is the 25 year 24 hour event. There is no design storm event requirement in the Presumptive Remedy. The down chute and Route 5 drainage are being design based upon an evaluation of the 50 and 100 year storm events.

6. Comments Regarding the Long-Term Monitoring Plan

Comment a: A comment was submitted stating that the Long-Term Monitoring Plan does not provide for the collection of sufficient background data. In addition, the comment indicated a need to sample the existing cover and cover materials placed as part of the cap. The comment also indicated that SVOC, dioxin, furans, and PCBs should be included in the Long-Term Monitoring Sampling.

Response: Sampling of the landfill cover is not necessary prior to cap placement. An interim cover was placed over the landfill after closure in November 1991. In addition, the majority of the landfill is covered with clean fill placed during the regrading of the landfill in August 1993. Once the cap is complete, the landfill waste and interim cover will be buried under five feet of cap material. In addition, EPA guidance regarding the investigation and capping of landfills does not support the need for characterization of the landfill cover soils unless "hot spots" are identified. While several areas of stained soils are present on the landfill surface, these are not considered "hot spots". To confirm this determination, the areas of stained soils were tested during the remedial investigation and evaluated in the risk assessment. The testing and risk assessment did not indicate the potential for an unacceptable risk from these areas. EPA does not see the need to sample the interim cover materials prior to cap construction.

The overburden and bedrock ground water at the Site has been well characterized and additional characterization will occur as part of the Long-Term Monitoring Program. PCBs were not detected in any of the BFI 10/91 samples or the EPA 10/92 and 8/93 samples. Pesticides have not been detected in either the BFI 10/91 or EPA 10/92 and 8/93 bedrock samples. Trace levels of pesticides were detected in well B-13D. As a result of these previous detections, B-13D was sampled for pesticides during the May 1994 sampling event. B-13D will be continue to be sampled for pesticides as part of the Long-Term Monitoring Program. Additional wells will be sampled for pesticides during the five year review. Dioxin and furans were not analyzed in the overburden and bedrock ground water samples. Dioxin and furans have a very low mobility and solubility. Based upon the above discussion and the results of the remedial investigation, supplemental remedial investigation, and EPA sample results, there is not a need to re-sample bedrock and overburden ground water prior to cap construction.

The surface water and sediments of the seeps have also been well characterized for Site-related contaminants. PCBs were not detected in any of the BFI 10/91 or EPA 10/92 and 8/93 samples. Very low levels of pesticides were detected the surface water and sediments of a few seeps. Two of these seeps have been eliminated by the ground water trench. The Long-Term Monitoring Program will include the periodic sampling of those seeps that are not controlled by the trench. Pesticides will be further evaluated for inclusion in the revised Long-Term Monitoring Plan.

The surface water and Sediments of the Connecticut River have been sampled for PCBs and Pesticides by EPA in 10/92 and 8/93. No PCBs were detected. Pesticides were not detected in the surface water of the Connecticut River. While pesticides were detected in the Connecticut River sediments, the very low level

of these detections do not indicate a significant concern.

Surface water run-off from the cap and water from the drainage layer within the cap will discharge to retention basins surrounding the Site. Two of the retention basins will drain to the Connecticut River. The water from these discharges, which will flow during the spring melt and major storm events, will be sampled for VOCs, sVOCs, metals. These constituents are also sufficient to characterize the discharge from the areas of the drainage layer containing tire shreds. Additional constituents may be added to the sampling of the two discharge culverts based upon the results of the sewage sludge sampling.

Comment b: A comment was submitted stating that residential wells should be sampled for SVOCs and that unfiltered data should be collected.

Response: Residential well samples are unfiltered. EPA will consider the addition of an occasional SVOC sampling as part of the residential well monitoring program.

Comment c: A comment was submitted stating that monitoring wells C-15, C-16, and J-35 should be included in the Long-Term Monitoring Plan.

Response: Monitoring wells MW-C15 and MW-C16 are located at the edge of the landfill between the landfill and the Route 5 trench. Water levels in the wells are useful in supporting ground water migration towards the trench. However, the usefulness in sampling these wells in not clear. Well E21 provides a plume delineation point outside of C15 and C16 and Well B13D is a better overburden ground water indicator well. Well J-35 does provide an indication of the deep overburden quality just downgradient of the Route 5 trench. The VOC levels in this well were very low in the 1992 sampling event. Well J-35 will be considered for inclusion in the LTMP.

Comment d: A comment was made regarding air emissions from sewage sludge.

Response: As sewage sludge is no longer proposed for use, a response to this comment is not necessary.

Comment e: A comment was submitted stating that the pH of each non-VOC sample should be checked.

Response: The pH of each sample will be checked.

Comment f: A comment was submitted stating that only one VOC vial should be filled per bailer and that VOCs should not be collected from pumps.

Response: While certain pumps are not appropriate for the collection of VOC samples, low flow pumps may be used to collect VOC samples. Low flow pumps are typically used for VOCs when the collection of low flow metal results is being performed. Standard sampling procedures allow for the collection of multiple vials for a single VOC sample from a single bailer to ensure adequate sample volume and to allow for potential breakage of a vial during sample handling and shipment. Additionally, when split samples are collected, it is common procedure to collect both samples from a single bailer to ensure reproducability.

Comment g: A comment was submitted stating that a well should be flushed at least three well volumes, even if the test parameters (pH, temperature, and conductivity) have stabilized and up to five well volumes if the test parameters have not stabilized. The comment also stated that samples should be collected immediately after flushing.

Response: Well flushing will be performed according to EPA protocol. Samples will be obtained as soon as practical after flushing.

Comment h: A comment was submitted requesting clarification of the residential well sampling procedures and indicated that the purge rate should not exceed 3 gallons per minute and the flow rate should not exceed 1 gallon per minute for 5 minutes preceding and during sampling for VOC.

Response: Residential wells will be sampled to minimize the disturbance of the sample while collecting a sample representative of residential exposure.

Comment i: A comment was submitted stating that surface water VOC samples should be obtained at some depth by submerging the vial upside down and then gradually tilting to fill. Sediment samples should be collected after surface water samples. Sample procedures should be clearly specified in the Long-Term Monitoring Plan.

Response: EPA protocal allows a collection device to collect the surface water sample which is carefully decanted into a pre-preserved vial. This avoids health and safety concerns regarding carrying acid on a boat. Sediment samples will be obtained following surface water samples.

Comment j: A comment was submitted requesting more detail regarding the sampling of the above ground storage tank and underground storage tank. The comment stated that the tanks should be sampled prior to any decontamination water being collected in the tank. The comment indicated that the sampling method must be capable of representatively sampling the tank.

Response: The current method of sampling involves either lowering a bailer or obtaining a sampling from the exit pipe. Both of these methods are believe to provide a representative samples. The method will be specifically described in the Long-Term Monitoring Plan and will address decon water.

Comment k: A comment was submitted stating that an HNu should be calibrated at the beginning and end of each day and after each time the instrument is shut off.

Response: HNu calibration will follow the protocol in the standard operating procedures in the Long-Term Monitoring Plan. This procedure requires daily calibration of the meter.

IV. REMAINING CONCERNS

PRP Comments:

Comment a: A comment was received stating that while residential waste, old appliances, tires, empty drums, and stumps have been observed during Site investigations of the area near the Connecticut River, no "drum fields" have been observed and that such a statement was false and misleading.

Response: EPA performed an independent inspection of the area along the Connecticut River after the report of a "drum field" by the TAG Group. No drum field was found. EPA agrees with the comment.

TAG Group and Citizen Comments:

Comment a: A comment questioned whether monitoring wells and a drainage diversion were installed in a right of way.

Response: A drainage diversion was installed at the request of a resident of Riverside Road. The monitoring wells were installed prior to EPA involvement. EPA has requested BFI to determine if a right of way exists at this location.

Comment b: A comment stated that a large number of 55 gallon drums were disposed in a ravine below the Site and requested testing of these drums.

Response: EPA and VT DEC investigated the ravines after the July 20, 1994 public hearing. There is a substantial amount of trash and debris in the ravines that was dumped by the previous property owners. These inspections revealed approximately 5 empty drums and a propane cylinder. These drums will be removed. However, analytical results of the Connecticut River surface water and sediments and direct observation did not show any support for the drums representing a chemical concern.

Comment c: A comment questioned whether the VT AOT has personnel trained to work in the area impacted by the Site.

Response: The VT AOT has individuals with the necessary training to work at the Site.

Comment d: Several comments requested that indoor air be tested in the four residences below of the landfill.

Response: Indoor air was not identified as a potential exposure pathway in the RI/FS. This was based upon the very low level of VOC concentrations in the bedrock ground water beneath these

locations. Any overburden ground water in the area of these homes is likely to be of a similar concentration as the bedrock ground water. The overburden ground water containing VOCs is further south and side gradient to the residences. There is no evidence that the contamination the overburden that discharges at seep # 6 extent further north than seep # 6. Monitoring well MW-8 was installed to monitor overburden flow north of seep # 6. The boring for this well did not encounter significant water bearing zones until just above the bedrock, approximately 50 feet below ground surface. The stratigraphy of the area consists of horizontal layers of silts and clay with small sand seams. The nature of these deposits causes water to flow horizontally and discharge at areas where the ground surface intercepts the water bearing zones. No seepage areas have been observed in the areas north of seep # 6 on the east side of Route 5. Based upon the information within the RI/FS, EPA does not consider indoor air sampling to be necessary.

Comment e: A comment was submitted requesting that additional background sampling is necessary to provide basis for future comparison.

Response: The Site database regarding the chemical characterization of ground water is sufficient to provide a baseline for future comparison. As part of the Long-Term Monitoring a better understanding of the background levels of certain metals will be obtained. However, it is not the intent of EPA to use background levels to adjust cleanup levels below existing standards or risk based levels. The purpose of background data is to prevent the establishment of cleanup levels below existing background levels. Background levels may be considered in the future if the metal concentrations in ground water are not reduced below the cleanup levels. The air testing performed during the RI and the NTCRA will provide the basis for determining the need for future air sampling.

Comment f: A comment was submitted that flare emissions and efficiency be tested as part of the Long-Term Monitoring Program and Proposed Cleanup Plan. VPIREF also stated that the State of Vermont does not have adequate personnel or resources to continuously monitor the flare. In addition, further comments suggested that the State of Vermont did not adequately consider the treatment and possible emissions from the flare.

Response: The landfill gas combustion flare was installed pursuant to a permit issued by the Vermont Air Division. The success and efficiency of the flare is based upon maintaining a temperature of combustion over a retention time. The flare has a thermocouple that does not permit the flare to operate at temperatures below 1600 degrees. The operation and maintenance manual for the flare covers the actions necessary to maintain the systems effectiveness. EPA believes that the State of Vermont

has the personnel to expertly review the existing information and determine the compliance of the flare with respect to federal and state air regulations. The State of Vermont Air Pollution Control Regulations, which are implemented through the Air Pollution Control Division (the permitting authority for the flare), are specifically set up to prevent the release of hazardous constituents into the air.

Comment g: A comment was made stating that the current method for transporting and disposing of the leachate collected at the Site was haphazard.

Response: The leachate and ground water collected at the Site are stored in tanks prior to shipment off-site for disposal. The water collected in these tanks is sampled to determine if the material is a hazardous waste. All sampling conducted since 1993 supports that the material is not a hazardous waste by characteristic. The water is disposed at an off-site industrial treatment facility at the present time. In the future, the material may be shipped to a POTW. The material was shipped to a POTW until spring 1994. The shipment to that POTW was suspended due to an investigation into improper operations of the POTW for other activities relating to septic sludge hauling. The investigators have not reported any improper activities related to the Site discharge. All shipments of the leachate or ground water from the Site are accompanied by a manifest identifying the material. The disposal of the collected ground water and leachate at the Site will be controlled by the characteristics of the material and federal and state regulations relating to transportation and disposal.

ATTACHMENT A

October 1992	EPA issues Press Release announcing the signing of the administrative order for the RI/FS.
October 1992	EPA holds a public information meeting for the RI/FS and to announce the proposal to install the ground water collection trench.
April 1992	EPA issues the community relation plan for the Site.
May 1993	EPA issues a Fact Sheet summarizing the results of the remedial investigation and human health risk assessment.
June 1993	EPA issues a Fact Sheet describing the proposed non-time-critical removal action to cap the landfill.
July 1993	EPA holds a public information meeting to discuss the non-time-critical removal action and update citizens regarding the Site.
August 1993	EPA holds an informal public hearing to receive oral comment on the proposed non-time-critical removal action.
September 1993	EPA signs an Action Memorandum with an attached Responsiveness Summary.
March 1994	EPA provides a Site tour for TAG Group and Technical Consultants.
April 1994	EPA issues a Fact Sheet announcing the completion of design and upcoming construction activities and updating citizens regarding RI/FS activities.
April 1994	EPA hold a public information meeting to discuss the fact sheet.
May 1994	EPA issues a Press Release describing residential well sampling and announcing a public information meeting.
May 1994	EPA holds a public information meeting to discuss residential well sampling
June 1994	EPA issues Proposed Plan

June 1994	EPA issues Press Release announcing issuance of Proposed Plan and upcoming public information meeting
June 1994	EPA holds public information meeting to discuss the Proposed Plan
July 1994	EPA holds an informal public information meeting

ATTACHMENT B

PUBLIC HEARING TRANSCRIPT

ENVIRONMENTAL PROTECTION AGENCY
BFI PUBLIC HEARING

COPY

THE BFI PUBLIC HEARING to receive comment on the proposed plan for the BFI-Rockingham Landfill Superfund Site taken before Tamara A. Violette, Professional Reporter and Notary Public, in and for the State of Vermont, at the Hit or Miss Club, Route 5, Rockingham, Vermont, at approximately 7:07 p.m.

Appearances:

Mary Jane O'Donnell
Chief, Maine & Vermont Superfund Section

Edward Hathaway
Remedial Project Manager for
the BFI-Rockingham Landfill Site

Brian Woods
State Project Manager for
the BFI-Rockingham Landfill Site

(The Hearing commenced at 7:07 p.m.)

MS. O'DONNELL: Welcome to tonight's public hearing for the BFI Landfill. My name is Mary Jane O'Donnell, I work for the EPA in Boston. With me tonight is Ed Hathaway who is the project manager for the site, also Brian Woods who is the State of Vermont's project manager, who is here tonight.

The purpose of tonight's hearing is to formally accept your comments on EPA's proposed plan for the site. I'd like to emphasize the word, formal. As you can see, tonight's hearing is a bit more structured than the meeting we had at the end of June. As you can see the entire contents of the meeting tonight is going to be transcribed. The reason for that is that the comments made tonight will become part of the administrative record for the site. Also, any written or oral comments that we receive tnighte during the formal part of the hearing, and those comments received during the time period will be responded to in a document called a responsiveness summary.

This responsiveness summary will summarize EPA's responses to the comments received during the comment period. They will also be included as part of the record of decision which is EPA's legal document, which explains its rational for its preferred alternative.

In terms of the agenda for tonight's meeting, I'm going

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to very briefly give a description of the hearing procedures, then I'm going to turn things over to Ed, who's going to give a summary of the presentation that he gave on the June 29th meeting. He's going to discuss the preferred alternative; how the public can comment on the preferred alternative; and also some of the studies that we've done. In addition to commenting at tonight's meeting, he will also summarize some of the studies that have recently been done; a summary of the nature and extent of contamination; the risk at the site from both a human health and ecological prospective; the other alternatives we looked at in addition to the preferred alternative; and also a proposed plan and basically what happens after tonight's meeting.

Upon the conclusion of Ed's presentation I'm going to open the floor to comment. I'd ask you for those of you who wish to make a comment, if you could just come to the front of the room just to help Tammy transcribe what tonight's comments are. If you come to the front of the room just identify yourself and your affiliation to the site. At some point I may ask you to slow down if it appears it's difficult for us to transcribe what your comments are. I also reserve the right to limit each oral comment to ten minutes. Although I don't expect that to be a problem tonight, I may have to impose that restriction.

During the formal part of the evening's hearing EPA and

Vermont people here tonight will not be able to respond to your comments and questions when they are asked. However, at the close of the formal part of tonight's hearing we'll certainly be available to answer whatever questions you may have and hopefully provide you with some answers.

As you already know, the comment period for the proposed plan began on June 30th and is scheduled to conclude on July 30th of this month. Therefore, if you wish to submit written comments, and I encourage you to do so, they should be postmarked no later than July 30th. All written comments should be mailed to Ed Hathaway at EPA's Boston office. Ed will give you the mailing address, but it's also in the proposed plan that hopefully you have all received copies of. If you didn't receive a copy there are additional copies in the back of the room.

Finally, I'd like to note, again, the entire contents of tonight's hearing is being transcribed and will become part of the administrative record for the site. Are there any questions in terms of the procedural aspect of tonight's meeting?

MR. VEITCH: I have a question. If someone wants to split the comment could they make part of the comments and then reserve time later on in the comment period?

MS. O'DONNELL: Oh sure, you mean, submitting written comments --

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MR. VEITCH: No, tonight in the verbal -- we're here to make comments, right?

MS. O'DONNELL: That's correct.

MR. VEITCH: If someone wants to speak for five minutes and come back at the end of the meeting and speak for another five minutes --

MS. O'DONNELL: That's fine. That's no problem. Any other questions? I'm going to turn things over to Ed Hathaway.

MR. HATHAWAY: Good evening everyone, I'm Ed Hathaway, I'm EPA's project manager for the site. What I'd like to do is just start off by summarizing the preferred alternative, EPA's proposal that we are here to comment on tonight. That alternative is entitled, Natural Restoration/Management of Existing Site Controls. The major components of this action are to continue to maintain the landfill cap once it's constructed; to operate and maintain the leachate collection and ground water collection system; and ensure that they are shipped to an offsite facility for treatment and disposal; to operate and maintain the gas collection and treatment system; to ensure that the institutional controls are maintained that will prevent any future use of the landfill cap that could damage it; to make sure that ground water in the area of contamination is not used; and assure water supply to any residents with site

contaminated ground water. It also involves continued long term monitoring of the seeps, ground water, collected ground water, leachate, Connecticut River surface water to confirm the nature and extent of contamination and confirm the restoration process. I should also add that there will be continued monitoring of residential wells. All EPA alternatives that involve leaving waste in place will include a review of site conditions every five years according to the statute. This alternative essentially relies on previously implemented activities to achieve ground water clean up; and it's estimated that ground water clean up will be achieved within 15 years of the completion of the cap.

As discussed earlier by Mary Jane, tonight is an important part of the public comment process. We actively seek public comment on these alternatives. The public comment period is at least 30 days, and in this case runs from June 30th to July 30th; and all public comments received before the end of the comment period will be evaluated by EPA in a document known as a Responsiveness Summary. There are two meetings that are usually included in a public comment process. One is a kick off informational meeting, that was held June 29th right here. Another is the public hearing, that's tonight, that's the purpose of tonight's meeting. EPA will finalize the decision by incorporating a selected alternative into a Record of Decision, which is signed by the

regional administrator. Just as a reminder, if you would like to make written comments, they should be sent to EPA postmarked no later than July 30, 1994 to my attention, U.S. EPA, Waste Management Division, JFK Building, Boston, Mass., 02203-2211. This address is in all the proposed plans. Hopefully you all have received one.

Just a quick, sort of provide the setting. I think everyone here knows where we are, that we're talking about the DSI/BFI Rockingham Landfill. It's directly across the street from us. It sits in southeastern Vermont, adjacent to the Connecticut River.

I'd like to just spend a little bit of time going over some of the technical foundation for our decision. Remedial Investigation Report: The Remedial Investigation is the studies and related reports that characterize the nature and extent of contamination at a site. The RI serves as the foundation for the Risk Assessment; both human health and ecological risk assessments. Based on that we prepare a list of clean up options known as Feasibility Study. At this site there is both a Remedial Investigation Report and a Supplemental Remedial Investigation Report, both of which are complete and available in the library.

A summary of the results of these reports were that we did a series of air investigations ranging from generic field screening type evaluations to very quantitative air

evaluations, and the results of these are that trace levels of four organic compounds were detected in the landfill area itself, but no detects -- nothing was detected outside the perimeter of the landfill. As far as sediments go, there was no significant contaminant to the Connecticut River, nothing that we would consider of concern. There were some what we consider very low level of pesticides detected in a few EPA samples taken in October of '92; none were subsequently detected in August of '93. As far as other sediments, sediments in seepage areas along Route 5, for the seepage area that's historically been up on the landfill, there have been volatile organic compounds, semi-organic compounds, metals. When I say VOCs I mean solvents like Trichloroethene; semi-volatiles, things that we establish as phenols, metals typically they are arsenic and manganese are essentially the major ones we find. The surface water, for all the samples we've taken in the five rounds of samples we've taken so far we've found the Connecticut River has consistently met drinking water standards. As far as seeps go, the seeps have shown consistently shown landfill impacts of the same type of parameters we found in the sediments; the volatile organic compounds, semi-volatile organic compounds, some metals and some trace pesticides in certain cases. One thing to note is that two of three seeps have been essentially dried up by the installation of a ground water trench. One is still flowing,

it's something that we're looking at right now and trying to get a better understanding of and develop a plan to address. And the seep in the landfill will be covered by the cap and will no longer exist after that. The ground water which is the area of primary concern at the site, we have seen volatile organic compounds, semi-volatile organic compounds, metals, some trace pesticides in overburden, but not the bedrock, and no PCBs have been detected in any media onsite to date.

I'd like to focus a little more closely on the bedrock ground water, because that is where we consider the most important area of concern to the site. What we have seen to date in what we call the overburden ground water, that is the soil zone above bedrock, the ground water that moves through that, there's an area of contamination that emanates from the landfill itself that moves, basically, over to about Route 5, that historically discharged at the seepage areas along Route 5. The area that is shaded here is areas where federal and state drinking water standards are exceeded. The area that's dotted over here is an area where there have been some contamination but not above established drinking water standards. And what we see now is the trench, that's fairly successfully intercepted two of the three seeps. There is still one seep down here that is flowing and we're going to try to address that. Occasionally there is still a little bit of water under the road that the contamination sort of dots

out over here, but isn't breaking out in the seeps anymore.

As far as the bedrock ground water is concerned, what we see is a similar pattern, but is more widespread. The bedrock ground water is pervasive. The overburden only exists in that area, that extends from just around this Hit or Miss building here to only about halfway down the hill, and then becomes all bedrock. We see an area, a very focused area, running from the landfill coming right across Route 5 and heading to the Connecticut River; where we see the major area of impact; where we see elevated arsenic, manganese with VOC contaminations. We have some other areas adjacent to those on the side and we have a new well here and we kind of dash that off a little bit. Proving once again these levels aren't exceeding federal drinking water standards for most compounds. We may get a hit that's just above a standard in one round but not above the next round, slightly elevated manganese concentrations, but generally arsenic concentrations in these two areas are relatively low.

The overall schematic of the ground water movement at the site is shown by this figure which shows that in general, you've got rain water or other sources of water infiltrating into the waste. That water has two options; it can either move into what we're calling overburden ground water, the water tends to move into that horizontally along toward the slope where it breaks out. It does that because the material

gets finer and tighter with depth, so it's easier for the water to move horizontally than it is vertically, which is why we're getting the breakouts at the seeps. We also have water that is either -- waste that is either in direct contact or near contact with the bedrock that is causing leachate to flow into the bedrock, and it's moving along the bedrock. We see higher levels in the shallow bedrock than we do in the deep bedrock. Our perception is, of course, that bedrock is then discharging to the Connecticut River. One thing to note, once the cap is installed over the landfill, the inflow of water will be stopped and we expect to see a drying of the waste; a gradual decrease in the amount of leachate generated; a substantial decrease in the amount of water collected in the seeps; and as estimated for alternative, a restoration of the bedrock ground water in 15 years.

In addition to a Remedial Investigation, human health and ecological baseline risk assessments are developed from the results of the Remedial Investigation. Human health risk assessment is an assessment of the potential adverse human health effects current or future caused by hazardous substances released from the site. It has a standard four step process; that is, to identify the contaminants of concern, focus on what potential health effects might occur as a result of exposure to those, determine what ways in which people might come into contact with those materials and then

to estimate or characterize any potential risk. At this site, in the risk assessment for the human health risk assessment, the focus was upon potential ingestion of bedrock ground water into drinking water supply; ingestion of drainage pond sediments by, basically, going over and playing in those sediments; ingestion of the seep sediments by playing in the seep, ingesting the soil; ingestion of drainage pond surface water, hop the fence, go for a swim in there and ingest some of that. The same thing with the Connecticut River; if you go down and play in the Connecticut, swim in the Connecticut, ingest the water, and also. dermal contact with the Connecticut River or the drainage pond.

When we do a risk characterization it's important to realize that risk is the result of both the toxicity and exposure. There has to be both a hazardous compound, and then there has to be a way in which someone comes in contact with that on some type of frequency that could cause an effect. The carcinogens, the risk is expressed as a probability. The agency typically considers excess cancer risk between one in a million to one in 10,000 acceptable range. The acceptable range for non-carcinogen compounds we use what is called a reference dose, which is essentially a ratio of safe dose to the dose you might be exposed to, which, you know, if you're exposed to a level that's five times the safe dose, the ratio would be five, and that would be your non-carcinogenic

exposure level.

The results of the risk assessment for the site essentially only identifies one pathway under which an unacceptable exposure might occur, which would have risk outside our acceptable risk range. That was for the future potential ingestion of ground water; were someone to install a well out in the area where the contamination exists as a water supply, to drink the highest level of contamination for 30 years at two liters a day, that would result in an unacceptable carcinogenic risk and unacceptable non-carcinogenic risk. All other pathways evaluated at the site were considered to be well within EPA's acceptable risk range. That includes exposure to the seep surface water and the seep sediments.

Now, EPA also performed an ecological risk assessment and the results of that -- this risk assessment was performed on data collected prior to the installation of the ground water collection trench, the seeps were actively flowing and it was based upon samples of seep water back at that time. The results of that is that the seep water sediments would be unacceptable aquatic habitat. The Connecticut River is periodically impacted at levels above what are called ambient water quality criteria. Those are standards that are established for reference criteria for ecological health. Samples were taken right at the base of the ravines where the

water directly intersected the Connecticut River and in that small area there were seeps above ambient water quality criteria, but several feet away there were not. One thing to note that is very important, is since the installation of the trench we did not see a repeat of those seeps, especially iron, which was a concern early on. We have not seen elevated levels of iron since the installation of the trench.

Based upon the Remedial Investigation, the risk assessment and all the data collected at the site, EPA identified what its objectives for the site were. These are essentially to prevent the ingestion of landfill impacted bedrock ground water that exceeds federal and state drinking water standards, and to try to restore the bedrock ground water at the landfill to drinking water standards.

We also established objectives for the surface water; that are to protect offsite surface water, specifically the Connecticut River by preventing the occurrence of landfill impacted seeps; to meet the federal and state standards in any discharge that may be necessary to the Connecticut River; and to provide long term monitoring to ensure that the Connecticut River is protected. I should note the long term monitoring is also the component of sort of every objective that is mentioned.

There is also generic objectives just for the landfill. Very quickly, what they are is to prevent water to come in

contact with the waste material; to try to prevent the generation of any future seeps; to control landfill gas; to try to prevent the migration of contaminated ground water outside the landfill boundary; to minimize the potential of any slope failures; to prevent any direct contact with the landfill debris material. I should note that all these objectives were incorporated in the decision that was made last year which is to cap the landfill, and that is how we feel these are being addressed.

Now, to provide numerical guidance on the clean up and focus on the contaminants that were most frequently detected and identified as our contaminants of concern, EPA developed a list of compounds or a chart of compounds for clean up. One thing to note, just because a compound isn't on here doesn't mean it will be ignored. There will be periodic testing for a variety of additional compounds. At the end of the clean up process, for it to be deemed successful, the ground water will have to meet all federal and state drinking water standards. These were the ones we focused on and, in particular, there were two; Tetachloroethene and Xylene, where there are two standards proposed. The reason there is two is these are standards where there is a marked difference between the EPA and the state standards, the state standard being the lower one. The EPA believes the federal standard is protective and what we're providing here is an opportunity that if the state

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does change the standards in the future to the federal standard, that they would then become the clean up standard for the site. However, in no case would we ever allow a standard less stringent than the federal drinking water standard.

Once all this is done you've got a risk assessment, you've got an RI, you've pulled together your objectives for clean up, you perform a feasibility study. A feasibility study takes your alternative that you've pulled together to try to evaluate what options you have to deal with the site, and the evaluation is based on nine criteria. There are two stars before the first two criteria. For the EPA to recommend any alternative, it must protect human health and the environment and be compliant with federal and state laws and regulations. We then use long term effectiveness, reduction in the toxicity, mobility or volume through treatment, short term effectiveness, implementability and cost, is the balancing factors to figure out which of the alternatives meet the first two criteria best, are our best choices. The next two criteria are used as part of our comment process. We actively seek the state's input and recommendation and the reason we're here tonight, the reason there is a public comment process, we look for the community's acceptance for the proposal.

For this site there were three alternatives given

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serious consideration. The first, and this one is required in all feasibility analyses, is to take no further action, essentially, for us to leave, go away and declare the site done. All's we would do is collect monitoring data over the next 30 years, do an assessment of the site every five years, but we would require no further maintenance of any existing controls at the site. The cost of this would be $110,000 a year and over 30 years, the NPV at seven percent would be 1.4 million dollars.

Another alternative that was evaluated for consideration was to, what's called management and ground water extraction. This one would essentially take all the components that were discussed in the preferred alternative but add the installation of several bedrock extraction wells, most likely along Route 5 right here. These wells would then treat the ground water and most likely the ground water would be treated for metals and volatile organic compounds, and be discharged in the Connecticut River in compliance with federal and state standards. Within this alternative some of the issues that really came out were the number and location of wells would need to be determined by extensive pump tests and predesigned testing. The topography out here is very steep and would be very difficult to locate wells and success in extracting and treating ground water is something that is subject to quite a bit of debate these days. Under this

alternative it is estimated that ground water clean up could be met within 13 years, annual operating cost would be $600,000 in the long term cost over 30 years would be 6.5 million dollars.

The third alternative then was evaluated as discussed before, is called natural restoration and management of existing site controls. I won't go through the components again, they've already been discussed. The key to focus on for the preferred alternative is that ground water clean up levels are expected to be reached within 15 years of completion of the cap, the annual operating costs are estimated to be $392,000 with a 30 year cost over seven percent of 2.9 million dollars.

Now, as I said this second alternative is EPA's proposal. Reasons that we have proposed that alternative are that we believe it's protective of human health and the environment by restoring ground water to drinking water standards within 15 years. We believe it is protective of the Connecticut River by shutting down the leachate that goes into the landfill which will eliminate landfill seeps. It will prevent direct contact with landfill material. It will control the release of landfill gas; maintain water line for the residents down below until that water is acceptable for drinking; it collects the shallow ground water and leachate; it has long term monitoring to confirm that restoration is

actually being achieved; incorporates five year reviews of all site activities to make sure the site is protective throughout the environment. This alternative will meet federal and state standards. We believe it's cost effective and the particular factors that also influenced the decision is there is no current exposure to the contaminated bedrock ground water; that there is a water line that is currently available to provide drinking water to residents that were formerly in the area -- that are currently in the area that have contaminated water; that the conception model supports that by examining migration is that ground water is discharged into the Connecticut River and not migrating off, further away from the site; and that there is a very low probability of the future use of the bedrock ground water in the area between the site and the Connecticut River, except in those areas where there are camps today.

One thing I also wanted to note is there's a quote here and it's, quote, from federal regulations, that essentially states that the Government EPA recognizes that when we say we're going to use natural attenuation or natural restoration it doesn't mean that we've written off the ground water or the aquifer. It means that we're going to rely on natural processes such as biodegradation, dispersion, dilution and absorption to effectively reduce contamination, and that institutional controls such as part of the remedy, may be

necessary until the time period in which clean up is achieved.

What are the next steps in the process? These are the same slides I used on July 29th because it's the same next steps. Public comment period from June 30 to July 30; please send any and all of your comments to myself, postmarked by July 30; the meeting notes are being transcribed; once I'm through the floor will be open for us to receive, via a transcript, formal comments on our proposal. All comments will be addressed in a Responsiveness Summary that will be prepared. A Record of Decision will then be prepared by EPA. We will then issue a news release acknowledging whether the proposed alternative was selected, and whether there were any changes to that. We'll then hold an informal meeting in the fall to discuss the next steps after the alternative is selected. We'll then enter negotiations with BFI to accept the responsibility to implement the action by Record of Decision, and the long term monitoring plan as it currently exists will be amended based upon public comments, requirements of selected alternatives and all the information we've collected to date.

I appreciate your patience, I thank you all for coming out tonight, and with that I'd like to turn it back over to Mary Jane to open the formal comment period.

MS. O'DONNELL: Thank you, Ed. In my introductory comment, if you wish to make a comment today I'd

ask you to, first of all, identify yourself, your affiliation with the site, and I appreciate it if you could come to the front of the room so we could accurately transcribe what your comments are.

MR. JOHNSON: Wayne Johnson, I'm a neighbor down the road here. After the ground water is supposedly clearified (sic) and that, is BFI going to return out artesian wells and our pumps and so forth to the way we had them? I had an artesian well and pump in the beginning, until they were contaminated.

MS. O'DONNELL: As I mentioned at the beginning of the meeting, the purpose, basically, of tonight's meeting is just to accept comments on the preferred alternative. We're not in a position to comment. However, at the conclusion of the meeting we'll be more than happy to answer the question that you have.

MR. JOHNSON: Okay, I'll change my question. What about after this last rain storm, which Ed was there, all this rain water and all that washed me out, my neighbors, we ended up with a lot of bad stuff, run off, bad run off from the dump. Nothing's been done yet as far as our culverts are plugged. It was supposed to be acted on very quick.

MR. HATHAWAY: Wayne, I guess the purpose of this part of the meeting is to receive your input formally for

the record as to what your comments are on the proposal. At the end of this we'll be glad to talk to you about what's going on and whatever concerns you have, but if you want to make a statement such as, you may have made earlier, the statement may be, you know, how will these things be addressed, make a statement and it will go into the record and we'll formally respond to those statements in the Responsiveness Summary. Then at the end -- as soon as the formal part is closed I'll be glad to talk to you.

MR. JOHNSON: So this meeting was sort of a waste of my time, then.

MR. HATHAWAY: No, these comments are going to go right into the formal record. These are going into the official record. They will be responded to. As soon as we're done we'll talk to you, probably in about half an hour.

MR. JOHNSON: I've bene rushed out so many times now --

MS. O'DONNELL: You stick around, we'll be happy to answer it.

MR. JOHNSON: What does it matter? Everything's going to the river. Everything's going on my lawn. It took eight days to get the EPA down here to check my ground sample after the last wash out, after two more storms, which definitely did away with some of the contaminants.

MR. HATHAWAY: Wayne, we're saying this is

a very structured meeting that's here to receive formal public comments --

MR. JOHNSON: I shouldn't have come here, actually. I'm pretty mad.

MR. VEITCH: Wouldn't it make sense for this resident -- my name is Michael Veitch, I'm with the Vermont Public Interest Research Group. We were awarded a technical assistance grant by the EPA to assist citizens in understanding and commenting on this particular site. Wouldn't it make sense to give this gentleman time to, at least ask his question, even though he may not get his answer until the end of the meeting? It seems entirely reasonable that he be given an opportunity to ask questions that would go into the record. So, you know, give him an opportunity to ask his questions and let it go into the record.

MR. HATHAWAY: We just said that, Michael, we said, please ask your questions but we can't respond until after the meeting.

MR. JOHNSON: So you don't want to give a comment until after this meeting's closed?

MR. HATHAWAY: We're not allowed to.

MS. O'DONNELL: That's correct.

MR. HATHAWAY: We're not allowed to until after because of the structure of this meeting.

MR. VEITCH: I mean, you are encouraging

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him to ask his question. You do want to hear what he has to say.

MS. O'DONNELL: That;s why we're here.

MR. JOHNSON: I just saw about three things back there, there's no top water run off. Ed, you were down here the other day in the main storm there, and you saw it, you smelled it, you stood in it. My neighbor, Huck Rummel was told to get the hell out of the stuff because it wasn't safe. That stuff's running right down into the river, it's running across the lawns. The problem hasn't been cured. You've got a few bails of hay down there.

I know this thing's been going on and on and on. I've lived there for 12 years, 14 years I've owned that place. First my water went dead because the state said, oh, it's safe to build a dump up there. Our water went bad, now everything's gone bad. I got washed out two weeks ago, got $3500 worth of my labor and building costs into my wall, and it's just going to happen again.

Sink holes; I can't let the kids go up in the backyard. I'm afraid they're going to sink down and out of sight. My vehicles; driving down the road, there's a culvert that let loose down there. I don't know if I'm going to be driving down the road and lose my Stealth one day.

No one know's where the water's going. No one knows where the ground's going. All of a sudden there's sink holes

everywhere.

The public hasn't heard this stuff. I haven't sounded off yet. I'm pretty damn mad about the whole situation. I'm sorry I own the place. I wanted river frontage for enjoyment, and I do have enjoyment, but, boy, what a hassle it is.

MR. HATHAWAY: Thank you.

MR. JOHNSON: I can't say anything much more other than you can't give the places away. You can't sell a place down there. A little old lady on side of me trying to sell, another neighbor trying to sell. They can't give their places away. Eight years ago I was worth a quarter of a million on the river. I'm lucky to get thirty out of it, if that; and I got a damn nice place. I'm sorry. That's all I got to say about this meeting. I'm heading off, I think, unless you're going to respond later.

MS. O'DONNELL: We'll be happy to respond later, but as we said before, we have to wait until the conclusion of the meeting, and in terms of how long that will take, it depends on how many people have comments. Any additional comments? Yes, sir, if you could just come forward and identify yourself.

MR. MURRAY: My name is George Murray, and I'm a member of a group of residents who are working with VPIRG on the technical assistance grant, and these are our concerns: We're concerned about the use of shredded tires in

place of sand in the drainage layer of the cap. We are opposed to the use of sewage sludge on the top layer. It's own potential as a pollutant makes its use too great a risk. Also, another mud slide would make a stinking mess. We're concerned about the lack of security fencing and large obvious warning signs. We are alarmed that the trench along Route 5 failed to stop all the seeps. We want to see more monitoring wells, particularly parking lot sub base sampling and south of the site as more than half the residential wells being tested are located in this direction. We are concerned about the seemingly haphazard method of transporting and disposing of leachate collected at the site in the past. We assume that steps have been taken to improve the safety of this process as volume of leachate will increase dramatically after closure.

As a member of a group of neighbors opposed to landfill expansion in 1988 we feared the risk of adding 40 to 50 vertical feet to the already overflowing landfill. The result of this expansion can been seen now as the seep slopes are subject to damaging mud slides and wash outs; one of which I was a witness to and what Mr. Johnson has been talking about. We are concerned that the cap will be difficult to erect and maintain at such grades. We question the lack of water testing in Charlestown, New Hampshire. And, finally, we are in agreement with VPIRG on any issues I have not mentioned yet.

MS. O'DONNELL: Thank you very much. Michael, if you could just come forward, please. Just for the court stenographer, if you could just identify yourself, again, please.

MR. VEITCH: My name's Michael Veitch. I am here representing the Vermont Public Interest Research Group. We were awarded a $50,000 technical assistance grant by the EPA in October of 1993 to assist residents living near the site, helping them to evaluate the accelerated clean up, and to comment on proposals and issues of concern at the site. VPIRG has hired John Snow Institute out of Boston, also ENSA Tri-S Division to work with us as technical advisors on this site. They will be delivering comments of a more technical nature regarding the proposed plan later this evening. I would like to acknowledge their work on behalf of VPIRG and the citizens who live in the area. Their efforts have been outstanding up to this point and we feel we have assembled an exceptional team of advisors to assist us on the site. Even more remarkable is the fact they have worked diligently up to this point without having been paid; this being due to the fact that VPIRG has, to date, only received $611 from the EPA in reimbursement for the technical assistance grant. We thank our advisors for their patience and we are waiting patiently ourselves for a quick resolution to this troublesome aspect of the project.

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I would like to discuss the public process issues related to clean up proposal and comment period. While we appreciate EPA's desire to restrict comments at this time to the proposed clean up plan, we feel that given the acceleration of activities at the site and the ever increasing list of issues, that it is very difficult to comment on the proposed clean up without also commenting on cap design, on the health risk assessment, the environmental risk assessment, the feasibility study, long term monitoring plan, public process and assorted other issues which, you know, we're hearing about new issues tonight. There is a symmetry to these issues that we feel we use them all together sort of a proposed clean up umbrella. For this reason, some of the comments made by us and by some of the technical advisors this evening will be on some of those other issues that I mentioned.

VPIRG is adamantly opposed to any further contamination of the site. I'm speaking specifically about dioxin contaminated sludge proposed for the cap. We feel that this site has extremely steep slopes, has a history of slope failure and a risk of not achieving adequate vegetation growth by this winter. And, you know, all of this together, you know, points in the direction of another serious wash out or failure similar to what we witnessed a few weeks ago at the site.

Another point I would like to mention is that the risk assessment and the proposed plan have assumed that clean material would be used on the cap. So there seems to be -- I mean, there is a gap here in terms of developing risk assessment versus, you know, what the actual risk may end up being based on changes in the cap design. We're calling for the termination of biomix experiment and we would like to see return to the certifiably clean cap material to be used on the cap that, you know, were used to develop the risk assessment, and the FS were assured as part of that process.

I would like to speak briefly about a site visit that I made earlier today; did have an opportunity to go down and visit with the property owners. One of the property owners down in the lower road, and first of all, I feel that to refer to these houses as camps is a mistake. These are beautiful homes that, if were placed out in the middle of a field, would not be classified as a camp. The fact that they sit on the river, I mean, that just happens to be their location. I think the EPA should reevaluate and redefine these residences. It's clear at least two are permanent, year round residences and possibly a third, and I'll try to verify that for you. I think that this is important, and I think that the definition or the term, camps, is kind of a -- it gives a misleading kind of a feeling about the nature of the residences down there and their value to their owners.

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I heard some comments made today concerning a right of way into property down on that lower road. Apparently this right of way had been breached in two places. One area where wells were placed directly in the middle of the right of way, and very recently apparently a rather large drainage ditch was placed across the right of way. I think this is an issue that needs to be clarified. If in fact a right of way has been breached, I would, you know, VPIRG would urge the EPA and BFI to work out some sort of agreement with the property owners for compensation.

In the process of our site visit I also came across what I would characterize as a drum field down this area down below all along the river. There seems to be an area where, at some point in the past, a large quantity of 55 gallon drums were dumped. There are a number of them visible. It appears that none of them have been tested, opened up, removed or checked. It's not clear to us at this time if these drums sit on property that is owned by BFI. I, again, VPIRG would urge the EPA to include complete evaluation of this area as part of their proposed clean up plan. Specifically, we feel that drums should be tested, sounded, you should make a determination how many 55 gallon drums are actually there, and if they in fact do contain any toxic material. Then in which case they should be removed.

In addition, we have some concerns about the efficiency

of the flare. We believe that the flare should be tested and monitored by EPA. It is clearly a treatment of the material that is being generated by the superfund site. For this reason alone we feel that it falls under EPA's jurisdiction and not the State of Vermont.

We feel that the impact on the Connecticut River and across the river into New Hampshire have not been adequately analyzed and assessed as part of the clean up process. Our technical people will go into this in a little more detail on this later, and our written comments should contain even more detail.

The stability of Route 5 is -- I learned today, also, a very serious issue given the fact that, again, you have permanent residents living below Route 5. I think the danger of a wash out is a very real possibility. It's our concern that ground water is leaving the landfill and is actually undermining the road. There are sink holes that are actually visible alongside the road. They were visible down below the Route 5 area, and we have had some additional concerns that an investigation into Route 5 is, apparently, according to my discussion with Mr. Hathaway earlier this week, apparently is being conducted by the agency of transportation. We feel that given the fact that this is a superfund site, the material leaving the site may have contamination -- may be contaminated with VOCs, may have any number of contaminants in it. We feel

that, you know, any work done to assess Route 5 in terms of what the problem is should be handled by technicians who are trained to work around toxic chemicals, similar to what we saw when you built the trench. Everybody dressed appropriately and with, you know, all measures taken to protect the health of the construction workers.

We urge EPA to include in the proposed clean up plan actual steps that will clearly define a rapid response to future landfill washouts and disturbances that are going to discharge, that are going to affect property owners beyond the borders of BFI. This rapid response should include testing for all potential contaminants within 24 hours of the event, complete removal of any and all sediment and run off that leave the site, and the establishment of a forum or a mechanism for restitution to property owners for losses associated with landfill washout. You know, as we heard earlier this evening, we've heard that a property owner suffered approximately a $3500 loss as a result of this washout. It is VPIRG's position that this is a responsibility of BFI to provide compensation to the property owner. It's strictly a good neighbor policy, and I think the EPA is in an excellent position at this point in time to help facilitate just such a mechanism for compensation.

Those are my initial comments. I'd like to reserve a little time at the end if I need it to make any additional

comments.

MS. O'DONNELL: Thank you, Michael.

MS. SPENCE: My name is Lisa Spence and I am submitting the following verbal comments which were developed by myself, Anne Marie Desmarais, Terry Greene and Dr. Richard Clapp for John Snow Incorporated on behalf of VPIREF.

I would like to raise some of the more serious issues regarding the effectiveness of the remedial alternative chosen in the proposed plan and the basis for development of the proposed plan. Out complete comments will be submitted to Ed Hathaway in writing.

It is our opinion that capping of the BFI is a necessary part of the remediation of this site. However, this proposed plan does not demonstrate that capping alone will significantly reduce the migration of chemicals from the landfill. Furthermore, we find it unacceptable for the proposed plan to address the discharge of site contaminants to the Connecticut River as remedial solution. Dilution is not considered a legitimate clean up alternative.

We are concerned that the clean up goal for arsenic, 50 micrograms per liter, is not protective of human health. This value was selected solely on the basis of the maximum contaminant level or MCL, developed under the safe drinking water act. This MCL is based on technological and economic

considerations in addition to health risks. A concentration of arsenic equivalent to the MCL of 50 micrograms per liter in drinking water results in a risk estimate which exceeds EPA's own acceptable cancer risk by a factor of ten.

Chemical-specific ARARs, such as the MCL, are typically one of three types of potential clean up goals. The proposed plan ignores the two other types. First, safe concentration back calculated from the risk assessment, and two, background concentrations. Use of a background concentration for arsenic would be more appropriate. Background arsenic concentrations are available for unimpacted bedrock wells as close to the landfill as the Hit or Miss Club, and the resident wells to the east of the landfill.

Regardless of the alternative chosen, the established clean up goals will influence the amount of time that affected residents are supplied with water, and will also impact the long term monitoring.

Defining the extent of site-related contaminant migration is the goal of the remedial investigation and provides the basis for the development of clean up priorities and the definition of the site. We are not convinced that EPA has defined the extent of site-related contamination. Under CERCLA regulations, a facility, quote, that is subject to clean up includes, quote, any site or area where a hazardous substance has come to be located, end quote. Results received

The risk assessment states that, quote, it is unlikely that a basement would be built within bedrock, end quote, ignoring the existence of some overburden material in this area. The assessment also ignores the fact that bedrock is a very efficient transport path for vapors into homes.

Part of the chosen alternative involved institutional controls designed to prevent exposures. There are a number of institutional controls considered for use at the site but it is not clear that they will be coordinated and cover the entire area of impacted ground water from the Hit or Miss Club to Rumrill Spring. Much of the discussion of institutional controls is limited to BFI property, but the impacted site area extends well beyond BFI property boundaries. In addition, some of those suggested controls have not yet been defined or even addressed in the proposed plan, such as barriers to restrict access to seep 6.

Although it is still our opinion that a cap on the BFI landfill is necessary, it is also our opinion that this may be only part of the remedial plan required to prevent exposure to site related contaminants. We would like to see additional documentation regarding the effects of the cap on the potential for exposure via all pathways. In addition, during the closure process EPA has not had to formally evaluate the sludge proposed as cap material and the effects their use would have on human and ecological health. The importance of

evaluating proposed capping materials has been highlighted by two recent events. First, elevated levels of dioxins were found in the paper sludge initially proposed as the capping material. As a result of this finding EPA has withdrawn this material for consideration. Second, during the storm on June 30th soils were washed off the landfill on to Route 5, and down to the residences below, illustrating one probable path for sediment runoff from the cap. This is another pathway that was not addressed in the risk assessments or evaluated in the feasibility study.

In summary, in its review of the proposed plan on behalf of VPIREF, JSI agrees that a cap is needed. However, additional studies are also needed to address the effectiveness of the cap in reducing exposure via all relevant pathways; the risk assessment must be reevaluated in light of the additional pathways; and clean up levels must be reevaluated to look at background and the protection of human health.

MS. O'DONNELL: Thank you very much.

MR. GAGNON: My name is David Gagnon. I'm with Tri-S Environmental Services of America. We were hired by VPIRG as under their TAG grant and to provide technical assistance to VPIRG. I have the following comments:

Were ARARs other than environmental ARARs considered? For instance, regulations should be considered that are

in July for the K wells newly installed near the Rumrill Spring show that the northeast edge of the bedrock ground water contamination is still undefined. The site area has increased significantly since the completion of the risk assessments which provide the driving force behind this clean up.

In addition, we have found that the human health risk assessment for the BFI site does not adequately address all potentially important exposures to the site contaminants. It is not possible to rely on the risk assessment unless all the pathways have been evaluated. This incomplete evaluation of exposure pathways have served to artificially focus the feasibility study or FS, and proposed plan on one response medium, bedrock ground water. However, the FS and proposed plan do not demonstrate conclusively what effect capping will have on ground water flow and contaminant concentrations in the bedrock aquifer.

One example of incomplete pathway assessment is the dismissal of household vapor pathway. The risk assessment ruled out any possibility of vapors entering homes built between Route 5 and the river using faulty logic and an inaccurate site characterization. The possible existence of overburden ground water beneath these residences has been denied and no investigation of the overburden material in this area has been attempted or of these homes has been attempted.

designed to protect roadways. For example, construction next to roadways must not compromise the structural integrity of the highway or the roadway. Does the volume of water recovered by the interceptor trench match the predicted volume as determined in the design calculation of the trench? As recently demonstrated by the observation of contaminants in the K wells it is clear that the contaminant plume has not been fully determined. As mentioned previously, the plume definition is necessary to finalize the long term monitoring plan. A review of the Dames and Moore letter dated July 8, 1994, the attached map entitled landfill watershed areas indicates a proposed downchute whose discharge could be a potential route for eroded material to escape the site during the cover stabilization period. Was the capacity of Route 5 storm water control design fully evaluated to determine if the volume of water from this downchute could be handled by the storm water culvert on Route 5? What was the design storm event specified by the presumptive remedy for landfill closure? How was the 15 years to clean site developed? Has this been achieved at other sites with similar contaminants and similar situations involving bedrock? Does the bedrock aquifer recharge the overburden aquifer below the landfill at its junction resulting in transport of contaminants from the landfill into the overburden aquifer? The interceptor trenches effectiveness as a means of migrating overburden

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aquifer contamination for moving offsite has not been fully demonstrated. Seep 6 provides substance to the need for more detailed evaluation of this trench. Should it be determined that the offsite migration of contaminated ground water cannot be controlled by this trench, or a modification thereof, then the SW3 alternative involving the pump and treat system should be reconsidered as a possible added alternative to the capping and trench system. We feel that the issue regarding discharge to the Connecticut River has not been adequately addressed, specifically detailed fate transport analysis should be completed assuming that the discharge is entering the river basin. And finally, regarding the landfill gas factor characterization as Michael Veitch mentioned earlier, this flare is burning the discharge of site-related chemicals from the BFI superfund site. Therefore, a characterization should be conducted by EPA. The performance test reviewed by the Vermont Air Pollution Control Division are not adequate. That's the end of my comments.

MS. O'DONNELL: Thank you. Would anyone else like to make comments at this point? I guess seeing as there are not more comments the formal part of tonight's hearing is now closed.

(The Hearing concluded at 8:10 p.m.)

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C E R T I F I C A T E

I, Tamara A. Violette, Notary Public, do hereby certify that the foregoing pages 1 through 40 inclusive, comprise a full, true and accurate transcript, to the best of my ability, of the BFI Hearing on July 20, 1994 held at the Hit or Miss Club, Route 5, Rockingham, Vermont.

Dated this 24th day of August 1994, at Williamsville, Vermont.

Tamara Violette

Tamara A. Violette
Professional Reporter
and Notary Public

My commission expires:
February 10, 1995

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APPENDIX E

ADMININSTRATIVE RECORD INDEX

BFI Sanitary Landfill (Rockingham)

Administrative Record
NPL Site

Current Action
Compiled: June 28, 1994

Index

Prepared by
Region I
Waste Management Division
U.S. Environmental Protection Agency

Introduction

This document is the Index to the Administrative Record for the BFI Sanitary Landfill National Priorities List (NPL) site (Current Action). A previous Administrative Record was prepared for the public comment on the Landfill Cap during June - September 1993. Section I of the Index cites site-specific documents and Section II cites guidance documents used by EPA staff in selecting a response action at the site.

The Administrative Record is available for public review at EPA Region I's Office in Boston, Massachusetts, and at the Rockingham Free Public Library, 65 Westminister Street, Bellows Falls, VT 05101. This Administrative Record includes, by reference only, all documents included in the September 13, 1993 Administrative Record for this NPL site. In addition, the design documents for the non-time critical removal action (landfill cap) are available at the Rockingham Free Public Library and EPA Records Center. Questions concerning the Administrative Record should be addressed to the EPA Region I site manager. The site manager, Edward Hathaway, can be contacted at (617) 573-5782.

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

BFI Sanitary Landfill (Rockingham)
NPL Site Administrative Record

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13.0 Community Relations

13.1 Correspondence
13.4 Public Meetings
13.5 Fact Sheets

Section I

Site-Specific Documents

02.06 REMOVAL RESPONSE - WORK PLANS AND PROGRESS REPORTS

Title:	Construction Report, Route 5 Slope Stabilization and Seepage System - Disposal Specialists, Inc. [Available in Records Center and Repository]		
Addressee:	DISPOSAL SPECIALISTS, INC.		
Authors:	BALSAM ENVIRONMENTAL CONSULTANTS, INC.		
Date:	September 10, 1993		
Format:	REPORT, STUDY	No. Pgs:	416
AR No.	02.06.1	Document No.	000051

Title:	Project Manual For DSI Landfill Cap. [Available in Records Center and Repository]		
Addressee:	DISPOSAL SPECIALISTS, INC.		
Authors:	BALSAM ENVIRONMENTAL CONSULTANTS, INC.		
Date:	April 25, 1994		
Format:	REPORT, STUDY	No. Pgs:	478
AR No.	02.06.2	Document No.	000050

Title:	Biomix Soil Utilization at DSI Landfill, Rockingham, Vermont, (Revised Plan), With Cover Letter.		
Addressee:	EPA REGION 1		
Authors:	BFI ORGANICS		
Date:	May 17, 1994		
Format:	REPORT, STUDY	No. Pgs:	54
AR No.	02.06.3	Document No.	000048

Title:	Proposed Tire Shreds Drainage Layer, Disposal Specialists, Incorporated.		
Addressee:	EDWARD M. HATHAWAY - EPA REGION 1		
Authors:	DAVID W. ANDREWS, MICHAEL A. DEYLING - BALSAM ENVIRONMENTAL CONSULTANTS, INC.		
Date:	June 6, 1994		
Format:	REPORT, STUDY	No. Pgs:	270
AR No.	02.06.4	Document No.	000049

Title: Palmer Water Pollution Control Facility, Evaluation for Disposal Specialists, Inc., Landfill Waste Water Discharge.
Addressee: EDWARD M. HATHAWAY - EPA REGION 1
Authors: JEFFREY S. HANSEN, MICHAEL A. DEYLING - DAMES & MOORE
Date: June 17, 1994
Format: LETTER No. Pgs: 61
AR No. 02.06.5 Document No. 000020

03.02 REMEDIAL INVESTIGATION - SAMPLING AND ANALYSIS DATA

Title: August 1993 Split Sampling Analytical Data.
Authors: ARTHUR D. LITTLE, INC.
Date: August 1993
Format: PRINTOUT No. Pgs: 14
AR No. 03.02.1 Document No. 000052

Title: Trip Report Technical Memorandum for August, 1993, With Transmittal Letter.
Addressee: EDWARD M. HATHAWAY - EPA REGION 1
Authors: MARK HEUBERGER - ARTHUR D. LITTLE, INC.
Date: October 21, 1993
Format: MEMORANDUM No. Pgs: 21
AR No. 03.02.2 Document No. 000053
*Attached to Document No. 000052 In 03.02

Title: Approval of Long-Term Monitoring Plan with Conditions.
Addressee: DERRICK D. VALLANCE - BROWNING FERRIS INDUSTRIES, INCORPORATED
Authors: MARY JANE O'DONNELL - EPA REGION 1
Date: January 18, 1994
Format: LETTER No. Pgs: 5
AR No. 03.02.3 Document No. 000018

Title:	Review of August, 1993 Analytical Data.		
Addressee:	EDWARD M. HATHAWAY - EPA REGION 1		
Authors:	MARK HEUBERGER - ARTHUR D. LITTLE, INC.		
Date:	March 17, 1994		
Format:	MEMORANDUM	No. Pgs:	9
AR No.	03.02.4	Document No.	000054

Title:	Long-Term Monitoring Plan, Disposal Specialists, Inc., Rockingham, Vermont.		
Addressee:	DISPOSAL SPECIALISTS, INC.		
Authors:	BALSAM ENVIRONMENTAL CONSULTANTS, INC.		
Date:	March 28, 1994		
Format:	REPORT, STUDY	No. Pgs:	388
AR No.	03.02.5	Document No.	000001

03.06 REMEDIAL INVESTIGATION - REMEDIAL INVESTIGATION REPORTS

Title:	Approval of Draft Supplemental Remedial Investigation Report with Conditions.		
Addressee:	DERRICK D. VALLANCE - BROWNING FERRIS INDUSTRIES, INCORPORATED		
Authors:	MARY JANE O'DONNELL - EPA REGION 1		
Date:	March 15, 1994		
Format:	LETTER	No. Pgs:	23
AR No.	03.06.1	Document No.	000017

Title:	Transmittal Letter for Final Supplemental Remedial Investigation Report with Comments, Responses to Comments, and Proposed Resolutions.		
Addressee:	EDWARD M. HATHAWAY - EPA REGION 1		
Authors:	JEFFREY S. HANSEN, MICHAEL A. DEYLING - BALSAM ENVIRONMENTAL CONSULTANTS, INC.		
Date:	April 20, 1994		
Format:	LETTER	No. Pgs:	26
AR No.	03.06.2	Document No.	000005

Title: Supplemental Remedial Investigation Report, Disposal Specialists, Incorporated Landfill, Rockingham, Vermont, Volume I of III.
Addressee: DISPOSAL SPECIALISTS, INC.
Authors: BALSAM ENVIRONMENTAL CONSULTANTS, INC.
Date: April 21, 1994
Format: REPORT, STUDY No. Pgs: 381
AR No. 03.06.3 Document No. 000002

Title: Supplemental Remedial Investigation Report, Volume II of III.
Addressee: DISPOSAL SPECIALISTS, INC.
Authors: BALSAM ENVIRONMENTAL CONSULTANTS, INC.
Date: April 21, 1994
Format: REPORT, STUDY No. Pgs: 695
AR No. 03.06.4 Document No. 000003
*Attached to Document No. 000002 In 03.06

Title: Supplemental Remedial Investigation Report, Volume III of III.
Addressee: DISPOSAL SPECIALISTS, INC.
Authors: BALSAM ENVIRONMENTAL CONSULTANTS, INC.
Date: April 21, 1994
Format: REPORT, STUDY No. Pgs: 706
AR No. 03.06.5 Document No. 000004
*Attached to Document No. 000002 In 03.06

03.10 REMEDIAL INVESTIGATION - ENDANGERMENT ASSESSMENTS

Title: Human Health Risk Assessment, Disposal Specialists, Inc. Site, Rockingham, VT, V.I of II. [Received During the Formal Comment Period]
Addressee: DISPOSAL SPECIALISTS, INC.
Authors: BALSAM ENVIRONMENTAL CONSULTANTS, INC.
Date: April 7, 1993
Format: REPORT, STUDY No. Pgs: 121
AR No. 03.10.1 Document No. 000058
*Attached to Document No. 000057 In 05.03

Title: Human Health Risk Assessment, Disposal Specialists, Inc. Site, Rockingham, VT V.II of II. [Received During the Formal Comment Period]
Addressee: DISPOSAL SPECIALISTS, INC.
Authors: BALSAM ENVIRONMENTAL CONSULTANTS, INC.
Date: April 7, 1993
Format: REPORT, STUDY No. Pgs: 174
AR No. 03.10.2 Document No. 000059
*Attached to Document No. 000057 In 05.03

Title: Final Report for Baseline Ecological Risk Assessment at the BFI Rockingham Landfill Site, Rockingham, VT.
Addressee: EPA REGION 1
Authors: ARTHUR D. LITTLE, INC.
Date: March 14, 1994
Format: REPORT, STUDY No. Pgs: 211
AR No. 03.10.3 Document No. 000006

04.06 FEASIBILITY STUDY - FEASIBILITY STUDY REPORTS

Title: Notification to Proceed with Feasibility Study.
Addressee: DERRICK D. VALLANCE - BROWNING FERRIS INDUSTRIES, INCORPORATED
Authors: LISA A. SPENCE - EPA REGION 1
Date: October 6, 1993
Format: LETTER No. Pgs: 5
AR No. 04.06.1 Document No. 000019

Title: Approval of Feasibility Study with Conditions.
Addressee: DERRICK D. VALLANCE - BROWNING FERRIS INDUSTRIES, INCORPORATED
Authors: MARY JANE O'DONNELL - EPA REGION 1
Date: June 21, 1994
Format: LETTER No. Pgs: 4
AR No. 04.06.2 Document No. 000016

Title: Final Feasibility Study Report, Disposal Specialists, Incorporated.
Addressee: DISPOSAL SPECIALISTS, INC.
Authors: BALSAM ENVIRONMENTAL CONSULTANTS, INC.
Date: June 24, 1994
Format: REPORT, STUDY
AR No. 04.06.3
No. Pgs: 498
Document No. 000007

04.09 FEASIBILITY STUDY - PROPOSED PLANS FOR SELECTED REMEDIAL ACTION

Title: EPA Proposes Cleanup Plan for the BFI-Rockingham Landfill Superfund Site.
Authors: EPA REGION 1
Date: June 1994
Format: MISCELLANEOUS
AR No. 04.09.1
No. Pgs: 32
Document No. 000063

05.03 RECORD OF DECISION - RESPONSIVENESS SUMMARIES

Title: Responsiveness Summary, EPA Region I ( ) [Filed and Included as an Appendix to Entry 1 in 5.4 Record of Decision].
Format:
AR No. 05.03.1
Document No. 000065

Title: Comments on the U.S. EPA Proposed Plan for the Disposal Specialists, Inc. Landfill, Rockingham, Vermont. [Received During Formal Comment Period]
Addressee: EDWARD M. HATHAWAY - EPA REGION 1
Authors: MARCEL A. GUAY, MICHAEL A. DEYLING - DAMES & MOORE
Date: July 29, 1994
Format: LETTER
AR No. 05.03.2
No. Pgs: 3
Document No. 000057

Title: Comments on Proposed Plan for VPIREF Tag Group. [Received During the Formal Comment Period]
Addressee: EDWARD M. HATHAWAY - EPA REGION 1
Authors: MICHAEL VEITCH - VT PUBLIC INTEREST RESEARCH GROUP, INC.
Date: July 29, 1994
Format: LETTER No. Pgs: 11
AR No. 05.03.3 Document No. 000060

Title: Comments on Proposed Plan Developed for VPIREF Tag Group. [Received During the Formal Comment Period]
Addressee: EDWARD M. HATHAWAY - EPA REGION 1
Authors: LISA A. SPENCE, ANNE MARIE DESMARIS, TERRY GREEN, RICHARD CLAPP - JOHN SNOW INSTITUTE
Date: July 29, 1994
Format: MISCELLANEOUS No. Pgs: 39
AR No. 05.03.4 Document No. 000061
*Attached to Document No. 000060 In 05.03

Title: BFI Superfund Feasibility Study Comments. [Received During the Formal Comment Period]
Addressee: MICHAEL VEITCH - VT PUBLIC INTEREST AND RESEARCH FUND
Authors: DAVE GAGNON, DAN FITZGERALD - ENSA, TRI-S DIVISION
Date: August 11, 1994
Format: MEMORANDUM No. Pgs: 4
AR No. 05.03.5 Document No. 000062
*Attached to Document No. 000060 In 05.03

05.04 RECORD OF DECISION - RECORD OF DECISION

Title: Record of Decision for BFI (Rockingham) Landfill, EPA Region 1 ( ).
Format:
AR No. 05.04.1 Document No. 000066

10.07 ENFORCEMENT - EPA ADMINISTRATIVE ORDERS

Title:	Administrative Order By Consent for Removal Action, In the Matter of BFI Rockingham Landfill Superfund Site, Rockingham, Vermont.
Authors:	PAUL G. KEOUGH - EPA REGION 1
Date:	September 24, 1993
Format:	LITIGATION
AR No.	10.07.1
No. Pgs:	92
Document No.	000015

13.01 COMMUNITY RELATIONS - CORRESPONDENCE

Title:	Request to Delay Deadline for Comments on Long-Term Monitoring Plan from VPIREF TAG Group.
Addressee:	EDWARD M. HATHAWAY - EPA REGION 1
Authors:	JOAN MULHERN - VT PUBLIC INTEREST RESEARCH GROUP, INC.
Date:	January 2, 1994
Format:	LETTER
AR No.	13.01.1
No. Pgs:	1
Document No.	000046

Title:	Letter with Attached Table of Major Documents for BFI-Rockingham Landfill Available for Review at Public Library.
Addressee:	MICHAEL VEITCH - VT PUBLIC INTEREST RESEARCH GROUP, INC.
Authors:	EDWARD M. HATHAWAY - EPA REGION 1
Date:	January 18, 1994
Format:	LETTER
AR No.	13.01.2
No. Pgs:	2
Document No.	000045

Title:	Transmittal Letter for Remedial Investigation Report and Long-Term Monitoring Plan as Requested by VPIRG.
Addressee:	DAVE GAGNON - ENSA, TRI-S DIVISION
Authors:	EDWARD M. HATHAWAY - EPA REGION 1
Date:	January 20, 1994
Format:	LETTER
AR No.	13.01.3
No. Pgs:	1
Document No.	000043

Title:	Transmittal Letter for Human Health Risk Assessment and Engineering Evaluation and Cost Analysis as Requested by VPIRG.		
Addressee:	TERRY GREEN - JOHN SNOW INSTITUTE		
Authors:	EDWARD M. HATHAWAY - EPA REGION 1		
Date:	January 20, 1994		
Format:	LETTER	No. Pgs:	1
AR No.	13.01.4	Document No.	000044

Title:	Letter Concerning Delayed Revision of Long-Term Monitoring Plan and Schedule of Activities.		
Addressee:	MICHAEL VEITCH - VT PUBLIC INTEREST RESEARCH GROUP, INC.		
Authors:	EDWARD M. HATHAWAY - EPA REGION 1		
Date:	March 16, 1994		
Format:	LETTER	No. Pgs:	3
AR No.	13.01.5	Document No.	000042

Title:	Action Items - Recommendations, Based on 3/29/94 Site Inspection.		
Addressee:	MICHAEL VEITCH - VT PUBLIC INTEREST RESEARCH GROUP, INC.		
Authors:	DAN FITZGERALD, DAVE GAGNON - ENSA, TRI-S DIVISION		
Date:	April 4, 1994		
Format:	MEMORANDUM	No. Pgs:	2
AR No.	13.01.6	Document No.	000041

Title:	Response to Initial Concerns of VPIRG Tag Group, Including Attached Analytical Results.		
Addressee:	MICHAEL VEITCH - VT PUBLIC INTEREST RESEARCH GROUP, INC.		
Authors:	EDWARD M. HATHAWAY - EPA REGION 1		
Date:	April 8, 1994		
Format:	LETTER	No. Pgs:	19
AR No.	13.01.7	Document No.	000039

Title:	Memorandum Instructing Visitors of Procedures on Visiting the Site, with Attached Schedule of Upcoming Activities.		
Addressee:	BRIAN WOODS - VT DEPARTMENT ENVIRONMENTAL CONSERVATION		
Authors:	EDWARD M. HATHAWAY - EPA REGION 1		
Date:	April 9, 1994		
Format:	MEMORANDUM	No. Pgs:	2
AR No.	13.01.8	Document No.	000038

Title:	VPIRG Tag Group Action Items Based on April 8, 1994 Conference Call.		
Addressee:	MICHAEL A. DEYLING - BALSAM ENVIRONMENTAL CONSULTANTS, INC.		
Authors:	EDWARD M. HATHAWAY - EPA REGION 1		
Date:	April 11, 1994		
Format:	LETTER	No. Pgs:	2
AR No.	13.01.9	Document No.	000036

Title:	4/08/94 BFI/Superfund Conference Call Follow-up, Concerning Installation of Perimeter Fence, Leachate Testing, and Exposed Seep.		
Addressee:	EDWARD M. HATHAWAY - EPA REGION 1		
Authors:	MICHAEL VEITCH - VT PUBLIC INTEREST RESEARCH GROUP, INC.		
Date:	April 11, 1994		
Format:	MEMORANDUM	No. Pgs:	2
AR No.	13.01.10	Document No.	000037

Title:	Follow-up Comments on Conference Call, Including Fencing, Well Monitoring, Seep Runoff on Putney Paper Lagoon Sludge Testing.		
Addressee:	EDWARD M. HATHAWAY - EPA REGION 1		
Authors:	MICHAEL VEITCH - VT PUBLIC INTEREST RESEARCH GROUP, INC.		
Date:	April 24, 1994		
Format:	MEMORANDUM	No. Pgs:	1
AR No.	13.01.11	Document No.	000035

Title:	Follow-Up on April 13, 1994 Town Meeting, Concerning the Use of Paper Sludge, Sewage Sludge, and Shredded Tires for Cap Construction.		
Addressee:	EDWARD M. HATHAWAY - EPA REGION 1		
Authors:	JSI, VPIRG		
Date:	April 26, 1994		
Format:	MEMORANDUM	No. Pgs:	2
AR No.	13.01.12	Document No.	000034

Title:	Transmittal Letter for Biomix Reports, Dioxin Testing Information, and Schedule of Site Activities.		
Addressee:	LISA A. SPENCE - ENVIRONMENTAL HEALTH SCIENCE		
Authors:	EDWARD M. HATHAWAY - EPA REGION 1		
Date:	April 28, 1994		
Format:	LETTER	No. Pgs:	1
AR No.	13.01.13	Document No.	000033

Title:	Response to VPIRG Regarding Use of Sewage Sludge.		
Addressee:	MICHAEL VEITCH - VT PUBLIC INTEREST RESEARCH GROUP, INC.		
Authors:	EDWARD M. HATHAWAY - EPA REGION 1		
Date:	May 5, 1994		
Format:	LETTER	No. Pgs:	2
AR No.	13.01.14	Document No.	000031

Title:	Summary of Private Water Supply Wells and Well Construction Details in Vicinity of DSI Landfill, with Transmittal Letter.		
Addressee:	DAVE GAGNON - ENSA, TRI-S DIVISION		
Authors:	EDWARD M. HATHAWAY - EPA REGION 1		
Date:	May 5, 1994		
Format:	MISCELLANEOUS	No. Pgs:	3
AR No.	13.01.15	Document No.	000032

Title:	Letter Expressing Concern about Sampling Event Scheduled to Occur During High Water Conditions.		
Addressee:	EDWARD M. HATHAWAY - EPA REGION 1		
Authors:	JEFFREY S. HANSEN, MICHAEL A. DEYLING - DAMES & MOORE		
Date:	May 11, 1994		
Format:	LETTER	No. Pgs:	2
AR No.	13.01.16	Document No.	000030

Title:	Letter Explaining Sampling and Analysis Procedures for CPM Mill Short Paper Fiber Material.
Addressee:	MICHAEL VEITCH - VT PUBLIC INTEREST RESEARCH GROUP, INC.
Authors:	EDWARD M. HATHAWAY - EPA REGION 1
Date:	May 16, 1994
Format:	LETTER
AR No.	13.01.17

No. Pgs: 1
Document No. 000029

Title:	Letter Regarding Posting of Signs at Disposal Specialists, Inc.
Addressee:	EDWARD M. HATHAWAY - EPA REGION 1
Authors:	DAVID W. ANDREWS, MICHAEL A. DEYLING - DAMES & MOORE
Date:	May 17, 1994
Format:	LETTER
AR No.	13.01.18

No. Pgs: 1
Document No. 000028

Title:	Update of Issues Since April 8, 1994 Conference Call and May 18, 1994 Public Meeting, Including Attached Table on SVOC Results.
Addressee:	MICHAEL VEITCH - VT PUBLIC INTEREST RESEARCH GROUP, INC.
Authors:	EDWARD M. HATHAWAY - EPA REGION 1
Date:	May 25, 1994
Format:	LETTER
AR No.	13.01.19

No. Pgs: 5
Document No. 000027

Title:	Transmittal Letter For 1993 Fact Sheets and Action Memorandum for the Landfill Cap.
Addressee:	LISA A. SPENCE - ENVIRONMENTAL HEALTH SCIENCE
Authors:	EDWARD M. HATHAWAY - EPA REGION 1
Date:	May 26, 1994
Format:	LETTER
AR No.	13.01.20

No. Pgs: 1
Document No. 000025

Title:	Letter Concerning the Use of Shredded Tires and Biomix on the BFI-Rockingham Landfill.
Addressee:	MICHAEL VEITCH - VT PUBLIC INTEREST RESEARCH GROUP, INC.
Authors:	EDWARD M. HATHAWAY - EPA REGION 1
Date:	May 26, 1994
Format:	LETTER
AR No.	13.01.21
	No. Pgs: 2
	Document No. 000026

Title:	Technical Comments Concerning the Long-Term Monitoring Plan, with Transmittal Memo Dated May 29, 1994, to Edward Hathaway, EPA Region I.
Addressee:	MICHAEL VEITCH - VT PUBLIC INTEREST RESEARCH GROUP, INC.
Authors:	LISA A. SPENCE, DAVE GAGNON, DAN FITZGERALD - JOHN SNOW INSTITUTE AND ENSA
Date:	May 30, 1994
Format:	MEMORANDUM
AR No.	13.01.22
	No. Pgs: 7
	Document No. 000023

Title:	Request for VPIRG TAG Group Response on Changes to the Biomix Proposal Which Includes Sampling and Analysis.
Addressee:	MICHAEL VEITCH - VT PUBLIC INTEREST RESEARCH GROUP, INC.
Authors:	EDWARD M. HATHAWAY - EPA REGION 1
Date:	June 3, 1994
Format:	LETTER
AR No.	13.01.23
	No. Pgs: 2
	Document No. 000021

Title:	Memorandum with Attached Table of Action Items from the Technical Assistance Grant Team for the BFI/Rockingham Landfill.
Addressee:	EDWARD M. HATHAWAY - EPA REGION 1
Authors:	MICHAEL VEITCH - VT PUBLIC INTEREST RESEARCH GROUP, INC.
Date:	June 15, 1994
Format:	MEMORANDUM
AR No.	13.01.24
	No. Pgs: 5
	Document No. 000024

Title:	Memo Concerning No Response to "Action Items from the Technical Assistance Grant Team for BFI Landfill" Memo of June 15.		
Addressee:	EDWARD M. HATHAWAY - EPA REGION 1		
Authors:	MICHAEL VEITCH - VT PUBLIC INTEREST RESEARCH GROUP, INC.		
Date:	June 22, 1994		
Format:	MEMORANDUM	No. Pgs:	1
AR No.	13.01.25	Document No.	000022

Title:	Response to List of Items to be Addressed Prior to the Start of Cap Construction.		
Addressee:	MICHAEL VEITCH - VT PUBLIC INTEREST AND RESEARCH FUND		
Authors:	EDWARD M. HATHAWAY - EPA REGION 1		
Date:	June 22, 1994		
Format:	LETTER	No. Pgs:	5
AR No.	13.01.26	Document No.	000056

13.04 COMMUNITY RELATIONS - PUBLIC MEETINGS

Title:	Summary of Public Meeting, BFI-Rockingham Landfill, Held at the Hit or Miss Club, Rockingham, Vermont.		
Date:	April 13, 1994		
Format:	PUBLIC MEETING RECORDS	No. Pgs:	9
AR No.	13.04.1	Document No.	000009

Title:	Summary of May 18, 1994 Public Meeting, BFI - Rockingham Landfill Site.		
Addressee:	EPA REGION 1		
Authors:	ARTHUR D. LITTLE, INC.		
Date:	June 24, 1994		
Format:	PUBLIC MEETING RECORDS	No. Pgs:	16
AR No.	13.04.2	Document No.	000055

Title: Summary of June 29, 1994 Public Meeting, BFI Rockingham Landfill Site, Rockingham, Vermont.
Addressee: EPA REGION 1
Authors: ARTHUR D. LITTLE, INC.
Date: August 30, 1994
Format: PUBLIC MEETING RECORDS No. Pgs: 69
AR No. 13.04.3 Document No. 000064

13.05 COMMUNITY RELATIONS - FACT SHEETS

Title: EPA Environmental News - EPA Awards a $50,000 Grant to the Vermont Public Interest Research Education Fund to Monitor Landfill Cleanup.
Authors: EPA REGION 1
Date: October 12, 1993
Format: FACT SHEET, PRESS RELEASE No. Pgs: 2
AR No. 13.05.1 Document No. 000013

Title: EPA Environmental News - EPA and VTDEC Announce Meeting for Upcoming Construction Activities at the BFI-Rockingham Landfill Superfund Site.
Authors: EPA REGION 1
Date: March 24, 1994
Format: FACT SHEET, PRESS RELEASE No. Pgs: 2
AR No. 13.05.2 Document No. 000012

Title: Superfund Program Fact Sheet, Information Update #3 - Cap Design Complete, Feasibility Study for Ground Water Under Review.
Authors: EPA REGION 1
Date: April 1994
Format: FACT SHEET, PRESS RELEASE No. Pgs: 12
AR No. 13.05.3 Document No. 000008

Title: EPA Environmental News - EPA and VTDEC Announce a Public Meeting to Discuss Residential Well Sampling and Long-Term Monitoring.
Authors: EPA REGION 1
Date: May 5, 1994
Format: FACT SHEET, PRESS RELEASE No. Pgs: 2
AR No. 13.05.4 Document No. 000011

Title: EPA Environmental News - EPA Proposes a Plan to Restore Bedrock Ground Water at the BFI-Rockingham Landfill Superfund Site.
Authors: EPA REGION 1
Date: June 15, 1994
Format: FACT SHEET, PRESS RELEASE No. Pgs: 2
AR No. 13.05.5 Document No. 000010

Section II

Guidance Documents

GUIDANCE DOCUMENTS

EPA guidance documents may be reviewed at the Region I Records Center in Boston, MA.

General EPA Guidance Documents

1. U.S. Environmental Protection Agency. Office of Water and Waste Management. Evaluating Cover Systems for Solid and Hazardous Waste, 1980. [2202]

2. "National Oil and Hazardous Substances Pollution Contingency Plan," Code of Federal Regulations (Title 40, Part 300), 1985.

3. "National Oil and Hazardous Substances Pollution Contingency Plan," Federal Register (Vol. 55, No. 46), March 8, 1990.

4. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Community Relations in Superfund: A Handbook (Interim Version) (EPA/HW-6), September 1983. [C017]

5. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Guidance on Remedial Investigations under CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) (EPA/540/G-85/002), June 1985. [C035]

6. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Guidance on Feasibility Studies under CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) (EPA/540/G-85/003), June 1985. [C034]

7. U.S. Environmental Protection Agency. Hazardous Waste Engineering Research Laboratory and Office of Emergency and Remedial Response. Covers for Uncontrolled Hazardous Waste Sites (EPA 540/2-85/002), September 1985. [2200]

8. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Superfund Federal-Lead Remedial Project Management Handbook (EPA/540/G-87/001, OSWER Directive 9355.1-1), December 1986. [2010]

9. U.S. Environmental Protection Agency. Office of Ground-Water Protection. Guidelines for Ground-Water Classification under the EPA Ground-Water Protection Strategy, December 1986. [2404]

10. U.S. Environmental Protection Agency. Office of Waste Programs Enforcement. Data Quality Objectives for Remedial Response Activities - Example Scenario: RI/FS Activities at a Site with Contaminated Soils and Groundwater (EPA/540/G-87/004, OSWER Directive 9355.0-7B), March 1987. [2102]

11. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Draft Guidance on CERCLA Compliance with Other Laws Manual (OSWER Directive 9234.1-01), November 25, 1987. [C178]

12. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Draft Guidance on CERCLA Compliance with Other Laws Manual (OSWER Directive 9234.1-01), August 8, 1988. [C169]

13. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. A Compendium of Superfund Field Operations Methods (OSWER Directive 9355.0-14), December 1987. [2100]

14. U.S. Environmental Protection Agency. Hazardous Evaluation Division. Laboratory Data Validation Functional Guidelines for Evaluating Organics, February 1, 1988. [2114]

15. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Draft Guidance on Conducting Remedial Investigations and Feasibility Studies under CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act), March 1988. [C021]

16. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Interim Final Guidance on Conducting Remedial Investigations and Feasibility Studies under CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act), October 1988. [C170]

17. U.S. Environmental Protection Agency. Hazardous Site Evaluation Division. Laboratory Data Validation Functional Guidelines for Evaluating Inorganics, July 1, 1988. [2113]

18. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) Compliance with Other Laws Manual (EPA/540/G-89/006, OSWER Directive 9234.1-01), August 1988. [3002]

19. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) (Interim Final) (EPA/540/G-89/004, OSWER Directive 9355.3-01), October 1988. [2002]

20. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Community Relations in Superfund: A Handbook (Interim Version), Chapter 6 (OSWER Directive 9230.0-3B), November 3, 1988. [7000]

21. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. User's Guide to the Contract Laboratory Program (OSWER Directive 9240.0-1), December 1988. [2119]

22. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. A Guide on Remedial Actions for Contaminated Ground Water (OSWER Directive 9283.1-2FS), April 1989. [2409]

23. U.S. Environmental Protection Agency. Office of Research and Development. Requirements for Hazardous Waste Landfill Design, Construction, and Closure (EPA/625/4-89/022), April 1989. [C171]

24. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. ARARs Q's & A's (OERR 9234.2-01FS), May 1989. [3006]

25. U.S. Environmental Protection Agency. Risk Assessment Work Group, Region I. Supplemental Risk Assessment Guidance for the Superfund Program (Draft Final) (EPA/901/5-89/001), June 1989. [C104]

26. Memorandum from Louis F. Gitto, U.S. Environmental Protection Agency Air, Pesticides, and Toxic Management Division, Region I to Merrill S. Hohman, Waste Management Division, Region I (OSWER Directive 9355.0-28), July 12, 1989 (discussing air stripper control guidance). [C110]

27. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Superfund LDR Guide #1, Overview of RCRA Land Disposal Restrictions (LDRs) (OSWER Directive 9347.3-01FS), July 1989. [2214]

28. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Superfund LDR Guide #2, Complying With the California List Restrictions Under Land Disposal Restrictions (LDRs) (OSWER Directive 9347.3-02FS), July 1989. [2215]

29. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Superfund LDR Guide #3, Treatment Standards and Minimum Technology Requirements Under Land Disposal Restrictions (LDRs) (OSWER Directive 9347.3-03FS), July 1989. [2216]

30. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Superfund LDR Guide #4, Complying With the Hammer Restrictions Under Land Disposal Restrictions (LDRs) (OSWER Directive: 9347.3-04FS), July 1989. [2217]

31. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Superfund LDR Guide #5, Determining When Land Disposal Restrictions (LDRs) Are Applicable to CERCLA Response Actions. (OSWER Directive: 9347.3-05FS), July 1989. [2218]

32. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Superfund LDR Guide #6A, Obtaining a Soil and Debris Treatability Variance for Remedial Actions. (OSWER Directive: 9347.3-06FS), July 1989. [2219]

33. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Risk Assessment Guidance for Superfund. Human Health Evaluation Manual Part A, July 1989. [5023]

34. U.S. Environmental Protection Agency. Office of Research and Development. Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments (EPA/530-SW-89-047), July 1989. [C172]

35. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) Compliance with Other Laws Manual - Part II: Clean Air Act and Other Environmental Statutes and State Requirements (EPA/540/G-89/009, OSWER Directive 9234.1-02), August 1989. [3013]

36. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. CERCLA Compliance with Other Laws Manual - RCRA ARARs: Focus and Closure Requirements (OSWER Directive 9234.2-04), October 1989. [C173]

37. "Risk Assessment Forum Report on Toxicity Equivalency Factors for Chlorinated Dibenzo-p-Dioxins and Dibenzofurans," Federal Register (Vol. 54, No. 214), November 7, 1989.

38. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. The Feasibility Study: Development and Screening of Remedial Action Alternatives (OSWER Directive 9355.3-01FS3), November 1989. [2018]

39. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Risk Assessment Guidance for Superfund - Volume I: Human Health Evaluation Manual (Part A - Interim Final) (EPA/540/1-89/002), December 1989. [C174]

40. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. CERCLA Compliance with Other Laws Manual - CERCLA Compliance with State Requirements (OSWER Directive 9234.2-05/FS), December 1989. [3009]

41. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. CERCLA Compliance with Other Laws Manual - CERCLA Compliance with the CWA and SDWA (OSWER Directive 9234.2-06/FS), February 1990. [3010]

42. "National Oil and Hazardous Substances Pollution Contingency Plan," Federal Register (Vol. 55, No. 46), March 8, 1990, p. 8666.

43. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. The Feasibility Study: Detailed Analysis of Remedial Action Alternatives (OSWER Directive 9355.3-01FS4), March 1990. [2019]

44. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. CERCLA Compliance with Other Laws Manual - Summary of Part II - CAA, TSCA, and Other Statutes (OSWER Directive 9234.2-07/FS), April 1990. [3012]

45. U.S. Environmental Protection Agency. Presumptive Remedy for CERCLA Municipal Landfill Sites (EPA-540-F-93-035, OSWER Directive 9355.0-49FS), September 1993. [C157]

46. U.S. Environmental Protection Agency. Revised Procedure for Planning and Implementing Off-Site Response Actions, 1987. [2007]

47. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. CERCLA Compliance with Other Laws (OSWER Directive 9234.1-01), 1988. [3002]

48. U.S. Environmental Protection Agency. Hydrologic Evaluation of Landfill Performance Model - Version 2.05, 1988. [C175]

49. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. CERCLA Compliance with Other Laws Part II. (OSWER Directive 9234.1-02), August 1989. [3013]

50. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Streamlining the RI/FS for CERCLA Municipal Landfill Sites (OSWER Directive: 9355.3-11FS) September 1990. [C176]

51. U.S. Environmental Protection Agency. Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites. (EPA/540/P-91/001), 1991. [C177]

52. Memorandum from Bruce M. Diamond, Director U.S. Environmental Protection Agency Office of Waste Programs Enforcement to Hazardous Waste Management Division Directors, Regions I-X, Environmental Services Division Directors, Regions I, VI, and VII, and Emergency and Remedial Response Division Director, Region II, September 27, 1993 (on Off-Site Rule Implementation, Procedures for Planning and Implementing Off-Site Response Actions). [C162]

53. U.S. Environmental Protection Agency. Office of Water. Sewage Sludge, Use and Disposal Rule, (40CFR Part 503 - - Fact Sheet (EPA-822-F-92-002), November 1992. [C163]

54. U.S. Environmental Protection Agency. Office of Wastewater Enforcement & Compliance, Municipal Technology Branch. Summary of 40 CFR Part 503, Standard For the Use or Disposal of Sewage Sludge. September 30, 1993. [C164]

55. Memorandum from John Skinner, Director U.S. Environmental Protection Agency Office of Solid Waste, to James Scarbrough, Chief Residuals Management Branch, Region IV, December 1984 (discussing RCRA Regulatory Status of Contaminated Ground Water). [C165]

56. Memorandum from Marcia E. Williams, Director Office of Solid Waste to Partick Tobin, Director Waste Management Division, Region IV, November 13, 1986 (discussing RCRA Regulatory Status of Contaminated Ground Water). OSWER 9441.1986(B3). [C166]

57. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. CERCLA Site Discharges to POTWs Guidance Manual (EPA/540/G-90/005), August 1990. [C167]

58. U.S. Environmental Protection Agency. Office of Research and Development. Technical Guidance Document, Quality Assurance and Quality Control for Waste Containment Facilities (EPA/600/R-93/182), September 1993. [C168]