Arthur D Little

Final Report for

Baseline Ecological Risk Assessment at the BFI-Rockingham Landfill Site Rockingham, VT

Submitted to:

U.S. Environmental
Protection Agency
Region I

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1.0 Introduction

This Ecological Risk Assessment (ERA) was performed for the BFI-Rockingham Landfill Superfund Site in Rockingham, Vermont under Work Assignment (WA) 23-1P86, dated July 14, 1992. ("Site" is defined below in Section 1.2.) This ERA was prepared in accordance with the following:

- Work Plan for Baseline Risk Assessment at the BFI-Rockingham Landfill, Rockingham, VT, dated August 26, 1992.
- A subsequent meeting on February 16, 1993 at which the technical approach to the ERA was revised (summarized in a March 5, 1993 memorandum from P. Rury to E. Hathaway).
- Subsequent refinements of the data reduction and risk calculation methods.
- Supplemental Risk Assessment Guidance for the Superfund Program, Part 2 - Guidance for Ecological Risk Assessments (EPA 901/5-89-001, June 1989).
- Risk Assessment Guidance for Superfund, Volume II, Environmental Evaluation Manual (EPA 540/1-89-001, March, 1989).

The ERA was conducted in coordination with both the Human Health Risk Assessment (HHRA) completed in July 1993 and remedial investigation oversight activities conducted under Work Assignment 24-1P86 by Arthur D. Little.

1.1 Objective

The primary objective of this ERA is to assess and document existing and potential ecological impacts and risks posed by site-derived contamination. A collateral objective in assessing the ecological risks is to provide an ecological context within which an evaluation of Remedial Action Alternatives can be conducted.

1.2 Site Description

The BFI Landfill Site is located in Rockingham, Vermont, on the west side of Route 5, also known as Missing Link Road (Figure 1-1). The total study area is approximately 125 acres, within which lies the 17-acre landfill and the site. The BFI Landfill Site is approximately 35 acres in size and lies between the western edge of the landfill and the Connecticut River.

Throughout this document the following terms will be used to characterize the land area being evaluated:

- *Property* - refers to the BFI Landfill property on both the east and west side of Route 5. The property is bounded by undeveloped land to the west and north, residences and undeveloped land to the northeast, the Connecticut River to the east and southeast, and residences to the south (see Figure 1-2 of the RI).

- *Study Area* - refers to the landfill on the BFI property and surrounding area of approximately 125 acres, including an area east of Route 5 extending to the Connecticut River (see Figure 1-1).

- *Site Areas* - refers to those sections of an approximate 35 acre area that consists of the landfill and downgradient receptor area between the western edge of the landfill and the Connecticut River, that receive ground and surface water contributions from the landfill, have been sampled for surface water and sediment contamination,and are evaluated in this ERA (see Figure 1-1).

1.3 Site History

The BFI Landfill Site was used as a source of material during the construction of Interstate 91. In 1968, Harry K. Sheppard, Inc. received approval to begin a municipal solid waste landfill in the area of the excavations. In 1969, Harry K. Sheppard, Inc. transferred the operation of the landfill to Disposal Specialists, Inc. (DSI). In 1973, Browning-Ferris Industries, Inc. (BFI) acquired Harry K. Sheppard, Inc. and DSI. Harry K. Sheppard, Inc. became Browning-Ferris Industries of Vermont, Inc. Browning-Ferris Industries of Vermont, Inc. (BFIVT) is a solid waste hauling company located at the site. DSI operated the landfill until the landfill ceased operation in 1991.

The site was placed on the EPA National Priorities List in October 1989. EPA entered into an Administrative Order by Consent with two parties, BFIVT and Disposal Specialists, Inc., in July 1992. This Administrative Order required the parties to perform a remedial investigation and feasibility study for the site, and to provide the data necessary for EPA to prepare human health and ecological risk assessments.

1.4 Previous Environmental Investigations

Various investigations have been conducted at the BFI Landfill. The results of these investigations are summarized below. A more detailed summary of the previous investigations is presented in Section 1.2.2 of the RI report, completed by Balsam Environmental Consultants (Balsam), dated April 26, 1993.

Shortly after the initial construction in 1968, the Vermont Agency of Environmental Conservation (VTAEC) observed a ground water seep in contact with the refuse disposed in the landfill. After the purchase by BFI, residents near the site began reporting ground water impacts presumed to be resulting from site activities. Ground water samples were collected in 1979 and found to contain elevated VOCs and metals concentrations.

After confirmation that ground water was contaminated in 1979, hydrogeologic investigations were conducted by Donald Reed, and operation plans were prepared by W.H. Moore Associates, Inc. The first hydrogeologic report by Donald Reed was completed in 1982, and the final engineering report was completed in 1983 by W.H. Moore Associates.

In 1985, an NUS/FIT Preliminary Assessment Superfund study was completed for the site and in 1987, the NUS/FIT Final Site Inspection Report was completed. Also in 1987, Haley and Aldrich, Inc. installed and sampled ground water monitoring wells, to begin a hydrogeologic study, and subsequently issued the 1986 and 1987 Annual Hydrogeologic Reports.

As a consultant to the landfill operators, Geotechnical Engineers, Inc. (GEI), sampled monitoring wells between 1988 and March 1989. In the summer of 1989, GEI, together with Dubois & King, studied the landfill for the Vermont Agency of Natural Resources Southeast Region Phase I Assessment Program.

In 1989, Balsam, as consultants to the landfill operators, began work at the site and issued the 1989 and 1990 Annual Hydrogeologic Reports. Balsam began the Remedial Investigation Report for the site after the GEI report was issued on behalf of the Vermont Department of Environmental Conservation, which included information regarding the 1989 field work for the Phase I Vermont Landfill Assessment Program.

1.5 Baseline Assumptions

The risks calculated in this document assume that ecological exposure to chemicals on the site already occurs under existing "baseline" conditions. Baseline is specifically defined for this site using the following assumptions:

- The landfill will be capped and no breaches in the cap will occur, thus precluding terrestrial ecological exposures to the landfill itself.

- Air emissions from the landfill will be controlled by a gas collection system.

- Past, current, and future risks are a result of chemical concentrations presently found on, or emanating from the site, and no natural attenuation of contaminants will occur in the future.

- The leachate interception drain constructed between the landfill site and Route 5 to collect overburden leachate flowing towards the seeps and the Connecticut River does not exist. This will permit past and potential ecological risks to be estimated, respectively, for those periods prior to installation of the new leachate interception system and future, worst-case scenarios of system dysfunction.

- Bedrock ground water will continue to transport contaminants at current levels and rates.

The baseline assumption that the landfill will be capped is consistent with the EPA Guidance for Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites (EPA/540/P-91/001), which will be referred to as the "landfill guidance." The landfill guidance allows for the baseline assumption of capping if preliminary ground water data demonstrate that remedial action at the site will be necessary. This assumption also permits the streamlining of the field investigations and risk assessment because it is not necessary to quantify long-term ecological risks from exposures to surface water, soil, and sediment *within* the landfill. Since this streamlining approach does not apply to exposure pathways outside the landfill, including the seeps and river areas, potential ecological exposure pathways in these areas have been considered.

1.6 Organization of Report

This Ecological Risk Assessment Report is organized into the following sections:

- Section 2.0 - Site Characterization and Ecological Receptors: a description of the physical, biological, and ecological features of the BFI-Rockingham Landfill Superfund Site.

- Section 3.0 - Hazard Identification: a review of the site contamination assessment data for each sampling location or group of locations (i.e., seeps), presented in the RI.

- Section 4.0 - Exposure Assessment: a description of the exposure pathways and scenarios evaluated for the potentially affected community.

- Section 5.0 - Toxicity Assessment: a summary of the ecotoxicological research conducted, data reviewed, endpoints selected for use in the toxicity assessment, and rationale for endpoint selection.

- Section 6.0 - Risk Characterization: a summary of the potential ecological risks both for pelagic and benthic aquatic communities, and for sediment dwelling biota of the seeps and floodplain wetlands. A comparison of risk quotients, calculated using Balsam's data and ADL's data was made for locations from which split samples were analyzed. The highest of these risk quotients was selected as a basis for the interpretation and discussion of ecological risks for each exposure zone. This risk characterization is based on:

  - A quantitative analysis

  - Identification and discussion of the most significant COCs influencing the risk estimates

  - The spatial distribution of these risks

  - Their qualitative ecological significance at the organismal, population, species, and community levels of ecosystem integration

Also included is a reassessment of those conclusions of the Draft ERA that were based upon the presumed functional effectiveness of the interceptor trench. This reassessment is based on a review of data from surface water and sediment samples collected by Balsam in August/September, 1993 and split with Arthur D. Little. The

validated Balsam analytical results and the unvalidated Arthur D. Little results for the August/September, 1993 sampling were compared with the corresponding maximum compound concentrations from the 1991 and 1992 Balsam data.

- Section 7.0 - Uncertainty Analysis: a summary of the key site contamination and ecotoxicological data gaps, as well as any weaknesses in the information, assumptions, exposure scenarios, and methods used in the risk assessment, that collectively influence data interpretation and conclusions about ecological risks.

Tables and Figures appear at the end of each section within which they are first cited. Appendices include more detailed supporting documentation drawn upon during the ERA and cited in the text of the main report.

Raw data for 1991 and 1992, from which data summaries presented here were derived, appear in the RI. Supplemental raw data from Balsam and ADL sampling events in 1993, which were reviewed to reassess the results and conclusions originally presented in the Draft ERA report, dated October 18,1993, prior to their incorporation into this Final ERA Report, appear in Appendix E.

Section 1
Tables and Figures

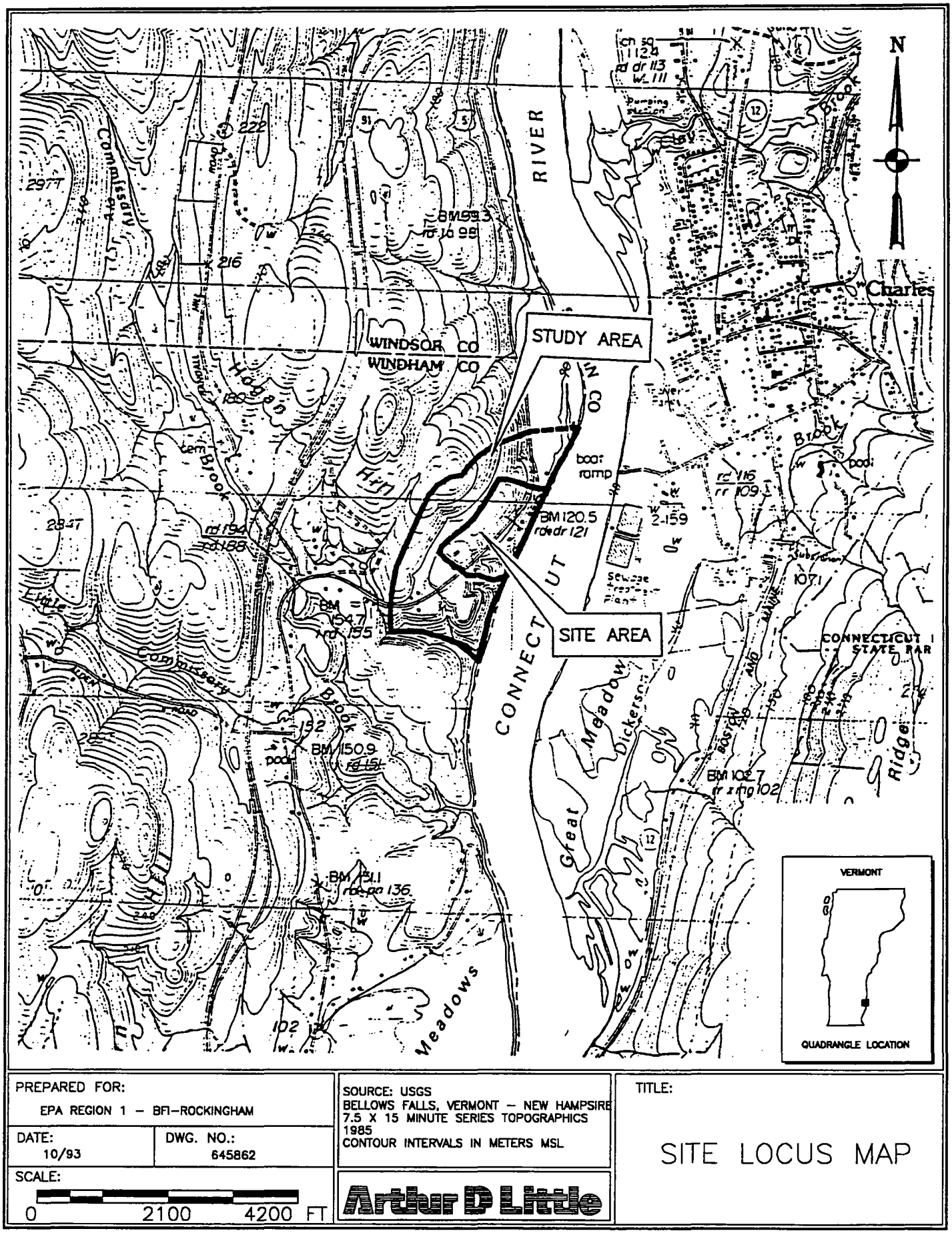
STUDY AREA
SITE AREA
WINDSOR CO
WINDHAM CO
CONNECTICUT RIVER
Great Meadows
Dickerson Ridge
Commissary Brook
Hobbs Brook
BM 120.5
BM 154.7
BM 150.9
BM 131.1
BM 102.7
boat ramp
Sewage treatment Plant
CONNECTICUT STATE BAR
VERMONT
QUADRANGLE LOCATION
N
PREPARED FOR:
EPA REGION 1 – BFI–ROCKINGHAM
DATE: 10/93
DWG. NO.: 645862
SCALE:
0 2100 4200 FT
SOURCE: USGS
BELLOWS FALLS, VERMONT – NEW HAMPSIRE
7.5 X 15 MINUTE SERIES TOPOGRAPHICS
1985
CONTOUR INTERVALS IN METERS MSL
Arthur D Little
TITLE:
SITE LOCUS MAP

Figure 1-1

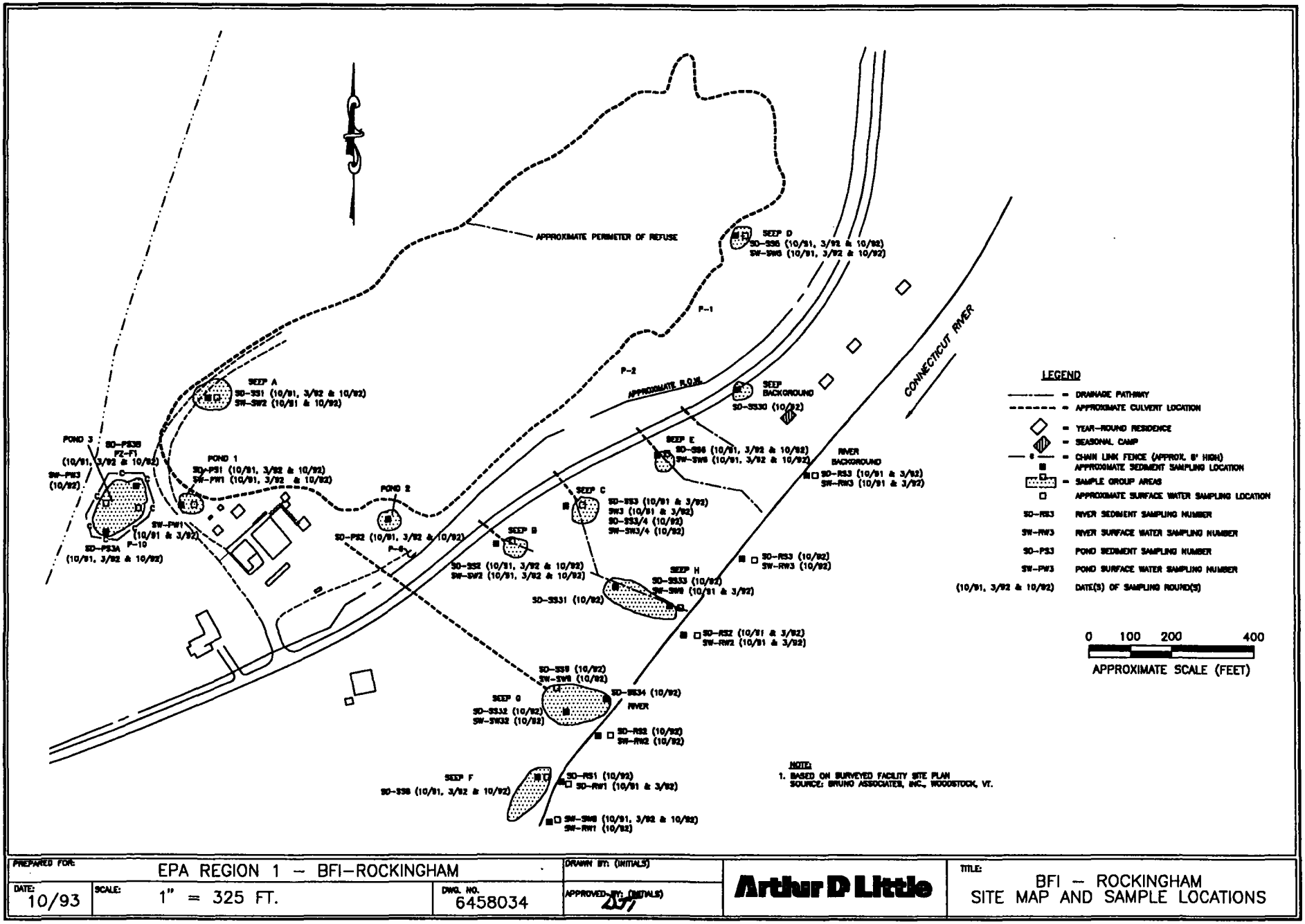
APPROXIMATE PERIMETER OF REFUSE
SEEP A
SD-SS1 (10/91, 3/92 & 10/92)
SW-SW2 (10/91 & 10/92)
POND 3
SD-PS3B
FZ-F1
(10/91, 3/92 & 10/92)
SW-PW3
(10/92)
POND 1
SD-PS1 (10/91, 3/92 & 10/92)
SW-PW1 (10/91, 3/92 & 10/92)
SW-PW1
(10/91 & 3/92)
P-10
SD-PS3A
(10/91, 3/92 & 10/92)
POND 2
SD-PS2 (10/91, 3/92 & 10/92)
P-6
P-1
P-2
APPROXIMATE FLOW
SEEP D
SD-SS6 (10/91, 3/92 & 10/92)
SW-SW6 (10/91, 3/92 & 10/92)
SEEP BACKGROUND
SD-SS30 (10/92)
SEEP E
SD-SS6 (10/91, 3/92 & 10/92)
SW-SW6 (10/91, 3/92 & 10/92)
RIVER BACKGROUND
SD-RS3 (10/91 & 3/92)
SW-RW3 (10/91 & 3/92)
CONNECTICUT RIVER
SEEP C
SD-SS3 (10/91 & 3/92)
SW3 (10/91 & 3/92)
SD-SS3/4 (10/92)
SW-SW3/4 (10/92)
SEEP B
SD-SS2 (10/91, 3/92 & 10/92)
SW-SW2 (10/91, 3/92 & 10/92)
SEEP H
SD-SS33 (10/92)
SW-SW8 (10/91 & 3/92)
SD-SS31 (10/92)
SD-RS3 (10/92)
SW-RW3 (10/92)
SD-RS2 (10/91 & 3/92)
SW-RW2 (10/91 & 3/92)
SD-SS9 (10/92)
SW-SW8 (10/92)
SD-SS34 (10/92)
RIVER
SEEP G
SD-SS32 (10/92)
SW-SW32 (10/92)
SD-RS2 (10/92)
SW-RW2 (10/92)
SEEP F
SD-SS8 (10/91, 3/92 & 10/92)
SD-RS1 (10/92)
SD-RW1 (10/91 & 3/92)
SW-SW8 (10/91, 3/92 & 10/92)
SW-RW1 (10/92)
LEGEND
= DRAINAGE PATHWAY
= APPROXIMATE CULVERT LOCATION
= YEAR-ROUND RESIDENCE
= SEASONAL CAMP
= CHAIN LINK FENCE (APPROX. 8' HIGH)
APPROXIMATE SEDIMENT SAMPLING LOCATION
= SAMPLE GROUP AREAS
APPROXIMATE SURFACE WATER SAMPLING LOCATION
SD-RS3 RIVER SEDIMENT SAMPLING NUMBER
SW-RW3 RIVER SURFACE WATER SAMPLING NUMBER
SD-PS3 POND SEDIMENT SAMPLING NUMBER
SW-PW3 POND SURFACE WATER SAMPLING NUMBER
(10/91, 3/92 & 10/92) DATE(S) OF SAMPLING ROUND(S)
0 100 200 400
APPROXIMATE SCALE (FEET)
NOTE:
1. BASED ON SURVEYED FACILITY SITE PLAN SOURCE: BRUNO ASSOCIATES, INC., WOODSTOCK, VT.
PREPARED FOR: EPA REGION 1 - BFI-ROCKINGHAM
DRAWN BY: (INITIALS)
DATE: 10/93
SCALE: 1" = 325 FT.
DWG. NO. 6458034
APPROVED BY: (INITIALS)
Arthur D Little
TITLE: BFI - ROCKINGHAM SITE MAP AND SAMPLE LOCATIONS

Figure 1-2

Section 2

2.0 Site Characterization and Ecological Receptors

2.1 Physical Setting

A comprehensive description of the geology, topography, soils, and hydrology of the BFI Landfill Site appears in the RI Report. Topography of the BFI Landfill Site and surrounding study area is illustrated in the Site Plan in Appendix D. Those geological, topographic, soil, and hydrologic features most pertinent to ecological exposure to site-derived contaminants are summarized below.

2.1.1 Topography

The landfill is located on a glacial terrace in an area of generally steep topography. The land surface drops steeply toward the Connecticut River located approximately 500 feet to the east-southeast of the landfill. The Connecticut River flows from north to south in this well-defined valley.

Relief between the base of the landfill and the Connecticut River ranges from approximately 460 feet mean sea level (MSL) to 290 feet MSL respectively. The top of the landfill is about 550 feet MSL (see Appendix D).

2.1.2 Buildings and Storm Drains

Various structures on the site include an office garage, a maintenance garage, sheds, and other structures used for the gas extraction system. Other structures not on BFI property, but potentially affected by the presence of the landfill, are primarily residences. For additional site layout and storm water management detail, see Figure 1-3 of the RI (Balsam, 1993).

The site surface water drainage system is controlled through the following man-made and naturally occurring mechanisms:

- Three retention ponds, hereafter referred to as Ponds 1, 2, and 3
- A storm drain
- Several shallow ditches and culverts

Pond 1 is located in the southwest corner of the site, and receives runoff from the northwest landfill face and nearby hillside via a swale at the toe of the landfill. When Pond 1 overflows the surface water drains into Pond 3. Pond 2 is located to the east of the offices, and receives runoff from the southeast face of the landfill via a swale/drainage ditch. Drainage from Pond 2 is combined with stormwater from

facility roadways and a parking lot at a six-foot diameter stormwater manhole. The collected surface water is transported through a corrugated pipe under Route 5 and discharges approximately 50 feet from the Connecticut River. Pond 3, the largest of the ponds, is located in the southwest corner of the site near Pond 1. In addition to receiving overflow from Pond 1, Pond 3 also receives direct surface water inflow from the northwest face of the landfill through a polyethylene drainage ditch. There is no observed outlet from Pond 3; water is lost through infiltration into the surface soils and evapotranspiration.

Surface water from the face of the landfill, along Route 5, is transported in sheet flow to a drainage ditch on the west side of Route 5. The drainage ditch then discharges to four culverts that conduct the water under Route 5. The culverts discharge the water to various swales, ravines, and gulleys leading to the Connecticut River, through areas referred to in the RI as Seeps B, C, E, F, G, H, and Seep Background.

2.1.3 Vegetative Cover Types

As described in the RI report, a northern hardwood-hemlock forest surrounds the landfill area. The overstory of this forest consists of Birch (*Betula spp.*), Northern Red Oak (*Quercus rubra*), beech (*Fagus grandifolia*) and Canadian Hemlock (*Tsuga canadensis*). The understory is comprised of Striped Maple (*Acer pennsylvanicum*), Hazelnut (*Corylus sp.*), saplings of canopy trees and woodland ferns. In open areas, cleared for trucks and machinery, grasses, sedges, Poplar (*Populus spp.*), and early successional stages of the hardwood-hemlock forest occur.

2.1.4 Hydrogeology

Surficial geologic features are of greatest concern at this site in assessing risks to ecological receptors, in that they influence the rate and extent of contaminant migration from the landfill into both the onsite ponds and the riverine ecosystem located downgradient, where ecological exposures can occur. The overburden and deep bedrock geology are critical transport mechanisms, in that the ground water contaminant plumes migrating within these layers are the primary conduit to the seeps, floodplain and river ecosystem located downgradient. The rate of migration in these layers is determined by rainfall infiltration into and ground water flow through the landfill. By capping the landfill the significance of this migration pathway will be minimized.

Two distinct water-bearing formations, overburden and bedrock, have been identified between the landfill and the Connecticut River. The overburden water-bearing formation ranges in thickness from zero feet beneath the northeast and northwestern sides of the landfill, to 200 feet just south of the landfill. The overburden consists of

silt, sandy silt, and varved clays. Bedrock, the second water-bearing formation, consists primarily of black-gray phyllite and slate, with NNE and NNW oriented foliation. No large scale faults have been identified in the immediate area. The overburden ground water flows towards the Connecticut River, but discharges along the top of the ravines into seeps. Overburden hydraulic conductivity ranges from 4.3×10^{-5} cm/sec to 1.3×10^{-4} cm/sec in the shallow overburden, decreasing to 7×10^{-6} cm/sec in the deeper overburden. The bedrock ground water also flows toward and discharges to the Connecticut River. Bedrock hydraulic conductivity ranges from 1.3×10^{-2} cm/sec to 1.6×10^{-6} cm/sec.

2.1.5 Surface Water Hydrology

The RI has described the surface water hydrology at three levels of integration: regional, intermediate, and local. The regional watershed is drained by one of the major waterways of New England, the Connecticut River. The Connecticut River basin encompasses approximately 11,250 square miles, within which the topography was geologically determined by underlying bedrock morphology.

The intermediate hydrologic system consists of approximately 225 acres of watershed. This small drainage basin is bound on the north and west by steep topography, to the south by an unnamed tributary to the Connecticut River, and to the east by the Connecticut River.

The local catchment is characterized by shallow ditches, storm drains and retention ponds that conduct overland flow to the Connecticut River. A detailed description of the surface water hydrology is found in Section 3.1 of the RI.

2.1.5.1 Surface Water Resources Three classifications of surface water resources are present on the site area and shown in Figure 1-2. These are:

- *Ponds* -- Three retention ponds totaling an area less than 1 acre are located on the site. Pond 1, the smallest of the three ponds and located approximately 150 feet northwest of the garage, is not a permanent surface water body. Pond 2, located approximately 350 feet north-east of the garage, is also not permanently flooded. Pond 3, the largest and only permanent surface water body onsite, is located approximately 250 feet west of the garage. Both fish and frogs have been observed in Pond 3, which appears to have no surface water outlet.

- *Seeps* -- Nine ground water "seeps" are located within the site area. Seeps A and D are located west of Route 5; Seeps B, C, E, and H are located south of Route 5 along a steep slope leading to the river; and Seeps F and G are located south of Route 5 and at the base of slope along the Connecticut River. The outermost

upgradient seep, designated *Seep Background,* is located south of Route 5 between Seeps D and E. The seeps are areas with combined surface water runoff, and outbreaks of either overburden ground water, deep bedrock ground water, or a combination of the two ground water sources.

- *River* -- The Connecticut River flowing from north to south is the most important aquatic ecosystem and surface water resource.

The surface water and sediment sample locations, identified for these three resource types are presented in Table 2-1 and are shown on Figure 1-2 and on the site plan of Appendix D.

2.1.6 Water Quality

Conventional surface water chemistry data for the ponds, seeps and river are summarized in Table 2-33 of the RI. This discussion is provided for descriptive purposes only, as part of the site ecological characterization. Insights regarding the general water quality conditions and relative extent of eutrophication of the ponds and river also could provide a useful context within which to assess surface water-mediated risks. However, a complete suite of water quality parameters was not collected at the surface water locations. Moreover, the most comprehensive analysis was conducted at seep surface water locations rather then in true aquatic habitats of the ponds or river. Only hardness, color, temperature, pH, and specific conductance were recorded for the pond and river water. Therefore, an evaluation of the water quality in these more ecologically significant, aquatic habitats of Pond 3 and the Connecticut River is not possible at this time. This precludes any evaluation of the degree to which existing stress to aquatic biota of the study area is the consequence of site-derived contaminants, as opposed to eutrophication-induced water quality problems (e.g., bass introduced to Pond 3 reportedly died, while the catfish survived - bass are more sensitive to water temperature). Since the discussion that follows on the water quality of the seeps is based on standards developed for aquatic communities. It represents a conservative approach of the potential for effects of seep discharge in the river, and it is only directly relevant for those seeps that are seasonally flooded and/or contribute nutrient loads to permanent aquatic habitats. Each of the following discussions begins with a summary of relevant water quality parameter criteria.

Many water bodies are phosphorous or nitrogen limited, that is the plant growth rate is limited by the availability of these nutrients, therefore, the introduction of these nutrients greatly increases the rate of eutrophication. Phosphorous is of greatest concern, even in the absence of nitrogen, since it promotes blooms of toxic freshwater blue-green algae (Family Cyanophyceae) which are nitrogen fixers.

Although EPA has not established a freshwater AWQC for total phosphorous, the following rationale has been presented to support criterion development. The concentration of total phosphorous should not exceed 100 ug/L in a flowing stream that does not discharge to a lake or reservoir, 50 ug/L in any stream entering a lake or reservoir, or 25 ug/L within a lake or reservoir. These concentrations are set to prevent the development of biological nuisances, that will compete with the existing community for available resources, and to reduce cultural eutrophication. Analytical data for total phosphorus were collected at the three seep locations B, C, and D. The average level of total phosphorus in these seeps is 560 ug/L, a value that is five times the eutrophication guideline for prevention of plant nuisances in a flowing stream. A maximum value of 1,300 ug/L of phosphorous was reported from Seep C.

The EPA has not established a criterion or presented a reference value with respect to ecological toxicity for total nitrogen. A health-based value for nitrate and nitrites in drinking water sources is not applicable to the seep surface water.

When assessing ecological risks water hardness is one of the most significant water quality parameters. The toxicity for several inorganics (e.g., copper, cadmium, and zinc) are inversely proportional to the hardness of the water, that is as water hardness increases toxicity decreases. Hardness, for most purposes, can be represented as the sum of calcium and magnesium concentrations and is most often expressed in terms of mg/L as $CaCO_3$. A water hardness of less than 50 mg/L is considered soft and a water hardness of greater than 300 mg/L is considered hard. The range of water hardness at the BFI Landfill Site varied among the ponds, seeps, and river. The hardest water was collected from seeps where values ranged from 226-2,220 mg/L, followed by the ponds, 23-440 mg/L, and the softest water was collected from the river 36-132 mg/L. Toxicity values for hardness-dependent inorganics were computed assuming a water hardness of 50 mg/L, which roughly corresponds to the average hardness reported for the Connecticut River. Therefore, aquatic ecological risks computed for those hardness-dependent inorganics detected in the seeps may be overestimated, for any aquatic biota inhabiting these seeps, except under seasonal conditions when river flood waters reach these seep locations. Therefore, during such flooding events, this conservative approach is protective of the biota in the Connecticut River.

Chemical Oxygen Demand (COD), used to determine the organic material content of water, is a measure of the total amount of oxygen required for the chemical oxidation of organic matter in water. COD in the seeps at the site ranged from 175 to 5,530 mg/L, with an average COD of 1,904 mg/L. Since an acceptable range of COD has not been established by EPA (there is no AWQC for COD), and data on dissolved oxygen (DO; AWQC=5 mg/L) were not collected for this site, no inferences can be

made as to potential seep contribution to oxygen deficiency stresses in biota of the Connecticut River. Domestic wastewater is considered "weak" at concentrations below 250 mg/L, of "medium" strength at concentrations below 500 mg/L, and "strong" at concentrations above 1,000 mg/L (Benefield and Randall, 1980). Although elevated COD levels in seep water may influence oxygen levels in the mixing zone where seep discharges enter the river, available data on ambient water quality and aquatic communities in the river do not permit an assessment of the potential for seep-induced COD stresses.

Surface water pH, a measure of hydrogen ion concentration, can affect both the bioavailability and toxicity of contaminants by shifting the solubility of metals and the degree of dissociation of weak acids and bases. Toxicity may be reduced by both increases and decreases in pH, depending on the reactions involved. The AWQC for pH for the protection of freshwater aquatic life ranges from 6.5 to 9. The surface water pH varied among the ponds, seeps, and river water, with pH ranges of:

- 5.9 to 7.6 in the retention ponds
- 5.6 to 11.2 in the seep discharges
- 6.2 to 7.8 in the Connecticut River

As compared with the freshwater AWQC for pH, water of the retention ponds and seeps ranges from acceptable to suboptimal. The surface water pH of the Connecticut River falls within the preferred range.

Associated with pH is alkalinity, a measure of the buffering capacity of the surface water or the ability of the water to prevent changes in pH. The alkalinity AWQC for the protection of freshwater aquatic life is a minimum of 20 mg/L. The alkalinity at all surface water sampling locations exceeds this value.

2.2 Ecological Overview of Site and Study Area

The site area evaluated in this ERA includes terrestrial, wetland, and freshwater aquatic ecosystems from which sediment and/or surface water samples were collected. Only those terrestrial, non-landfill habitats that contain ground water seeps and/or intermittent surface water runoff channels, are considered as possible exposure zones in this ERA. Such areas are confined to the forested slopes between Route 5 and the Connecticut River. However, these seeps and intermittent streams from which surface water and/or sediments were collected are evaluated in this ERA as aquatic microhabitats, located within this terrestrial forest.

The only vegetated wetland habitats evaluated in this ERA are those found along the western floodplain of the Connecticut River, between the river's banks and toe of the forested slopes east of Route 5. Portions of these wetlands receive surface water and silt deposits from the seeps and intermittent streams of the forested slopes.

Freshwater aquatic habitats evaluated include the intermittently (Ponds 1 and 2) or permanently (Pond 3) flooded retention ponds associated with the landfill. The only other aquatic ecosystem evaluated is the open water habitat of the Connecticut River. This ecosystem contains shallow areas along its west bank that are dominated by water lilies (family Nymphaeaceae) and other aquatic macrophytes, as well as flowing, deeper water river habitat.

2.2.1 Floristic Diversity

The major habitats of the site and study area can be classified floristically as follows:

- Terrestrial Habitats
  - Canadian Hemlock/Northern hardwood forests
  - Relatively open, shrub-dominated woodlands
  - Herbaceous cover types occurring on the landfill surface

- Vegetated Wetland Habitats
  - Shallow, seasonally flooded marsh and shrub/wooded swamps of the Connecticut River floodplain

- Freshwater Aquatic Habitats
  - Manmade retention ponds located onsite
  - Open water habitat of Connecticut River
  - Intermittent streams on forested slopes between Route 5 and the river

The dominant plant species found in these various types of study area habitats were identified in the Draft Ecological Risk Assessment Report prepared by Balsam (Balsam ERA) (see Appendix A), but detailed species inventories for each sampling location were not prepared. However, relatively high diversity of tree, shrub, and herbaceous plant species is found in the ERA study area of only about 500 feet between Route 5 and the Connecticut River, due to the combined presence of terrestrial, wetland, and aquatic habitats, and associated moisture gradient.

Field observations by Arthur D. Little on July 27, 1992 and September 28, 1993 confirmed the accuracy of the floristic overview provided by Balsam, for the area between Route 5 and the Connecticut River (see field notes and photographs of Appendices B and C). As described by Balsam for this area, the dominant coniferous

tree is Canadian Hemlock (*Tsuga canadensis*), which occurs either in nearly pure stands on ridges and north-facing slopes, or growing among a mixture of hardwood trees, among which no single species appears dominant. Slope aspect, thus, is a key determinant of the distribution and relative dominance of the hemlock in this area. Understory saplings of canopy trees (i.e., transgressives), shrubs, and the species composition of the herbaceous flora all indicate mesic (moist) soil conditions throughout the year. Even areas of exposed silt and clay associated with landslides have significant growth of mosses, indicating moisture availability. No significant or unusual symptoms of vegetative stress were observed within this forest habitat, although normal stress symptoms such as insect damage were evident.

2.3 Faunal Overview of Site and Study Area

2.3.1 Faunal Habitat Value

The Canadian Hemlock/Northern Hardwood forest on the slopes between Route 5 and the Connecticut River is expected to provide very good wildlife habitat to a variety of vertebrates, due to the occurrence of upland forest, floodplain marsh, shallow aquatic plant communities, and deeper water river habitat over a horizontal distance of only a few hundred feet. However, due to the hydrology and substrate conditions of the seeps and their erosional gullies, in which neither surface water pools nor riffle habitat are found, these seep areas offer little if any habitat for aquatic biota such as invertebrates, fish or amphibians. All of these "seep" areas have intermittent, clay-bottom stream channels within these gullies, that lack sand and gravel, riffle-type niches and thus are unlikely to support any significant invertebrate fauna. Amphibian populations are presumed absent from the seeps, with the possible exception of forest-dwelling species such as newts, salamanders, and toads that are known to inhabit mesic forests with significant amounts of intermittent or perennial surface runoff. During periods of river flooding, however, the lower reaches of these erosional gullies would likely become inundated, thus giving aquatic species from the river temporary access to these seep sampling locations.

2.3.2 Faunal Diversity

Based on the local and regional wildlife and wildlife habitat features and data occurrences reported in Balsam's Draft Ecological Risk Assessment (see excerpt in Appendix A), the Canadian Hemlock/Northern Hardwood forest, vegetated wetland (in river floodplain), and freshwater aquatic habitats might be capable of supporting up to 170 different species of amphibians, birds, mammals, and reptiles. However, no site-specific faunal surveys were conducted by Balsam, nor by previous investigators of the site.

The report prepared by Balsam infers potential faunal biodiversity within the study area from observations on similar habitat and literature reviews. The total diversity of fauna estimated for the study area estimated by Balsam includes:

- 26 genera and 38 species of fish (Appendix A - Table 2-2)
- 24 genera and 31 species of reptiles and amphibians (Appendix A - Table 2-1)
- 56 genera and 64 species of birds (Appendix A - Table 2-1)
- 32 genera and 37 species of mammals (Appendix A - Table 2-1)

This fauna includes a total of 138 genera and 170 species of vertebrates that were observed or are expected to inhabit the study area.

In addition, invertebrates reported from the Connecticut River, by Aquatic (1990, 1992) include:

- 81 genera and 90 species of benthic invertebrates (Appendix A - Table 2-6)
- 22 genera and 28 species of zooplankton (Appendix A - Table 2-4)

No inferences were made by Balsam concerning invertebrate or vertebrate fauna expected to inhabit the intermittent stream and associated "seeps" between Route 5 and the Connecticut River.

2.4 Selection of Indicator Species

Indicator species are selected to represent toxicologically sensitive species, those likely to receive large doses of contaminants, and in some cases those that were observed or anticipated to occur onsite in large numbers. However, the focus of this ERA is on risks to entire communities of invertebrates, amphibians, and fish at each sampling location. Therefore, indicator species from these communities were not selected as part of the site characterization task. COC uptake and ingestion risks were not evaluated for birds and mammals in this ERA since the streamlined risk assessment process for landfills eliminates the need for food-chain modeling, and exposures through pathways other than the seeps, intermittent streams, wetland, and river are expected to be minimal.

2.5 Visible Symptoms of Biological or Ecological Stress

No obvious symptoms of vegetation or faunal stress were observed onsite or in the larger study area during those field activities or site walkovers reported in the RI report. Although, during a site visit by Arthur D. Little in July of 1992, BFI personnel reported having found a dead, newborn white-tailed deer (*Odocoileus*

virginicus), at the edge of the landfill. However, visual inspection of dominant vegetation along the Connecticut River floodplain adjacent to Seeps F, G, and H, and at these seeps revealed only normal levels of plant stress, such as insect damage to leaves.

2.6 Trustee Resources and Endangered Species

Trustee resources found onsite include vegetated wetlands and associated surface waters that are protected as "waters of the United States" under Section 404 of the Clean Water Act (33 USC 1344). Wetlands and their associated floodplains also receive federal protection, respectively, under Executive Orders 11990 and 11988 issued by President Carter in 1977. Wetlands also are afforded protection by the federal "no net loss" policy for wetlands, set forth in a 1990 Memorandum of Agreement between the EPA and Corps of Engineers (COE). Vegetated wetlands on-site include the herbaceous flora of Pond 1, whereas, those found south of Route 5 are confined to the floodplain and banks of the Connecticut River.

Faunal trustee resources known or expected to inhabit or use the site, which fall under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS), include migratory waterfowl, while furbearers such as Mink (*Mustela vison)* or Muskrat (*Ondatra zibethicus*) are state trustee species. Atlantic Salmon (*Salmo salar)*, a freshwater anadromous fish species qualifies as a trustee resource protected jointly by the National Oceanic and Atmospheric Administration (NOAA) and USFWS. Trustee resources of the National Marine Fisheries Service, such as commercial fish/shellfish and marine mammals, are absent from the site.

Balsam, in their ERA, reported, based on consultations with the U.S. Fish and Wildlife Services, Vermont Department of Fish and Wildlife, and Vermont Nongame and Natural Heritage Program, that there are no known significant natural communities of rare, threatened, or endangered plant or animal communities within one-half mile of the BFI Landfill Site. However, transient Bald Eagles (*Haliaeetus leucocephalus)* and Osprey (*Pandion haliaetus*) may fly along the Connecticut River in the Rockingham area and could possibly prey on fish of the river. The Federally endangered Barbed-bristle Bulrush (*Scirpus ancistrochaetus*) has been found along the Connecticut River in the town of Rockingham, within a three-mile radius of the landfill. In 1987, this species was identified 1.7 miles south of the landfill by NUS. Field observations in potential floodplain marshes along the river, made by Arthur D. Little on September 28, 1993 did not reveal any onsite occurrences of this bulrush.

2.7 Economically Important Species

Economically important species known or thought to inhabit the site and study area include fish, such as the Atlantic Salmon, Rainbow, Brown and Brook Trout, and furbearers, such as the Eastern Mink. However, no commercial exploitation of these resources is known to occur in the study area.

Section 2
Tables and Figures

Table 2-1
Sample Group Areas Sediment and Surface Water Samples
BFI-Rockingham, Inc., Rockingham, Vermont

Sample Group Areas	Sample Group Medium	Sample Numbers
River Background	River Surface Water	SW-RW3
	River Sediment	SD-RS3 [1]
River	River Surface Water	SW-RW1
	River Surface Water	SW-RW2
	River Sediment	SD-RS1 [2]
	River Sediment	SD-RS2 [3]
Pond 1	Pond Surface Water	SW-PW1
	Pond Sediment	SD-PS1 [4]
Pond 2	Pond Sediment	SD-PS2 [5]
Pond 3	Pond Surface Water	SW-PW3
	Pond Sediment	SD-PS3 [6]
Seep Background	Seep Sediment	SD-SS30
Seep A	Seep Surface Water	SW-SW1
	Seep Sediment	SD-SS1
Seep B	Seep Surface Water	SW-SW2
	Seep Sediment	SD-SS2
Seep C	Seep Surface Water	SW-SW3
	Seep Surface Water	SW-SW4
	Seep Surface Water	SW-SW3/4
	Seep Sediment	SD-SS3
	Seep Sediment	SD-SS4
	Seep Sediment	SD-SS3/4
Seep D	Seep Surface Water	SW-SW5
	Seep Sediment	SD-SS5
Seep E	Seep Surface Water	SW-SW6
	Seep Sediment	SD-SS6
Seep F	Seep Surface Water	SW-SW8
	Seep Sediment	SD-SS8
Seep G	Seep Surface Water	SW-SW9 [7]
	Seep Surface Water	SW-SW32
	Seep Sediment	SD-SS9
	Seep Sediment	SD-SS32
	Seep Sediment	SD-SS34
Seep H	Seep Surface Water	SW-SW9 [7]
	Seep Sediment	SD-SS31
	Seep Sediment	SD-SS33

Notes:

[1] SD-RS3 includes samples SD-RS3A, SD-RS3B, and SD-RS3C
[2] SD-RS1 includes samples SD-RS1A, SD-RS1B, and SD-RS1C
[3] SD-RS2 includes samples SD-RS2A, SD-RS2B, and SD-RS2C
[4] SD-PS1 VOC results include samples SD-PS1A, SD-PS1B, SD-PS2C, and SD-PS1D
[5] SD-PS2 VOC results include samples SD-SP2A, SD-PS2B, SD-PS2C, and SD-PS2D
[6] SD-PS3 VOC results include samples SD-PS3A and SD-PS3B
[7] The designation SW-SW9 was used for two discreet locations during separate sampling rounds.

Section 3

3.0 Hazard Identification

The hazard identification process identifies those contaminants detected at concentrations that are expected to contribute to the majority of the risk at the site. The historic waste disposal practices at the BFI Landfill Site have resulted in soil, ground water, sediment, and surface water contamination by a variety of contaminants. Landfill gas is currently controlled by an active gas collection system, permitted by the State of Vermont, and burned in a flare. Assessment of air exposure risks to ecological receptors was not performed.

Although the following site contamination data were previously compiled in the RI (Balsam, 1993), it is briefly provided here as a basis for evaluating ecological risks. The analytical data summaries of chemical contamination at the BFI Landfill Site, prepared by Balsam and used by Arthur D. Little are included in Tables 3-1 through 3-16. Average and maximum concentrations are presented, as well as the frequency of detects and the location of maxima. These data summaries were provided by Balsam on diskette, and have been recompiled to present risks of potential ecological exposure to chemicals in surface water and sediment at the BFI Landfill Site. The site was delineated into various zones for surface water and sediment sampling by Balsam, and the corresponding data for each zone were reduced and compiled into statistical summaries provided in Tables 3-1 through 3-16. The summaries have been presented for the Round 1, 2, and 3 sampling events performed by Balsam, as well as for the Round 3 oversight sampling conducted by Arthur D. Little.

Detailed accounts of spatial contamination patterns are provided in the RI Report. Discussions presented here focus primarily on the nature and levels of surface water and sediment contamination, site-wide average and maximum contamination levels, as well as the spatial patterns of sediment and surface water contamination, including localized areas of elevated concentration levels.

3.1 Extent of Contamination

Ecological exposures to contaminants in soil and air were not evaluated, since it is assumed that the contaminated soils are and will remain confined below the current landfill cover, so that current and future exposure to these soils will be prevented. It is also assumed that the landfill gas collection system will adequately control current gas emissions, and that these emissions are unlikely to pose an ecological risk. No terrestrial soil samples were collected from the landfill area for chemical analysis. The following discussion, therefore, summarizes only the contamination data for ground water, surface water, and sediments.

3.1.1 Air

Since the landfill has a gas collection system and the landfill will be capped, air emissions from the landfill surface will be minimal. Since air emissions are currently controlled and the landfill cap will change the conditions for the release of landfill gas, a post-capping landfill gas evaluation may be necessary to confirm that no unacceptable ecological exposures will occur after the cap is installed.

3.1.2 Soil

The only contaminated soils associated with the BFI site are those beneath the landfill cap. They are, therefore, the only soils available for potential contaminant exposure. However, given the assumptions that the landfill is capped and that no breaches in this cap will occur, potential ecological exposure to these soils will be prevented. If, for some reason, the landfill were not capped, or the caps were breached, an assessment of ecological risks from exposures of terrestrial fauna to the soil within the landfill would become necessary.

3.1.3 Ground Water

Two distinct ground water aquifers, overburden and bedrock, have been identified at the site. The overburden ground water plume contamination has been found to contain volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals. One pesticide, Endosulfan I, was detected only in Round 1 sampling; no PCBs were detected. Federal or State drinking water standards were exceeded in some areas of the overburden ground water.

The bedrock ground water also contains VOCs, SVOCs, and metals contamination. The deep bedrock is less impacted than the shallow, overburden. However, arsenic concentrations are higher in the bedrock than the overburden ground water. Federal or State drinking water standards were also exceeded in some areas of the bedrock ground water. A complete assessment of ground water contamination appears in the RI, and human health risks from these exceedences are evaluated in the HHRA prepared by Arthur D. Little on July 7, 1993.

The overburden aquifer is limited to the area underlying the landfill and extending east to the Connecticut River. The contaminant concentrations within this aquifer are diverse and relatively high. When not controlled, this overburden ground water emerges at seeps, between the Connecticut River and Route 5, that discharge, ultimately, to the Connecticut River. The flow to and discharge from these seeps have been significantly reduced by an interceptor trench installed parallel to Route 5 in October, 1992. This trench now collects the majority of contaminated, overburden ground water, so that the seeps along Route 5 were dry during Balsam's May 1993 sampling event. Bedrock ground water, however, continues to discharge to the seeps closer to the floodplain (Seeps F, G, and H) of the Connecticut River, and then to the

river itself. The bedrock aquifer discharges to the Connecticut River, and has been shown to contain landfill-derived contaminants such as the VOCs vinyl chloride, tetrachlorethane, and xylene; the SVOCs pentachlorophenol and bis(2-chloroisopropyl)ether; and inorganics, such as nickel, iron, mercury and copper. Installation of the leachate interceptor trench along Route 5 has not affected the transport of contaminants in this bedrock aquifer to the Connecticut River and nearby Seeps F, G, or H.

3.1.4 Sediments and Surface Water

Sediments are loosely defined as any unconsolidated geological or biological material such as sand, silt, clay, peat, or detrital matter that are typically located at the bottom of a surface water body. Sediment samples were obtained from depths of 0 to 4 inches below the water-sediment interface, or from dry, intermittent streams during some sampling events (i.e., "seeps"). Sediments and surface water are associated with the on-site stormwater retention ponds, terrestrial ground water seeps, and the Connecticut River. These areas have been segregated into potential exposure zones primarily as a result of their hydrologic characteristics and locations relative to contaminant sources and migration routes. Ecological characteristics of these zones are described in Sections 2.3 through 2.6, to provide insight to the habitat value of these sediment and surface water locations. The retention ponds are located on the BFI property and are hydrologically isolated from any other surface water bodies. The topography in the forested area with ground water seeps, east of Route 5, is very steep. All seeps are hydrologically similar, resulting from surface water flow and various areas of ground water breakout along the embankment between the Connecticut River and Route 5.

3.1.4.1 River Water Classification The Connecticut River is a major water body and is hydrologically distinct from any other water body on the site. The Connecticut River is classified as a Class B water resource. A one-mile segment of the river in the vicinity of the landfill is designated as a waste management zone of a Class B water (formerly referred to as a Class C water), as a result of the Charleston sewage treatment facility located along the east bank of the river opposite the site. Class B water is classified for use as a public water supply with proper filtration and disinfection, irrigation and other agricultural uses, or swimming and recreation. Waste management zones of Class B water are designated for recreational boating, and irrigation of crops.

3.1.4.2 Migration of Organic Compounds Surface runoff and ground water flow has resulted in organic contaminant migration to the various surface water/sediment locations. Table 3-17 presents the number of unique organic compounds detected in each medium and exposure zone.

The majority of these organic compounds are detected in the seeps, indicating that ground water is the primary compound transport route. Overland transport to the river of site-derived contaminants is minimal, occurring mostly via stormwater discharges from the facility through drainage culverts located beneath Route 5.

3.1.4.3 Occurrence of Inorganic Compounds Metals are naturally occurring inorganic substances, so that the detection of numerous metals in both surface water and sediment of the exposure zones is not, in itself, significant. To estimate the potential significance of metals in these media, the concentration levels at which they are reported must be placed in perspective with respect to metal concentrations that would be likely present at these locations had the landfill not been constructed. Pre-disposal metal concentrations for the seeps and river were inferred by sampling at upgradient locations, whereas an upgradient pond was not available. The maximum detected concentrations in the seeps and river were compared to concentrations detected at the upgradient seep and river locations, and exceedances noted in the statistical summary Tables (3-1 through 3-16). All ecological risks from metal concentrations, in surface water and sediments of the retention ponds and seeps, that exceed the inferred background concentrations are attributed to the site. Both the ponds and seeps receive leachate and/or surface runoff from the landfill, and landfill-derived organic compounds in the overburden aquifer also could conceivably accelerate leaching of naturally occurring inorganics from parent material beneath the landfill refuse.

3.1.4.4 Upgradient Compound Concentrations in Sediments and Surface Water Background concentrations of naturally occurring inorganic compounds are defined as the concentration present onsite if no disposal activity had taken place. The majority of organic compounds detected at the BFI Landfill Site are presumed not to occur there naturally, so that background concentrations of volatile organics, semivolatile organics (of non-botanical origin), pesticides, and PCBs are defined as zero. Naturally occurring inorganics (metals), however, are considered in this ERA as contributors to background ecological risks that predate disposal activities onsite.

Some organic compounds, such as pesticides and/or naturally occurring semivolatiles (e.g., PAHs) may be present on site but not as a result of past disposal activities. For example, trace levels of pesticides might be expected in the soil, sediment, and surface water due to their widespread use and persistence over time. Other human activities, not connected to past disposal practices, that could influence the background levels of certain compounds, include insecticide spraying for mosquito control near the river or atmospheric deposition of lead and other compounds from industrial and/or vehicular sources such as Route 5. As a conservative approach,

however, pesticides and other organic compounds are considered to be site-related for this ecological risk assessment, and upgradient seep and river samples are presumed to reflect background concentrations of metals in sediments and surface water.

Ponds. No ponds occur onsite or adjacent to the site in locations that could serve as upgradient reference areas for use in defining local "background" levels of compounds for pond ecosystems.

Seeps. The seep sediment sample taken from a location presumed as upgradient from all landfill contaminant sources, is considered most representative of local seep sediment background conditions; no surface water samples were collected from this seep. The upgradient seep sampled by Balsam (SS-30; "Seep Background") and occurring between Route 5 and the river, approximately 200 feet northwest of a seasonal, riverside camp, was selected to determine local background metal levels in seep sediments. Sediments at this location had no detectable VOCs, whereas several SVOCs were detected; among these SVOCs, only pyrene and phenanthrene occurred at levels exceeding their NOAA ER-L values. Sediments were not analyzed for PCBs or pesticides at this seep location. Inorganic concentrations were below NOAA sediment guidelines, except for zinc which only slightly exceeded its ER-L value.

Connecticut River. River sediment and surface water samples taken from a location (RW/RS-3) upgradient of site-affected ground water Seeps F, G, and H, but downstream from the discharge point from Seep E, were evaluated as potentially indicative of local background conditions for all river exposure locations. In 1993, a new background river sampling location (RW/RS-4) was established upstream of the Seep E discharge point, in an area with marsh vegetation on a narrow shelf of river floodplain, north of a riverside bedrock outcrop and near two homes with boat docks (see Figure 1-2 and Appendix D). However, no data were available from this new background river location for use in this ERA.

All the metal concentrations in river surface water at sampling station RW-3 are below both the Vermont and Federal chronic and acute AWQC, except for aluminum and iron. Only one VOC (acetone) was detected in the surface water at this location, below the federal and state AWQC, and no SVOCs were detected. Inorganic concentrations in sediment at this location (RS-3) are all below the NOAA ER-M and ER-L sediment guidelines. Two VOCs and two SVOCs were detected in river sediments at RS-3, but none of these four exceed the NOAA guidelines. Neither sediment nor surface water at this location were analyzed for pesticides and PCBs.

Although there remains some doubt about the validity of using RW/RS-3 as a true background river location, these analytical results suggest that site-derived organic contaminants discharged to surface water from Seep E have not adversely affected river water quality at this location.

3.2 Ecological Exposure Zones

In this review of the site and study area, fourteen (14) surface water and sediment exposure zones were identified, two of which are upgradient locations and presumed not to be affected by the site. These exposure zones, described below and shown in Figure 1-2 and Appendix D, are:

- Ponds 1, 2, and 3 (downgradient)
- Seeps A, B, C, D, E, F, G, and H (downgradient)
- The Connecticut River (downgradient)
- Seep Background (upgradient)
- Connecticut River Background (RW/RS-3, below Seep E)

3.2.1 Retention Ponds

Pond 1, the smallest of the three ponds, located approximately 150 feet north-northwest of the garage, is not a permanent surface water body, but receives intermittent stormwater runoff and provides a sparsely vegetated microhabitat. Pond 2 is located approximately 350 feet south-east of the garage and also is not a permanent surface water body. Pond 3 is the largest and only permanent source of ponded surface water runoff from the landfill. It is located approximately 250 feet north-west of the garage. Both fish (catfish) and frogs have been observed in Pond 3.

3.2.2 Terrestrial Seeps

3.2.2.1 Roadside Slope Seeps Seeps A and D are located east of Route 5, while seeps B ,C, and E, and H are located south of Route 5 along a steep slope leading to the river. The outermost upgradient seep, designated "Seep Background", is located west of Route 5 approximately 200 feet northwest of a seasonal camp. All seeps are generated from either surface water flow, outbreaks of overburden ground water, deep bedrock ground water, or a combination of these sources. The surface water associated with these seeps is transient and under normal conditions does not provide permanent habitat for fish, amphibians, or aquatic invertebrates. This lack of habitat is especially significant at those seeps (B, C, and E) located well above the Connecticut River floodplain, on the steep, forested slopes adjacent to Route 5. However, during periods of extended precipitation and/or seasonal high flow, they may serve as water sources for amphibians as well as terrestrial species. However, under no conditions would fish or aquatic invertebrates be expected at these three

upper seeps. In addition, the source of the seep may determine the likelihood of long-term exposure, because while overburden generated seeps will presumably dry up with the application of a landfill cap, deeper bedrock discharges to the floodplain seeps will not. Therefore any compound transport between the overburden and deep bedrock aquifers may result in continued compound migration into the Connecticut River and nearby terrestrial seeps.

3.2.2.2 Riverside Seeps Closer to the river, and opening onto the river's floodplain, are Seeps F, G, and H, which occur within the Canadian Hemlock/Northern Hardwood forest, and receive overland flows from the higher elevation seeps in this forest found along Route 5 (Seeps B, C, and E; see Figure 1-2 and Appendix D). The habitats observed within the lower reaches of this forested slope are essentially identical in their soils, hydrology, and vegetation, in the vicinity of the sediment and surface water sampling locations at Seeps F, G, and H. All three areas occur within deeply-cut, erosional gullies that receive surface water runoff from the steep slopes between Route 5 and the river. No areas of ponding of this runoff occur within any of the gullies or stream channels, and no evidence of vernal pools was found in the area, so that no true aquatic habitats occur within the forest. Due to heavy rains on the night preceding our field investigation, distinct areas of ground water seepage were not evident, but surface runoff was flowing at several of the locations. The clay-rich, silty soils of all seep areas have eroded sufficiently to form extensive, deltaic outwash deposits of silt and clay at the interface between the forested slopes and floodplain marsh/shrub swamp habitats. A brief description of each of these three, riverside "seep" areas is provided below.

Seep F (SD/SW-8). This habitat is essentially identical to that of Seeps G and H, although it has a smaller area of Speckled Alder (*Alnus rugosa*) and shrub-dominated wetland on the floodplain area between the seep/gully and the river, than that seen at Seep G. No ponding areas within gully nor any vernal pools were found in either the forest or floodplain habitats. Grey clay and silt deposits were identified in the stream channel; no sand/gravel riffle microhabitat were observed in the stream. No invertebrates were seen in the stream of the gully.

Seep G (SD/SW-9). Exposed clayey-soils were observed on the South slope of this deep, erosional gully, caused by chronic landslides just below and South of the outfall of the stormwater pipe. The stormwater pipe, which had been built along the bottom of this gully, is now broken at a point below which the erosion is most severe. The lower segment of pipe is now buried beneath the deltaic silt/clay deposits at Sampling Station SD/SW-9. Unstable soils on both sideslopes of this gully are indicated by the immature, secondary growth of forest trees, shrubs, and herbs on these slopes, as compared with the mature forest areas on the ridges and southeastern

slopes away from the gullies. Canadian Hemlock is more abundant on the north-facing slopes, as compared with the predominance of hardwood trees on the south-facing slopes of these same gullies. No areas of surface water ponding occur in these gullies, even at the bottom of the slopes adjacent to the river floodplain, and no vernal pools occur in this area. The channel of the stream in the bottom of the gully consists almost entirely of grey, silt and clay deposits, being devoid of sand or gravel deposits common in riffle habitats. Tracks of predators or omnivors, such as raccoons, have been reported in all streams by EPA personnel during previous visits.

Seep H (SW/SD-31 and SW/SD-33). Soils, hydrology, and vegetation in Seep H was essentially identical to those at Seeps F and G. Canadian Hemlock again was mostly restricted to the north-facing side slopes of the gully, with hardwood trees dominating the drier, south-facing slopes. As with Seeps F and G, the Hemlock/hardwood forest at Seep H lacks permanent aquatic habitat, such as ponding areas within the gully/stream or vernal pools in either the forested slopes or river floodplain.

3.2.3 Connecticut River

3.2.3.1 Aquatic Habitat The Connecticut River, flowing from north to south, is the ultimate receptor of contaminated ground water, seep water, and stormwater discharged from the landfill site. This aquatic ecosystem provides aquatic habitat for both pelagic and benthic biota, for which risks are assessed. Along the west bank of the river are permanent shallows with abundant Water Lilies (Nymphaeaceae; inaccessible for species identification) and associated, submerged aquatic macrophytes.

3.2.3.2 Floodplain Wetland Habitat Along the river's west bank is a flat area of clayey-silt deposits, which extends from the water's edge to the toe of the steep, hemlock/hardwood forested slopes, so that no obvious demarcation can be seen between the river bank and associated floodplain. Balsam's floristic description of the marsh and shrub swamp cover types within the floodplain is accurate and complete. Marsh communities dominate this segment of the floodplain, with isolated areas dominated by wetland shrubs best developed in areas with large outwash deposits of silt and clay at the discharge points from the erosional gullies to the floodplain (e.g., Seep G). No sightings were made of the Barbed-bristle Bulrush (*Scirpus ancistrochaetus*), nor were many suitable microhabitats for this species found in the floodplain. No vernal pools or permanent ponds occur along this segment of the floodplain. Abundant tracks of unidentified birds, Raccoon (*Procyon lotor*), and

White-tailed Deer (*Odocoileus virginicus*), however, were seen in the wet silt deposits at the water's edge; bedding areas for White-tailed Deer, noted by EPA personnel during previous site visits, also were confirmed as low-growing areas of grass surrounded by tall Cattails.

While the surface water and sediment samples collected were not designated as floodplain wetland samples, the near-shore river samples were taken in areas that during the low flow periods are expected to be representitive of floodplain sediments. Therefore, the risk estimates for the Connecticut River also apply to the floodplain flora and fauna.

3.3 Exposure Zone Chemical Concentrations

The statistical summary tables (Tables 3-1 to 3-14) present information for each chemical of potential concern in sediment and surface water as generated by Balsam. Tables 3-15 and 3-16 present Round 3 oversight data for sediments and surface water collected by Arthur D. Little. Since ecological exposure to contaminants in soil and air are not assessed, contaminant concentrations in these media are not included. The information provided in the statistical summary tables includes:

- Number of detects per total samples collected
- Minimum detected concentrations
- Maximum detected concentrations
- Arithmetic mean concentrations
- Location of maximum detected concentrations
- Upgradient concentrations
- Annotations indicating levels exceeding upgradient concentration (inorganics)

All statistical summary information is based on data from Rounds 1, 2, and 3, provided by Balsam, and was compiled in the same manner 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. The oversight data collected by Arthur D. Little (Tables 3-15 and 3-16) are presented in raw format (i.e., no averaging and point by point results), for purposes of comparison with Balsam's data from corresponding sampling locations.

3.3.1 Statistical Summary Methods

For each analyte detected in a given medium, a statistical summary was produced. In producing the statistical summary, "J" validated data, (i.e., data for which the concentration level is estimated), were treated as positive detects. Non-detects were included in the average calculation as one-half the reported sample quantitation limit

(SQL); samples receiving the "U" or "UJ" designation were included in the calculation as one-half the reported SQL; and samples designated "R" were rejected and not included in the calculation. Duplicate samples were averaged prior to inclusion in any calculation. Since this method of calculation is conservative, sample concentrations used in the ERA are probably biased high. This method, however, reduces the impact of sample analysis uncertainty on the computed arithmetic averages. In performing the statistical computations, duplicates were averaged together, and non-detects (NDs) of analytes found in at least one other location of the exposure zone were included in the computation as one-half the SQL. In instances where using one-half the SQLs resulted in average concentrations above the maximum detected value, the NDs were selectively removed from the computation, by Balsam, until the resulting average no longer exceeded the maximum concentration. The uncertainty associated with the use of and/or omission of one-half the SQL is discussed in Section 7.

3.3.2 Comparison of Balsam vs. Arthur D. Little Contamination Data

As part of Arthur D. Little's RI oversight activities under EPA Work Assignment No. 24-1P86, a detailed comparison of analytical results was conducted for all media and sample locations analyzed by both Balsam and Arthur D. Little. The following discussion summarizes the results of this comparative review of BFI surface water and sediment analytical data for October 1991 (Round 1), March 1992 (Round 2), and October 1992 (Round 3).

3.3.2.1 Temporal Variability of Contaminant Levels All three classes of contaminants (VOCs, SVOCs, and metals) reveal at least some degree of significant temporal variability, in both surface water and sediment samples, at two or more locations. Metals are the most variable of all compounds in both surface water and sediment, with the majority of metals showing significant variation among datasets for all sample locations for which complete data are available. However, for organic contaminants the level of disparity in analytical results of different sampling events is generally very low at several locations. SVOCs, for example, reveal the highest degree of similarity among both surface water and sediment analyses of the four sampling events, with very few compounds indicating significant variation at only two or three locations.

Retention Ponds. No significant differences among sampling events are evident for organic compounds in the retention pond surface water or sediment samples, except for two VOCs (acetone and 2-butanone) in sediments at PS-3. These samples had "J" values (in Rounds 1 & 2) for concentrations that were one order of magnitude greater

than the detection limits (DLs) for each of their corresponding NDs from Round 3. Significant variability was noted, however, for metal levels in both the surface water (PW-1 and PW-3) or sediments (PS-1 and PS-2) of these ponds.

Seeps. The seeps reveal the greatest degree of temporal variability in sediment and surface water analytical results among the four datasets reviewed. The most variable seep sampling locations, for all three classes of contaminants, are SS/SW-3 and SS/SW-4, which include the samples labelled as "SS/SW-3/4 " in Balsam's October 1992 sampling round (Seep C). Sediments and surface water samples at these locations vary significantly in their levels of each class of contaminants. Concentrations of contaminants of all three classes also seem to vary significantly, over time, in surface water at Seep SW-9 (Seep G).

Connecticut River. As with the onsite retention ponds, no significant differences in organic contaminant levels were noted among the surface water samples from the river. However, significant concentration differences were evident for several metals in surface water among all three locations. Incomplete data preclude temporal comparisons among sediment contamination levels at these locations.

3.3.2.2 Variability in Organic Compound Levels Contaminant levels of both classes of organic compounds are more variable in surface water than in corresponding sediments from the same location. Sediment concentrations, thus, often reveal much narrower ranges than do the same compounds in associated surface water samples, especially for the organic contaminants. This is not surprising, however since rainfall events and dry periods directly influence the site hydrology and thus the relative dilution of contaminant concentrations in both the ground and surface water.

3.3.2.3 Occurrences of Pesticides Although Balsam's analyses of retention pond sediments and surface water showed non-detects for all pesticides, Arthur D. Little does not have corresponding oversight pesticide analyses for these ponds. Pesticide data generally correspond very well for surface water and/or sediments, at locations sampled by both Arthur D. Little and Balsam, with the following exceptions.

Surface Water. Although no pesticides were detected by the Balsam at SW-2 and SW-3/4, Arthur D. Little detected trace levels of the following pesticides:

- Delta-BHC, heptachlor epoxide, and 4,4-DDE at SW-2 (Seep B)
- Aldrin, endrin, and alpha chlordane at SW-3/4 (Seep C)
- Alpha chlordane at SW-32 (no Balsam data) (Seep G)

All of these *apparent* discrepancies may be an artifact of the lower detection limits of the Arthur D. Little analyses for all pesticides, except for the aldrin detected by Arthur D. Little at SW-3/4 at a concentration (0.11 ug/L) that exceeded Balsam's Round 1 detection limits of 0.056 ug/L (SW3) and 0.066 ug/L (SW-4).

Sediment. Since their data for seep sediments from SS-2 were rejected, the Balsam data could not be compared with the levels detected in the Arthur D. Little samples for six pesticides (heptachlor, heptachlor epoxide, dieldrin, endosulfan II, 4,4'DDD, and endrin aldehyde). Balsam data for SW-3/4 (Seep C), however, indicated non-detects for all four of the pesticides detected in the corresponding Arthur D. Little samples (heptachlor, heptachlor epoxide, 4,4'DDE, and endrin aldehyde). This is presumably a consequence of different detection limits among these datasets. The only discrepancy that *cannot* be presumed as the consequence of lower detection limits for the Arthur D. Little analyses is that for endrin aldehyde; this was detected at 11 ug/kg (DL=7.8 ug/kg) in the Arthur D. Little sample, but was non-detected in the Balsam sample for which the DL had been 7.4 ug/kg.

3.4 Chemical Fate and Transport Within Exposure Zones

It is important to understand the behavior of contaminants within each of the exposure zones. This requires knowledge of the nature of the media, what chemicals are present within the media, the chemical concentrations, and their physical/chemical properties. Likewise, knowledge of chemical disposal methods and environmental conditions, especially the hydrogeology of the affected area, is also very important.

3.4.1 Air

The potential exists for landfill gas to migrate upward through the landfill into the air without being captured by the gas collection system. However, ambient air quality screening results presented in the RI (Balsam, 1993) indicate that gas concentrations at the landfill have a negligible impact on the local ambient air quality. Atmospheric transport of contaminants from the landfill, thus is not considered a significant ecological exposure pathway.

3.4.2 Soils

Soils are loosely defined as unconsolidated geologic material remaining unsaturated with water (except during rain events) for the majority of the year. Soil located off the BFI property does not provide a significant transport mechanism for contaminants, since erosion and overland runoff are the primary method of transport, and the contaminated soils are located beneath the landfill cap. In addition, a

significant amount of vegetation immediately adjacent to the landfill limits soil transport by overland flow. However, current data do not indicate that overland flow of surface water or sediment is a significant transport pathway.

3.4.3 Ground Water

The environmental media of primary ecological concern at the BFI Landfill Site are the surface water and sediments of the Connecticut River. The presence of the cap on the landfill and the leachate interception system should minimize overland and overburden aquifer transport of landfill compounds. Therefore, the transport mechanism of greatest concern is deep bedrock ground water upwelling to the seeps near the river, and under gaining conditions to the river itself. Numerous chemicals have been detected in the bedrock aquifer including VOCs, SVOCs, and metals.

The ground water at the BFI Landfill Site is the primary mechanism of chemical transport, and as such it is critical to consider the site's hydrogeology when estimating potential ecological risks from exposure to ground water seeps. Ground water at the site is present in two aquifers, one in overburden, and a second in bedrock. The source of contaminants in both ground water systems is the landfill. The ground water contamination results from the leaching of contaminants by precipitation percolating through refuse and recharging the ground water below. The primary pathway is advection, whereby contaminants are entrained in the percolating precipitation and transported from the source area under the influence of the hydraulic gradient.

Based on the current understanding of site conditions, the factors with the largest influence on contaminant fate and transport are locally perched overburden and bedrock ground water. Shallow overburden ground water discharges as seeps and then flows as surface water toward the Connecticut River (Balsam, 1993). However, the discharge of the overburden aquifer to the seeps has recently been mitigated by the installation of an interceptor trench long Route 5. Bedrock ground water, nevertheless, still flows well beneath this trench and then discharges to the Connecticut River,and perhaps to nearby Seeps F, G, and H.

3.4.4 Sediment and Surface Water

Sediment and surface water may contribute to the localized transport of contaminants. As surface water travels over land, contaminants may be adsorbed from contaminated water onto soils or sediments in contact with the water, or partitioned from contaminated sediments into the water column. Discharge from seep locations has been shown to correlate directly with precipitation events. High flow rates in

drainage channels will likely result in greater mobility of sediments. Therefore, during precipitation events of high intensity or extended duration, contaminated sediment may be transported greater distances from the seep source areas.

For a detailed discussion regarding chemical fate and transport, see Section 7 of the RI (Balsam, 1993).

3.5 Contaminants of Concern

All compounds detected in sediment and surface water were considered as potential contaminants of concern (COCs) from an ecological perspective. This method of evaluation is comprehensive, and eliminates a potential for underestimating the aggregate risks from those COCs for which compound-specific risks, taken individually, are considered insignificant. In order to consider these aggregate ecological risks from exposures to complex contaminant mixtures, no screening to eliminate COCs was performed. Only those compounds for which ecotoxicological endpoints were not available were not evaluated quantitatively as COCs in this ERA.

Section 3
Tables and Figures

TABLE 3-1
DATA SUMMARY FOR COMPOUNDS DETECTED
IN CONNECTICUT RIVER WATER AND SEDIMENT
BFI-ROOCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	River Water					River Sediment				
	Frequency of Detection*	Detected Range Minimum mg/L	Detected Range Maximum mg/L	Average mg/L	Location of Maximum	Frequency of Detection*	Detected Range Minimum mg/kg	Detected Range Maximum mg/kg	Average mg/kg	Location of Maximum
Volatile Organic Compounds:										
acetone						4 / 6	0.063	0.13	0.06	SD-RS-2B
2-butanone						2 / 6	0.019	0.029	0.013	SD-RS-2B
Semivolatile Organic Compounds:										
4-methylphenol	1 / 4		0.002 J	0.002	SW-RW-2					
bis (2-ethylhexyl) phthalate						5 / 6	0.036	0.26	0.125	SD-RS2C
Pesticides/PCBs: N/A										
Inorganic Compounds (total):										
aluminum	6 / 6	0.061	24.9 J E	4.388 E	SW-RW-2	6 / 6	6330	11000 E	7858	SD-RS-2B
arsenic						6 / 6	1.50	2.8 E	1.9	SD-RS-2B
barium	3 / 6	0.103 E	0.128 E	0.0269 E	SW-RW-2	6 / 6	25.9	44.6 E	31.2	SD-RS-2B
beryllium	1 / 6		0.0011 E	0.0008 E	SW-RW-2	6 / 6	0.400 E	0.59	0.5 E	SD-RS-2B
calcium	4 / 6	12.4	14	11.917	SW-RW-1,2	6 / 6	1630	5390 E	2855 E	SD-RS-2B
chromium	1 / 6		0.04 E	0.0084 E	SW-RW-2	6 / 6	10.4	18.9	13.8	SD-RS-2B
cobalt	1 / 6		0.026 E	0.0065 E	SW-RW-2	6 / 6	5.900	11.5 E	8.2	SD-RS-2B
copper						6 / 6	13.2	25.2 E	18.2	SD-RS-2B
iron	6 / 6	0.216	47 J E	8.352 E	SW-RW-2	6 / 6	11500	21900 E	15900	SD-RS-2B
lead	1 / 6		0.0198 J E	0.0037 E	SW-RW-2	6 / 6	5.500	9.7	6.8	SD-RS-2B
magnesium	5 / 6	1.65	17.5 E	4.23 E	SW-RW-2	6 / 6	3350	6290 E	4670 E	SD-RS-1B
manganese	6 / 6	0.037	1.6 J E	0.332 E	SW-RW-2	6 / 6	179	625 E	387 E	SD-RS-2B
nickel	1 / 6		0.0463 E	0.0126 E	SW-RW-2	6 / 6	13.1	22.1 E	16.7	SD-RS-2B
potassium	6 / 6	1.150	6.55 E	2.363 E	SW-RW-2	6 / 6	713	1430 E	1040	SD-RS-1B
sodium	5 / 6	5.51	16.7 E	7.33 E	SW-RW-2					
vanadium	3 / 6	0.002	0.0476 E	0.0097 E	SW-RW-2	6 / 6	13.5	21.9 E	15.9	SD-RS-2B
zinc	1 / 6		0.0026	0.0017	SW-RW-2	6 / 6	43.2	80.2 E	54.5	SD-RS-2B

NOTE:
* Frequency of detection refers to the number of times a constituent was detected, per sample group size, during the 10/91, 3/92 and 10/92 rounds.
N/A = Not analyzed for during the 10/91, 3/92 and 10/92 rounds
J = Concentration is estimated
E = Exceeds upgradient concentration (inorganics only)

TABLE 3-2
DATA SUMMARY FOR COMPOUNDS DETECTED
IN CONNECTICUT RIVER WATER AND SEDIMENT (BACKGOUND)
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM,VERMONT

	River Water (Background)				River Sediment (Background)			
	Frequency of Detection*	Detected Range Minimum mg/L	Detected Range Maximum mg/L	Average mg/L	Frequency of Detection*	Detected Range Minimum mg/kg	Detected Range Maximum mg/kg	Average mg/kg
Volatile Organic Compounds:								
methylene chloride					3 / 3	0.047	0.18	0.105
acetone	1 / 2		0.005 J	0.005				
2-butanone					3 / 3	0.012	0.05	0.042
Semivolatile Organic Compounds:								
fluoranthene					1 / 3		0.071 J	0.071
pyrene					1 / 3		0.057 J	0.057
Pesticides/PCBs: N/A								
Inorganic Compounds (total):								
aluminum	3 / 3	0.046	3.96 J	1.434	3 / 3	5690	9240	7643
arsenic					3 / 3	1.40	2.1	1.8
barium	2 / 3	0.011	0.0256	0.0132	3 / 3	23.3	39	32.3
cadmium					1 / 3		1.3 J	0.73
calcium	3 / 3	11.3	15.3	13.8	3 / 3	1590	2150	1890
chromium	1 / 3		0.006	0.0035	3 / 3	13	19.3	16.2
cobalt					3 / 3	5.30	8.8	7.2
copper					3 / 3	11.3	19	15.4
iron	3 / 3	0.209	7.13 J	2.67	3 / 3	10600	16500	13800
lead					3 / 3	6.00	9.8	8
magnesium	2 / 3	1.80	2.24	1.92	3 / 3	2910	4660	3870
manganese	3 / 3	0.037	0.285 J	0.139	3 / 3	159	314	238
nickel					3 / 3	11.7	18.2	15.8
potassium	3 / 3	1.64	1.9	1.73	2 / 3	928	1060	762
selenium					1 / 3		0.067	0.42
sodium	2 / 3	6.96	7.27	5.68				
vanadium	1 / 3		0.0078	0.0038	3 / 3	12.4	18.9	16.1
zinc	1 / 3		0.0032 J	0.0022	2 / 3	54.7	64	46.3

NOTE:
* Frequency of detection refers to the number of times a constituent was detected, per sample group size, during the 10/91, 3/92 and 10/92 rounds.
N/A = Not analyzed for during the 10/91, 3/92 and 10/92 rounds
J = Concentration is estimated

TABLE 3-3
DATA SUMMARY FOR COMPOUNDS DETECTED
IN DRAINAGE POND 1 WATER AND SEDIMENT BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Pond 1 Water				Pond 1 Sediment			
	Frequency of Detection*	Minimum mg/L	Detected Range Maximum mg/L	Average mg/L	Frequency of Detection*	Minimum mg/kg	Detected Range Maximum mg/kg	Average mg/kg
Volatile Organic Compounds:								
chloroethane					1 / 9		0.01 J	0.072
acetone	1 / 3		0.016	0.0105	3 / 9	0.055 J	0.47 J	0.079
2-butanone					3 / 9	0.020 J	0.27 J	0.04
4-methyl-2-pentanone					1 / 9		0.003 J	0.003
2-hexanone					1 / 9		0.01 J	0.007
toluene	1 / 3		0.012 J	0.0073				
Semivolatile Organic Compounds:								
phenol	2 / 3	0.035 J	0.14 J	0.06	1 / 3		0.11 J	0.11
bis (2-ethylhexyl) phthalate					1 / 3		0.92 J	0.557
benzo (b) fluoranthene					1 / 3		0.065 JT	0.065 T
benzo (k) fluoranthene					1 / 3		0.065 JT	0.065 T
fluoranthene					1 / 3		0.068 J	0.068
pyrene					1 / 3		0.064 J	0.064
2-methylphenol	1 / 3		0.21 J	0.077				
4-nitrophenol	1 / 3		0.003 J	0.003				
diethylphthalate	1 / 3		0.011 J	0.008				
Total PAH							0.130	0.130
Pesticides/PCBs:								
None detected								
Inorganic Compounds (total):								
aluminum	3 / 3	0.218	3.06	1.973	3 / 3	5370	21200	11247
arsenic	3 / 3	0.003 J	0.0052 J	0.0042	3 / 3	1.60	5.5 J	3.4
barium	3 / 3	0.035	0.095	0.0702	3 / 3	23.6	99.1	49.1
beryllium					1 / 3		0.24	0.24
cadmium	1 / 3		0.00056	0.00056				
calcium	3 / 3	38.5	240 J	140.8	3 / 3	1780 J	3370	2330
chromium	3 / 3	0.006	0.0121	0.0093	3 / 3	9.3	34.7	18.9
cobalt	3 / 3	0.004	0.0126	0.0089	3 / 3	5.3	21.5	11.5
copper	1 / 3		0.0248	0.0113	3 / 3	12.5	68.3	33.3
iron	3 / 3	4.22	14.9	8.25	3 / 3	10700	40100	22300
lead	3 / 3	0.002 J	0.0222	0.0105	3 / 3	2.90	17.8	9.5
magnesium	3 / 3	7.56	35.6	20.85	3 / 3	2940	10700	8780
manganese	3 / 3	0.304	6.18	35.55	3 / 3	192	677	381
nickel	1 / 3		0.0108 J	0.0097	3 / 3	13.3	41.5	23.5
potassium	3 / 3	9.15	26.5	17.117	3 / 3	977	3630	1906
silver	1 / 3		0.0017	0.0017				
sodium	3 / 3	22.1	69.8	40.7	1 / 3		77.2	50.4
vanadium	2 / 3	0.006	0.0242	0.0106	3 / 3	13	45	25
zinc	2 / 3	0.006 J	0.0695	0.03	3 / 3	27.3	108 J	62.4

NOTE:
* Frequency of detection refers to the number of times a constituent was detected, per sample group size, during the 10/91, 3/92 and 10/92 rounds.
J = Concentration is estimated
T = Concentration is used in computing total PAH for those PAHs lacking chemical-specific NOAA sediment sediment guidelines.

TABLE 3-4
DATA SUMMARY FOR COMPOUNDS DETECTED
IN DRAINAGE POND 2 SEDIMENT
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Pond 2 Sediment			
	Frequency of Detection*	Detected Range Minimum mg/kg	Detected Range Maximum mg/kg	Average mg/kg
Volatile Organic Compounds**				
acetone	4 / 9	0.010 J	0.026 J	0.011
2-butanone	5 / 9	0.004	0.009	0.006
total xylenes	1 / 9		0.002 J	0.002
tetrahydrofuran	1 / 1		0.01 J	0.001
Semivolatile Organic Compounds:				
None detected				
Pesticides/PCBs:				
None detected				
Inorganic Compounds (total):				
aluminum	3 / 3	4570	7460 J	5785
arsenic	2 / 3	1.90	2.3	1.8
barium	3 / 3	16.7	25 J	20.2
beryllium	2 / 3	0.260	4.7	1.7
cadmium	1 / 3		0.94	0.54
calcium	3 / 3	1820	2850 J	2220
chromium	3 / 3	7.3	14.5	10.6
cobalt	3 / 3	5.60	7.5	6.6
copper	3 / 3	12.9	22.3	17.7
iron	3 / 3	11900	17100 J	13733
lead	3 / 3	4.100	6.2 J	4.9
magnesium	3 / 3	2350	3940	3070
manganese	3 / 3	191	305 J	243
nickel	3 / 3	11.8	16.1	13.8
potassium	3 / 3	691	1300	968
sodium	1 / 3		163 J	118
thallium	1 / 3		0.48	0.32
vanadium	3 / 3	10.5	19.4	14.3
zinc	3 / 3	31.4 J	40.6 J	36.6

NOTE:
* Frequency of detection refers to the number of times a constituent was detected, per sample group size, during the 10/91,
** Tetrahydrofuran was analyzed for only during the 10/91 round.
J = Concentration is estimated

TABLE 3-5
DATA SUMMARY FOR COMPOUNDS DETECTED
IN DRAINAGE POND 3 WATER AND SEDIMENT
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Pond 3 Water				Pond 3 Sediment			
		Detected Range				Detected Range		
	Frequency of Detection*	Minimum mg/L	Maximum mg/L	Average mg/L	Frequency of Detection*	Minimum mg/kg	Maximum mg/kg	Average mg/kg
Volatile Organic Compounds:								
chloroethane					1 / 9		0.59	0.074
methylene chloride	1 / 2		0.062	0.042	1 / 9		0.008 J	0.008
acetone					1 / 9		0.18	0.029
carbon disulfide					1 / 9		0.095	0.02
chloroform					2 / 9	0.003 J	0.1	0.019
2-butanone					2 / 9	0.011 J	0.028 J	0.012
Semivolatile Organic Compounds:								
phenol	1 / 3		0.013	0.0077				
4-methylphenol	1 / 3		0.001 J	0.0001				
bis (2-ethylhexyl) phthalate					2 / 7	0.140	0.18	0.14
benzo (b) fluoranthene					1 / 7		0.058 JT	0.034 T
benzo (k) fluoranthene					1 / 7		0.058 JT	0.034 T
fluoranthene					1 / 7		0.057 J	0.034
pyrene					1 / 7		0.054 J	0.3
2-methylphenol	1 / 3		0.004 J	0.004				
Total PAH							0.116	0.068
Pesticides/PCBs:								
None detected								
Inorganic Compounds (total)*:								
aluminum	1 /3		0.927	0.361	6 / 6	5220.	10000	7710
arsenic					3 / 6	2.1	3.9 J	1.9
barium	3 /3	0.009	0.0331	0.021	6 / 6	16.1	47.9	26.7
beryllium					1 / 6		0.27	0.22
calcium	3 /3	7.390	47	26.197	6 / 6	967.	3000	1660
chromium					6 / 6	8.3	18.1	12.1
cobalt					6 / 6	5.7	12.6	8.1
copper					6 / 6	12.7	48	23.8
iron	3 / 3	0.484	3.65	1.646	6 / 6	11900.	19700 J	14883
lead	1 / 3		0.0025	0.0012	6 / 6	5.3 J	8.8	6.8
magnesium	3 / 3	1.130	6.41	3.5	6 / 6	2630.	5590	3637
manganese	3 / 3	0.204	1.58	0.75	6 / 6	145.	237	181
nickel	1 / 3		0.0096	0.0093	6 / 6	13.8	22.3	16.8
potassium	3 / 3	1.340	5.09	3.69	6 / 6	581	1720	923
sodium	3 / 3	1.710	9.85	5.71	2 / 6	48.7	76.8	42.9
vanadium					6 / 6	11.4	22.7	15.6
zinc					6 / 6	30.9	61.9 J	46.2

NOTE:
* Frequency of detection refers to the number of times a constituent was detected, per sample group size, during the 10/91, 3/92 and 10/92 rounds.
J = Concentration is estimated
T = Concentration is used in computing total PAH for those PAHs lacking chemical-specific NOAA sediment sediment guidelines.

TABLE 3-6
DATA SUMMARY FOR COMPOUNDS DETECTED
IN SEEP AREA A
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep A Water				Seep A Sediment			
	Frequency of Detection*	Minimum mg/L	Detected Range Maximum mg/L	Average mg/L	Frequency of Detection*	Minimum mg/kg	Detected Range Maximum mg/kg	Average mg/kg
Volatile Organic Compounds:								
methylene chloride					1 / 3		0.005 J	0.003
acetone	1 / 2		1.2	0.85	1 / 3		0.23 J	0.081
carbon disulfide					1 / 3		0.002 J	0.002
c,t-1,2-dichloroethene	1 / 2		0.002 J	0.002	1 / 3		0.017 J	0.01
2-butanone	2 / 2	0.500	1.6	1.05	2 / 3	0.004 J	0.151 J	0.054
1,1,1-trichloroethane	1 / 2		0.003 J	0.003				
4-methyl-2-pentanone	2 / 2	0.100 J	0.025	0.063	1 / 3		0.027 J	0.013
2-hexanone	1 / 2		0.39 J	0.2	1 / 3		0.075 J	0.029
toluene	1 / 2		0.13	0.13	1 / 3		0.013 J	0.008
ethylbenzene	1 / 2		0.017	0.017	1 / 3		0.002 J	0.002
total xylenes	1 / 2		0.038	0.038	2 / 3		0.016 J	0.009
Semivolatile Organic Compounds:								
phenol	2 / 2	0.098	0.28 J	0.189	2 / 3	0.043	0.052 J	0.0475
4-methylphenol	2 / 2	0.780 J	0.93	0.86				
acenaphthylene					1 / 3		0.067 J	0.067
bis (2-ethylhexyl) phthalate					1 / 3		1.7 J	0.611
di-n-octyl phthalate					1 / 3		0.023 J	0.023
benzo (b) fluoranthene					1 / 3		0.029 JT	0.029 T
benzo (k) fluoranthene					1 / 3		0.029 JT	0.029 T
fluoranthene					1 / 3		0.041 J	0.041
pyrene					1 / 3		0.035 J	0.035
phenanthrene					1 / 3		0.05 J	0.05
2-methylphenol	1 / 2		0.006	0.006				
diethylphthalate	1 / 2		0.018 J	0.018				
Total PAH							0.058	0.058

Pesticides/PCBs:
None detected

TABLE 3-6
DATA SUMMARY FOR COMPOUNDS DETECTED
IN SEEP AREA A
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep A Water					Seep A Sediment					
	Frequency of Detection*	Detected Range Minimum mg/L		Detected Range Maximum mg/L		Average mg/L	Frequency of Detection*	Detected Range Minimum mg/kg		Detected Range Maximum mg/kg		Average mg/kg	
Inorganic Compounds (total):													
aluminum	2 / 2	14.5		142		79.8	2 / 3	3890 J		9290	E	5505	
arsenic	2 / 2	0.014 J		0.0521 J		0.033	3 / 3	2.20	E	3 J	E	2.6	E
barium	2 / 2	0.198 J		0.982		0.59	3 / 3	10.7 J		67.8	E	31.4	
calcium	2 / 2	287		443 J		365	3 / 3	1730 J		3920	E	2703	E
chromium	2 / 2	0.040		0.231		0.135	3 / 3	8.10		19.3	E	12.8	
cobalt	2 / 2	0.021		0.167 J		0.094	3 / 3	3.60		11.2	E	7.7	
copper	1 / 2			0.46		0.244	3 / 3	16.7		21.2	E	18.9	E
iron	2 / 2	65.0 J		344		204.5	3 / 3	11200 J		20300	E	16700	E
lead	2 / 2	0.029 J		0.514 J		0.272	3 / 3	3.80		33.1	E	15.1	
magnesium	2 / 2	44.4		166 J		105.2	3 / 3	2210		5640	E	3740	
manganese	2 / 2	5.170 J		13 J		9.09	3 / 3	227		295 J		256	
mercury	1 / 2			0.001		0.0006	1 / 3			0.16	E	0.09	E
nickel	2 / 2	0.063		0.454		0.259	3 / 3	14.7		21.3	E	16.9	
potassium	2 / 2	29.4		61.8 J		45.6	3 / 3	503		2270	E	1150	E
sodium	2 / 2	63.2		132 J		97.6	1 / 3		E	56.1 J	E	53.6	E
vanadium	2 / 2	0.029		0.32 J		0.175	3 / 3	9.90		24.2	E	16.5	
zinc	1 / 2			3.96 J		2.024	2 / 3	24.6 J		45.6		29.4	

NOTE:
* Frequency of detection refers to the number of times a constituent was detected, per sample group size, during the 10/91, 3/92 and 10/92 rounds.
J = Concentration is estimated
T = Concentration is used in computing total PAH for those PAHs lacking chemical-specific NOAA sediment sediment guidelines.
E= Exceeds upgradient concentration

TABLE 3-7
DATA SUMMARY FOR COMPOUNDS DETECTED
IN SEEP AREA B
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep B Water*				Seep B Sediment*			
	Frequency of Detection**	Minimum mg/L	Detected Range Maximum mg/L	Average mg/L	Frequency of Detection**	Minimum mg/kg	Detected Range Maximum mg/kg	Average mg/kg
Volatile Organic Compounds:								
vinyl chloride	1 / 3		0.062 J	0.038				
acetone					1 / 2		0.555 J	0.284
c,t-1,2-dichloroethene	1 / 3		0.27	0.107	1 / 3		0.019 J	0.013
2-butanone	1 / 2		1.75	0.9	1 / 2		0.485 J	0.249
4-methyl-2-pentanone	1 / 3		0.42	0.158	1 / 3		0.075 J	0.032
2-hexanone	2 / 3	0.002	0.605	0.219	1 / 3		0.1325	0.0507
toluene	1 / 3		0.0835	0.047	1 / 3		0.0098 J	0.0098
ethylbenzene	1 / 3		0.0195	0.01	1 / 3		0.008	0.007
total xylenes	2 / 3	0.079	0.087 J	0.056	1 /3		0.031 J	0.017
Semivolatile Organic Compounds***								
phenol	1 / 3		0.17 J	0.068	1 / 3		0.195 J	0.195
4-methylphenol	2 / 3	0.002	0.99 J	0.341	1 / 3		0.66	0.427
acenaphthylene					3 / 3	0.660 J	0.094 J	0.081
anthracene					2 / 3	0.075 J	0.089 J	0.082
benzo (a) anthracene					3 / 3	0.220 J	0.535 J	0.358
benzo (a) pyrene					3 / 3	0.190 J	0.365 J	0.275
benzo (b) fluoranthene					3 / 3	0.380 J	0.86 JT	0.56 T
benzo (ghi) perylene					2 / 3	0.076 J	0.23 JT	0.153 T
benzo (k) fluoranthene					3 / 3	0.140 J	0.628 JT	0.383 T
chrysene					3 / 3	0.220 J	0.35	0.298
dibenzo (a,h) anthracene					2 / 3	0.043 J	0.082 J	0.063
fluoranthene					3 / 3	0.450 J	0.855 J	0.672
indeno (1,2,3-cd) pyrene					3 / 3	0.120 J	0.28 JT	0.19 T
pyrene					3 / 3	0.370 J	0.655 J	0.558
phenanthrene					3 / 3	0.100 J	0.28 J	0.193
4-chloro-3-methylphenol	1 / 3		0.005	0.005	1 / 3		0.069	0.069
1,4-dichlorobenzene	1 / 1		0.00011	0.00011				
diethylphthalate	1 / 3		0.5 J	0.028				
Total PAH							1.998	1.286
Pesticides/PCBs:								
None detected								

TABLE 3-7
DATA SUMMARY FOR COMPOUNDS DETECTED
IN SEEP AREA B
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep B Water*				Seep B Sediment*							
	Frequency of Detection**	Minimum mg/L	Detected Range Maximum mg/L	Average mg/L	Frequency of Detection**	Minimum mg/kg		Detected Range Maximum mg/kg		Average mg/kg	
Inorganic Compounds (total)†											
aluminum	1 / 3		0.0361	0.026	3 / 3	1660		7850 J		4123	
arsenic	3 / 3	0.007 J	0.0152 J	0.0118	3 / 3	2.200	E	64.8 J	E	37.6	E
barium	3 / 3	0.281	1.43	0.687	3 / 3	161	E	1344 J	E	1118	E
cadmium	1 / 3		0.0022	0.0014	1 / 3			0.87	E	0.78	E
calcium	3 / 3	45.1	259.5	156.2	3 / 3	2340	E	55150 J	E	23363	E
chromium					2 / 3	4.70		13		6.2	
cobalt	3 / 3	0.007	0.0141	0.0103	3 / 3	4.40		8.3	E	6.9	
copper					3 / 3	4.90		15.7		10.2	
iron	3 / 3	0.155	145.5	58.3	3 / 3	75200	E	148000	E	103867	E
lead					3 / 3	2.60		21.9 J		11.6	
magnesium	3 / 3	76.3 J	112	96.7	3 / 3	1800		4840	E	3370	
manganese	3 / 3	0.014	5.17	1.93	3 / 3	194		1080	E	653	
nickel	2 / 3	0.031	0.0478	0.031	2 / 3	6.80		18.7	E	8.9	
potassium	3 / 3	121.5	260	171.5	3 / 3	443		1380	E	835	
sodium	3 / 3	215 J	813.5	435.5	1 / 3			1005 J	E	424	E
thallium					1 / 3			0.76	E	0.44	E
vanadium	1 / 3		0.0033	0.002	3 / 3	7.30		17.7 J	E	12.2	
zinc	3 / 3	0.083	0.315	0.169	3 / 3	216		637	E	408	E

NOTE:
* Includes duplicate sample SW-SW7 (3/92 round) and SD-SS7 (3/92 round) averaged with SW-SW2 (3/92 round) and SD-SS2 (3/92 round) respectively prior to data analysis.
** Frequency of detection refers to the number of times a constituent was detected, per sample group size, during the 10/91, 3/92 and 10/92 rounds.
*** 1,4-Dichlorobenzene was analyzed for only during the 10/92 round
J = Concentration is estimated
T = Concentration is used in computing total PAH for those PAHs lacking chemical-specific NOAA sediment sediment guidelines.

TABLE 3-8
DATA SUMMARY FOR COMPOUNDS DETECTED
IN SEEP AREA C
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep C Water				Seep C Sediment			
	Frequency of Detection*	Detected Range Minimum mg/L	Detected Range Maximum mg/L	Average mg/L	Frequency of Detection*	Detected Range Minimum mg/kg	Detected Range Maximum mg/kg	Average mg/kg
Volatile Organic Compounds**								
vinyl chloride	1 / 5		0.17	0.169	1 / 5		0.45 J	0.105
chloroethane	3 / 5	0.140	0.89	0.39	4 / 5	0.120 J	0.2 J	0.094
methylene chloride	2 / 5	0.097	0.45	0.166				
acetone	1 / 5		1.3	1.1	5 / 5	0.005 J	17 J	5.103
1,1-dichloroethene					1 / 5		0.009 J	0.0083
1,1-dichloroethane	3 / 5	0.350 J	3	0.67	1 / 5		1.3 J	0.277
c,t-1,2-dichloroethene	2 / 5	0.043 J	4.3	0.904	2 / 5	0.060 J	2.2 J	0.456
1,2-dichloroethane	1 / 5		0.012 J	0.012				
2-butanone	5 / 5	1.70	14	5.9	4 / 5	0.046 J	18 J	5.11
1,1,1-trichloroethane	1 / 5		0.64 J	0.17	1 / 5		0.39	0.095
trichloroethene					1 / 5		0.05	0.027
benzene					1 / 5		0.008 J	0.008
4-methyl-2-pentanone	4 / 5	0.120	1	0.39	4 / 5	0.005 J	1.2 J	0.342
2-hexanone	5 / 5	0.160	1.6	0.61	4 / 5	0.110 J	3.8 J	0.86
tetrachloroethene					1 / 5		0.012 J	0.01
toluene	5 / 5	0.057 J	3	1.047	4 / 5	0.017 J	2.1 J	0.5
chlorobenzene					1 / 5		0.004 J	0.004
ethylbenzene	5 / 5	0.031 J	0.23 J	0.118	5 / 5	0.003 J	0.36	0.086
total xylenes	4 / 5	0.140	0.89 J	0.426	5 / 5	0.010 J	1.2 J	0.453
tetrahydrofuran	1 / 2		0.53 J	0.39	2 / 2	0.040 J	0.28 J	0.16
Semivolatile Organic Compounds								
phenol	4 / 5	0.060 J	3.6 J	0.92	2 / 5	0.076 J	1.6 J	0.565
4-methylphenol	4 / 5	0.540 J	24 J	7.178	3 / 5	0.059 J	7.1	1.65
naphthalene					1 / 5		0.75 J	0.432
2-methylnaphthalene					1 / 5		0.46 J	0.363
bis (2-ethylhexyl) phthalate					1 / 5		0.88 J	0.667
benzo (a) anthracene					2 / 5	0.074 J	0.11 J	0.092
benzo (a) pyrene					2 / 5	0.074 J	0.12 J	0.097
benzo (b) fluoranthene					3 / 5	0.088 J	0.25 JT	0.159 T
benzo (ghi) perylene					1 / 5		0.084 JT	0.084 T
benzo (k) fluoranthene					2 / 5	0.088 J	0.25 JT	0.189 T
chrysene					3 / 5	0.065 J	0.15 J	0.108
fluoranthene					3 / 5	0.120 J	0.3 J	0.226
pyrene					3 / 5	0.090 J	0.25 J	0.187
phenanthrene					3 / 5	0.072 J	0.15 J	0.117
4-chloro-3-methylphenol	1 / 5		0.062	0.062	1 / 5		0.058 J	0.058
2-methylphenol	2 / 5	0.440 J	0.11	0.085				
diethylphthalate	1 / 5		0.12 J	0.12				
Total PAH							0.584	0.432

Pesticides/PCBs
None detected

TABLE 3-8
DATA SUMMARY FOR CONSTITUENTS DETECTED
IN SEEP AREA C
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep C Water				Seep C Sediment							
	Frequency of Detection*	Minimum mg/L	Detected Range Maximum mg/L	Average mg/L	Frequency of Detection*	Minimum mg/kg		Detected Range Maximum mg/kg		Average mg/kg	
Inorganic Compounds (total):											
aluminum	3 / 5	0.446	2.11	0.64	5 / 5	1450 J		6190 J		3424	
arsenic	5 / 5	0.006	0.018	0.01	5 / 5	2.400 J	E	12.4 J	E	6.8	E
barium	5 / 5	0.982 J	3.85	2.642	5 / 5	119 J	E	2120 J	E	812	E
beryllium					1 / 5			0.43		0.36	
cadmium	1 / 5		0.0037	0.0018							
calcium	5 / 5	227	655	458	5 / 5	464 J		44200	E	35228	E
chromium					3 / 5	3.70		20.8 J	E	10.5	
cobalt	5 / 5	0.013 J	34.6	0.02	4 / 5	8.80	E	20.8 J	E	12.6	E
copper	1 / 5		0.009	0.0054	4 / 5	9.70		16.4		10.3	
iron	5 / 5	108	505	286	5 / 5	27900 J	E	338000 J	E	260460	E
lead	3 / 5	0.002 J	0.0041 J	0.0018	5 / 5	8.200 J		11.4 J		9.4	
magnesium	5 / 5	64.2	139	114	5 / 5	1530		3510		2472	
manganese	5 / 5	2.47 J	12.2	7.05	5 / 5	349		3650	E	2154	E
nickel	4 / 5	0.045	0.0616	0.046	2 / 5	10.0		14.3		9.9	
potassium	5 / 5	73.5	231	167	5 / 5	645		13.1		928	
silver	1 / 5		0.0021	0.0018							
sodium	5 / 5	237 J	582	383	2 / 5	186	E	1410	E	797	E
vanadium	3 / 5	0.012	0.0223	0.009	5 / 5	7.40		17.7 J	E	13.4	
zinc	4 / 5	0.067 J	0.485	0.219	5 / 5	98.9 J		132		113	
cyanide					2 / 5	1.60	E	2.3	E	1	E

NOTE:
* Frequency of detection refers to the number of times a constituent was detected, per sample group size, during the 10/91, 3/92 and 10/92 rounds.
** Tetrahydrofuran was analyzed for only during the 10/91 round
J = Concentration is estimated
T = Concentration is used in computing total PAH for those PAHs lacking chemical specific NOAA sediment guidelines.
E= Exceeds upgradient concentration (inorganics only)

TABLE 3-9
DATA SUMMARY FOR COMPOUNDS DETECTED
IN SEEP AREA D
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep D Water				Seep D Sediment				
	Frequency of Detection	Detected Range Minimum mg/L	Detected Range Maximum mg/L	Average mg/L	Frequency of Detection	Detected Range Minimum mg/kg	Detected Range Maximum mg/kg		Average mg/kg
Volatile Organic Compounds**									
methylene chloride					1 / 3		0.013 J		0.009
acetone	1 / 2		0.01	0.0075	1 / 3		0.004 J		0.004
2-butanone	1 / 2		0.001	0.001					
tetrahydrofuran	1 / 1		0.091	0.091					
Semivolatile Organic Compounds:									
fluoranthene					1 / 3		0.036 J		0.036
diethylphthalate	1 / 2		0.005	0.005					
Pesticides/PCBs:									
None detected									
Inorganic Compounds (total):									
aluminum	2 / 2	0.832	4.64 J	2.736	3 / 3	2700 J	10500	E	6567
arsenic					3 / 3	2.8 J E	6.7	E	4.2 E
barium	2 / 2	0.152	0.182	0.167	3 / 3	10 J	113	E	51.3 E
calcium	2 / 2	58.2	76.2	67.2	3 / 3	573 J	4020	E	1981
chromium	1 / 2		0.0056	0.0041	3 / 3	4.1	16.3	E	10.3
cobalt	2 / 2	0.008	0.018	0.0129	2 / 3	7.5	20.6	E	9.7 E
copper					2 / 3	15.1	22.9	E	14.2
iron	2 / 2	8.40	20.3 J	14.35	3 / 3	6840 J	45800	E	22747 E
lead	1 / 2		0.0075 J	0.004	3 / 3	5.20 J	18.5		9.7
magnesium	2 / 2	19.5	24.5	22	3 / 3	1420	5620	E	3533
manganese	2 / 2	2.65 J	4.73 J	3.69	3 / 3	100 J	2860	E	1102 E
nickel	1 / 2		0.122	0.0122	2 / 3	14	21.4	E	13
potassium	2 / 2	21.7	31.4 J	26.6	3 / 3	494	1610	E	1038 E
sodium	2 / 2	59.5	115 J	87.3	1 / 3		50.5	E	32.2 E
thallium					1 / 3		0.46 J	E	0.35 E
vanadium	2 / 2		0.0087	0.0051	3 / 3	5.4	23.1	E	14
zinc					2 / 3	16 J	63.9		33.4

NOTE:
* Frequency of detection refers to the number of times a constituent was detected, per sample group size, during the 10/91, 3/92 and 10/92 rounds.
** Tetrahydrofuran was analyzed for only during the 10/91 round
J = Concentration is estimated
E= Exceeds upgradient concentration (inorganics only)

TABLE 3-10
DATA SUMMARY FOR COMPOUNDS DETECTED
IN SEEP AREA E
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep E Water*				Seep E Sediment*			
	Frequency of Detection	Minimum mg/L	Detected Range Maximum mg/L	Average mg/L	Frequency of Detection	Minimum mg/kg	Detected Range Maximum mg/kg	Average mg/kg
Volatile Organic Compounds*:**								
chloroethane	4 / 4	0.012	0.66	0.233				
acetone	3 / 4	0.590 J	1.5	0.857	1 / 3		0.16 J	0.049
1,1-dichloroethane	2 / 4	0.061 J	0.29 J	0.09				
c,t-1,2-dichloroethene	2 / 4	0.031 J	0.1 J	0.035				
chloroform	1 / 4		0.03 J	0.013				
2-butanone	4 / 4	0.590 J	2.7	1.44	1 / 3		0.11 J	0.0096
4-methyl-2-pentanone	4 / 4	0.060 J	0.58	0.27				
2-hexanone	4 / 4	0.031 J	0.15 J	0.089				
toluene	4 / 4	0.002 J	0.52	0.157				
ethylbenzene	1 / 4		0.027 J	0.022				
total xylenes	2 / 4	0.036 J	0.14 J	0.047				
tetrahydrofuran	1 / 1		0.135	0.135				
Semivolatile Organic Compounds:								
phenol	4 / 4	0.038	0.075 J	0.054				
4-methylphenol	2 / 4	0.030	0.032	0.031				
bis (2-ethylhexyl) phthalate					2 /4	0.068 J	0.41 J	0.217
anthracene					1 / 4		0.16	0.16
carbazole					1 / 4		0.099	0.099
benzo (a) anthracene					3 / 4	0.046 J	0.23 J	0.148
benzo (a) pyrene					2 / 4	0.071 J	0.13 J	0.101
benzo (b) fluoranthene					3 / 4	0.075 J	0.2 JT	0.171 T
benzo (ghi) perylene					1 / 4		0.041 JT	0.041 T
benzo (k) fluoranthene					2 / 4	0.087	0.17 JT	0.18 T
chrysene					3 / 4	0.051 J	0.24 J	0.156
fluoranthene					3 / 4	0.098 J	0.75 J	0.327
fluorene					1 / 4		0.059 J	0.059
indeno (1,2,3-cd) pyrene					1 / 4		0.064 JT	0.064 T
pyrene					3 / 4	0.081 J	0.66 J	0.288
phenanthrene					3 / 4	0.052 J	0.8 J	0.298
2-methylphenol	2 / 4		0.012	0.012				
bis(2-chlorisopropyl)ether	1 / 2		0.066 J	0.066				
diethylphthalate	2 / 4	0.006	0.006	0.006				
Total PAH							0.475	0.456
Pesticides/PCBs:								
4,4'-DDD					1 / 1		0.0049 J	0.0049
4,4'-DDT					1 / 1		0.008 J	0.008

TABLE 3-10
DATA SUMMARY FOR COMPOUNDS DETECTED
IN SEEP AREA E
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep E Water*				Seep E Sediment*				
	Frequency of Detection	Detected Range Minimum mg/L	Detected Range Maximum mg/L	Average mg/L	Frequency of Detection	Detected Range Minimum mg/kg		Detected Range Maximum mg/kg		Average mg/kg
Inorganic Compounds (total):										
aluminum	3 / 4	0.023	0.11	0.056	4 / 4	8190	E	16500 J	E	13048 E
arsenic	4 / 4	0.006	0.112 J	0.033	3 / 4	5.00	E	13.6	E	6.3 E
barium	4 / 4	0.205	0.321 J	0.258	4 / 4	74.3 J	E	174	E	108 E
beryllium					3 / 4	0.400		0.77	E	0.53 E
cadmium					1 / 4		E	0.83	E	0.59 E
calcium	4 / 4	139.5	270	186	4 / 4	2470 J	E	20700	E	13168 E
chromium					4 / 4	13.2		27.6	E	21.6 E
cobalt	3 / 4	0.005	0.0219	0.011	4 / 4	14.5	E	16.7	E	15.3 E
copper	1 / 4		0.0066	0.0031	4 / 4	23.8	E	29 J	E	26.2 E
iron	4 / 4	3.49	49	25.5	4 / 4	33200 J	E	76300	E	46550 E
lead					4 / 4	8.30		27.5 J	E	14.3
magnesium	4 / 4	101.9 J	228	162.5	4 / 4	4890	E	9.4 #		7568 E
manganese	4 / 4	1.22	12.2	4.98	4 / 4	677 J		3810	E	1787 E
nickel	3 / 4	0.024	0.0309	0.024	4 / 4	15.6		32.3	E	25.3 E
potassium	4 / 4	21.4 J	52.7	36.4	4 / 4	1010	E	2250	E	1813 E
silver	1 / 4		0.00017	0.00017						
sodium	4 / 4	174 J	593 J	389	3 / 4	460	E	574	E	429 E
thallium					1 / 4			0.67 J	E	0.45 E
vanadium	1 / 4		0.0023	0.0018	4 / 4	21.6	E	32.3 J	E	27.4 E
zinc	4 / 4	0.055	0.127	0.09	4 / 4	202 J		503	E	314 E
cyanide	1 / 4		0.013	0.007						

NOTE:
* Includes duplicate sample SW-SW7 (10/91 and 10/92 rounds) and SD-SS7 (10/92 round) averaged with SW-SW6 (10/91 and 10/92 rounds) and SD-SS6 (10/92 round) respectively prior to data analysis.
**Frequency of detection refers to the number of times a constituent was detected, per sample group size, during the 10/91, 3/92 and 10/92 rounds.
*** Tetrahydrofuran was analyzed for only during the 10/91 round.
† bis(2-Chloroisopropyl)Ether was analyzed for only during the 10/91 round.
J = Concentration is estimated
T = Concentration is used in computing total PAH for those PAHs lacking chemical specific NOAA sediment guidelines.
E= Exceeds upgradient concentration (inorganics only)
#= Maximum concentration value is less than average concentration.

TABLE 3-11
DATA SUMMARY FOR COMPOUNDS DETECTED
IN SEEP AREA F
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep F Water				Seep F Sediment			
	Frequency of Detection*	Detected Range Minimum mg/L	Detected Range Maximum mg/L	Average mg/L	Frequency of Detection*	Detected Range Minimum mg/kg	Detected Range Maximum mg/kg	Average mg/kg
Volatile Organic Compounds:								
None detected								
Semivolatile Organic Compounds:								
4-methylphenol	1 / 3		0.001 J	0.001				
Pesticides/PCBs:								
None detected								
Inorganic Compounds (total):								
aluminum	2 / 3	7.82	55.9 J	21.2	1 / 1		2850	2850
arsenic	2 / 3	0.002	0.0267 J	0.01	1 / 1		1.3	1.3
barium	3 / 3	0.057	0.393 J	0.175	1 / 1		8.8	8.8
beryllium	1 / 3		0.002	0.001				
calcium	3 / 3	45.3	158	102	1 / 1		1090	1090
chromium	2 / 3	0.014	0.09	0.036	1 / 1		4.6	4.6
cobalt	3 / 3	0.005	0.0835	0.032	1 / 1		6	6
copper	1 / 3		0.0256	0.0147	1 / 1		7.5	7.5
iron	3 / 3	1.72	97 J	37.74	1 / 1		10100	10100
lead	2 / 3	0.007	0.0675 J	0.025	1 / 1		3.2	3.2
magnesium	3 / 3	13.6	47.7	26.1	1 / 1		1510	1510
manganese	3 / 3	0.338	8.67	4.66	1 / 1		158	158
mercury	1 / 3		0.0001	0.0001				
nickel	2 /3	0.020	0.167	0.064	1 / 1		6.9	6.9
potassium	3 / 3	4.09	23.9	14.4				
selenium	1 / 3		0.0026	0.0023				
sodium	3 / 3	57.1	106	86.6				
vanadium	2 / 3	0.016	0.103	0.04	1 / 1		7.3	7.3
zinc	2 / 3	0.043	0.0454	0.044				

NOTE:
* Frequency of detection refers to the number of times a constituent was detected, per sample group size, during the 10/91, 3/92 and 10/92 rounds.
J = Concentration is estimated

TABLE 3-12
DATA SUMMARY FOR COMPOUNDS DETECTED
IN SEEP AREA G
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep G Water					Seep G Sediment				
	Frequency of Detection*	Detected Range Minimum mg/L	Detected Range Maximum mg/L	Average mg/L	Location of Maximum	Frequency of Detection*	Detected Range Minimum mg/L	Detected Range Maximum mg/L	Average mg/L	Location of Maximum
Volatile Organic Compounds:										
methylene chloride						1 / 3		0.009 J	0.0073	SD-SS34
acetone	1 / 2		0.0043 J	0.0059	SW-SW9					
2-butanone	1 / 1		0.0039 J	0.0039	SW-SW9					
4-methyl-2-pentanone	1 / 2		0.0014 J	0.0014	SW-SW9					
Semivolatile Organic Compounds:										
2,4 Dinitrophenol	1 / 2		0.001	0.001	SW-SW32					
Pesticides/PCBs:										
None detected										
Inorganic Compounds (total):										
aluminum	2 / 2	0.561	2.3	1.43	SW-SW9	3 / 3	3270	6150	4390	SD-SS9
arsenic					SW-SW9	3 / 3	1.50	3.4 E	2.2 E	SD-SS34
barium	2 / 2	0.058	0.0657	0.0618	SW-SW9	3 / 3	13.9	20.2	17.2	SD-SS32
beryllium	1 / 2		0.0047	0.0019	SW-SW9					
cadmium	1 / 2		0.00028	0.0002	SW-SW9					
calcium	2 / 2	52.7	95.5	74.1	SW-SW9	3 / 3	1610	2080	1907	SD-SS9
chromium	1 / 2		0.314	0.08	SW-SW9	3 / 3	5.60	10.4	7.4	SD-SS9
cobalt	1 / 2		0.0049	0.0035	SW-SW9	3 / 3	3.90	7.4	5.4	SD-SS9
copper	1 / 2		0.0194	0.0117	SW-SW9	3 / 3	11.9	14.9	13.1	SD-SS9
iron	2 / 2	1.900	7.09	4.5	SW-SW9	3 / 3	8310	14300	11370	SD-SS9
lead	1 / 2		0.0071	0.0038	SW-SW9	3 / 3	3.200	4.9	3.8	SD-SS9
magnesium	2 / 2	9.010	18	13.5	SW-SW9	3 / 3	1770	3440	2417	SD-SS9
manganese	2 / 2	1.720	2.04	1.72	SW-SW9	3 / 3	148	274	223	SD-SS9
nickel	1 / 2		0.0085	0.0063	SW-SW9	3 / 3	8.00	13.9	10.4	SD-SS9
potassium	2 / 2	9.53	11.7	0.011	SW-SW9	1 / 3		845	457	SD-SS9
sodium	2 / 2	47.2	95.8	71.5	SW-SW9					
vanadium	1 / 2		0.0083	0.0052	SW-SW9	3 / 3	7.80	13.2	10.1	SD-SS9
zinc	2 / 2	0.056	0.0808	0.068	SW-SW9	1 / 3		53.2	28.9	SD-SS9

NOTE:
* Frequency of detection refers to the number of times a constituent was detected, per sample group size, during the 10/91, 3/92 and 10/92 rounds.
J = Concentration is estimated

TABLE 3-13
DATA SUMMARY FOR COMPOUNDS DETECTED
IN SEEP AREA H
BFI_ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep H Water				Seep H Sediment			
	Frequency of Detection*	Minimum mg/L	Detected Range Maximum mg/L	Average mg/L	Frequency of Detection*	Minimum mg/kg	Detected Range Maximum mg/kg	Average mg/kg
Volatile Organic Compounds:								
acetone	1 / 2		0.46	0.305				
2-butanone	2 / 2	0.160 J	0.49	0.325				
4-methyl-2-pentanone	1 / 2		0.03	0.019				
2-hexanone	1 / 2		0.099	0.054				
Semivolatile Organic Compounds:								
phenol	1 / 2		0.015 J	0.01				
4-methylphenol	1 / 2		0.098	0.074				
2-methylphenol	1 / 2		0.056	0.053				
diethylphthalate	1 / 2		0.005 J	0.005				
Pesticides/PCBs: N/A								
Inorganic Compounds (total):								
aluminum	2 / 2	0.470	199 J	0.1	2 / 2	6260	6330	6295
arsenic	2 / 2	0.002	0.0196 J	0.011	2 / 2	1.70	2.1 E	1.9
barium	2 / 2	0.184	1.175 J	0.677	2 / 2	27.6	32.7	30.15
beryllium	1 / 2		0.0047	0.0029				
calcium	2 / 2	109	169	139	2 / 2	2120	3510 E	2815 E
chromium	1 / 2		0.314	0.158	2 / 2	10.5	10.7	10.6
cobalt	1 / 2		0.174	0.088	2 / 2	6.20	6.9	6.6
copper					2 / 2	12.2	12.9	12.6
iron	2 / 2	0.993	366 J	0.183	2 / 2	13400	14200	13800
lead	1 / 2		0.119 J	0.06	2 / 2	4.70	5.2	5
magnesium	2 / 2	72.6	163	117.8	2 / 2	3370	3440	3405
manganese	2 / 2	0.222	9.93 J	5.076	2 / 2	346	357	352
mercury					1 / 2		0.11 E	0.07 E
nickel	2 / 2	0.015	0.393	0.204	2 / 2	12.2	12.3	12.3
potassium	2 / 2	46.6	53.6	50.1	2 / 2	825	871	848
sodium	2 / 2	189	278	233.5				
vanadium	1 / 2		0.353	0.177	2 / 2	13.2	13.3	12.3
zinc	1 / 2		0.929	0.466				

NOTE:
* Frequency of detection refers to the number of times a constituent was detected, per sample group size, during the 10/91, 3/92 and 10/92 rounds.
N/A = Not analyzed for during the 10/91, 3/92 and 10/92 rounds
J = Concentration is estimated
E= Exceeds upgradient concentration (inorganics only)

TABLE 3-14
DATA SUMMARY FOR COMPOUNDS DETECTED
IN BACKGROUND SEEP SEDIMENT
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep Sediment (Background)			
			Detected Range	
	Frequency of Detection	Minimum mg/kg	Maximum mg/kg	Average mg/kg
Volatile Organic Compounds:				
None detected				
Semivolatile Organic Compounds:				
bis (2-ethylhexyl) phthalate	1 / 1		0.12 J	0.12
benzo (a) anthracene	1 / 1		0.16 J	0.16
benzo (a) pyrene	1 / 1		0.17 J	0.17
benzo (b) fluoranthene	1 / 1		0.27 JT	0.27 T
benzo (ghi) perylene	1 / 1		0.85 JT	0.85 T
benzo (k) fluoranthene	1 / 1		0.1 JT	0.1 T
chrysene	1 / 1		0.22 J	0.22
fluoranthene	1 / 1		0.37 J	0.37
indeno (1,2,3-cd) pyrene	1 / 1		0.093 JT	0.093 T
pyrene	1 / 1		0.41 J	0.41
phenanthrene	1 / 1		0.3 J	0.3
Total PAH			1.313	1.313
Pesticides/PCBs: N/A				
Inorganic Compounds (total):				
aluminum	1 / 1		8170	8170
arsenic	1 / 1		2	2
barium	1 / 1		44.1	44.1
beryllium	1 / 1		0.44	0.44
calcium	1 / 1		2270	2270
chromium	1 / 1		14.8	14.8
cobalt	1 / 1		7.9	7.9
copper	1 / 1		17.6	17.6
iron	1 / 1		16200	16200
lead	1 / 1		23.8	23.8
magnesium	1 / 1		4230	4230
manganese	1 / 1		804	804
nickel	1 / 1		17.5	17.5
potassium	1 / 1		951	951
vanadium	1 / 1		16.8	16.8
zinc	1 / 1		247	247

NOTE:
* Frequency of detection refers to the number of times a constituent was detected, per sample group size, during the 10/91, 3/
N/A = Not analyzed for during the 10/91, 3/92 and 10/92 rounds
J = Concentration is estimated
T = Concentration is used in computing total PAH for those PAHs lacking chemical specific NOAA sediment guidelines.

TABLE 3-15
DATA SUMMARY FOR COMPOUNDS
DETECTED IN ROUND 3 OVERSIGHT SURFACE WATER
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM,VERMONT

	River Water			Seep Surface Water			Seep Surface Water		
Sample Location	BFI-Landfill RW-2A	BFI-Rockingham RW-3	BFI-Rockingham RW-3	BFI-Rockingham SW-2	BFI-Rockingham SW-3/4	BFI-Rockingham SW-6	BFI-Rockingham SW-9(MS/MSD)	BFI-Rockingham SW-32	BFI-Rockingham SW-35
Sampling Date		10/15/92	10/15/92	10/14/92	10/13/92	10/14/92	10/15/92	10/15/92	10/15/92
Volatile Organic Compounds (ug/L)									
Vinyl Chloride					4 J				
Chloroethane					900 J	15			
Methylene Chloride					52				
Acetone					2000 J	910 J			
Carbon Disulfide					2 J				
1,1-Dichloroethane					4 J				3 J
1,2-Dichloroethane					2 J				
2-Butanone					3800	920 J			
1,1,1-Trichloroethane									2 J
Benzene					2 J				
4-Methyl-2-pentanone					300 J	66			
2-Hexanone					260 J	31			
Toluene					280 J	2 J			
Ethylbenzene					31				
Total Xylenes					180	2 J			
Semivolatile Organic Compounds (ug/L)									
Phenol					260 J				
4-Methylphenol					4700				
Diethylphthalate						6 J			
Pesticides and PCBs (ug/L)									
delta-BHC				0.020 J					
Aldrin					0.11 J				
Heptachlor epoxide				0.0078 J					
4,4'-DDE				0.010 J					
Endrin					0.021 J				
alpha-Chlordane			0.014 J		0.0054 J				
Inorganics (ug/L)									
Aluminum	218				337		570 J	2720	204
Barium	11.2 J	11.2 J		358 J	4440 J	230 J	70.1 J	68.3 J	94.7 J
Calcium	16100 E	15200 E	15500 E	44400	513000	163000	88800 J	54700	95100
Cobalt				12.2					
Iron	737	248	263		415000	3600	2030 J	8030	5670
Lead	2.3 E	2.5 E		2.6	6.4	3.4	2.6 J	7.8	2.9
Magnesium	1970	1820	1830	112000	139000	231000	17200 J	9500	16800
Manganese	77.0	37.9	38.9	16.8	7500	1280	1990 J	1810	3550
Nickel				53.7	62.4	32.3	3.5 J	8.2	3.1
Potassium	2210 E	1900	1650	248000	231000	49100	10900 J	9880	13800
Sodium	7690 E	6590	6650	276000	447000	387000	90100 J	49800	96400
Vanadium					15.8 J				
Zinc				295	184	93.4		89.0	60.9
Cyanide									

J = Concentration is estimated
E = Concentration exceeds upgradient river water concentration (note: upgradient seep surface water concentration was not collected.)

TABLE 3-16
DATA SUMMARY FOR COMPOUNDS
DETECTED IN ROUND 3 OVERSIGHT SEDIMENT DATA
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	River Sediment		Seep Sediment			Seep Sediment	
Sample Location	BFI - Rockingham RWS-2A	BFI - Rockingham RWS-3B	BFI - Rockingham SS-2	BFI - Rockingham SS-3/4	BFI - Rockingham SS-3/4	BFI - Rockingham SS-9(MS/MSD)	BFI - Rockingham SS-33
Sampling Date	10/14/92	10/15/92	10/13/92	10/13/92	10/13/92	10/15/92	10/15/92
Volatile Organic Compounds (ug/Kg)							
Carbon Disulfide				4 J	5 J		
Ethylbenzene				6 J	7 J		
Total Xylenes				68	85		
Semivolatile Organic Compounds (ug/Kg)							
4-Methylphenol					57 J		
4-Chloro-3-methylphenol				66 J	80 J		
Acenaphthylene			270 J	110 J			
Dibenzofuran			190 J				
Fluorene			280 JT	54 JT			
Phenanthrene			2200	670 J	140 J		
Anthracene			460	160 J			
Carbazole			420	69 J			
Fluoranthene		93 J	2400	1200 J	270 J		
Pyrene		85 J	1800	950 J	220 J		
Benzo (a) anthracene			1000	440 J	120 J		
Chrysene		55 J	1100	460 J	150 J		
Bis (2-ethylhexyl) phthalate					65 J	93 J	
Benzo (b) fluoranthene			1200 T	470 JT	150 JT		
Benzo (k) fluoranthene			580 T	290 JT	98 JT		
Benzo (a) pyrene			790	420 J	110 J		
Indeno (1,2,3-cd) pyrene			340 JT	220 JT	72 JT		
Dibenzo (a,h) anthracene			150 J	71 J			
Benzo (ghi) perylene			150 JT	150 JT			
Total PAH			2550	1184	320		
Pesticides and PCBs (ug/Kg)							
delta-BHC		1.0 J					
Heptachlor		3.9 J		0.36 J	0.64 J		
Heptachlor epoxide			0.34 J	1.1 J			
Dieldrin		0.37 J	0.20 J				
4,4'-DDE		0.51 J		0.95 J	0.24 J		
Endosulfan II		0.75 J	1.8 J				
4,4'-DDD		0.88 J	2.0 J				
4,4'-DDT			3.7 J				
Endrin aldehyde			6.0	11 J	7.8 J		
Gamma Chlordane					1.4 J		
Inorganics (mg/Kg)							
Aluminum	6000	8410	3450	3660	4200	5570	8080
Barium	22.8	40.4 E	182 E	204 E	198 E	20.5	45.5 E
Calcium	1800	1900	2460 E	24000 E	23100 E	2070	3850 E
Chromium	9.5 E	15.7 E	5.7 J	6.1 J	6.8 J	9.6	15.3 E
Cobalt	7.2	8.9 E		6.3	6.7	7.5	8.9 E
Copper	14.8	20.3 E	15.0	11.7	30.8 E	15.0	17.0
Iron	14600	15900	97300 E	94000 E	92200 E	13900	18000 E
Lead	6.7 J	13.4 J E	18.5 J	13.6 J	14.1 J	7.0 J	6.7 J
Magnesium	3330	4220	1990	2410	2620	3100	4340 E
Manganese	344 E	261	205	1230 E	1270 E	279	449
Nickel	12.8	16.2	6.1 J	6.1 J	6.5 J	11.8	15.4
Potassium	824	1010	472	649	754	822	1310 E
Sodium				354 J E	344 J E		
Vanadium	15.0	19.8 E	20.1 E	22.4 E	21.0 E	13.8	20.4 E
Zinc	45.1 J	58.6 J	242 J	74.0 J	69.6 J	50.3 J	42.0 J
Cyanide							

J= Concentration is estimated
T= Concentration used in computing total PAH.
E= Exceeds upgradient concentration.

Table 3-17
Diversity of Organic Contaminants Detected in Media of Exposure Zones

Media and Exposure Zone	Number of Contaminants per Chemical Class		
	VOCs	SVOCs	Pesticides/PCBs
Surface Water			
Ponds	3	5	0
Seeps	19	10	6
River	0	1	1
Sediment			
Ponds	10	6	0
Seeps	18	25	9
River	2	4	6

Section 4

4.0 Exposure Assessment

A total of 28 exposure scenarios were evaluated, collectively, based on the 14 ecological exposure zones, and the two media of concern: surface water and sediment (see Section 3.2). The basic type of exposure considered for each of these 28 scenarios is *media contact*, which evaluates exposures to contaminants in surface water and/or sediment via multiple exposure routes. This exposure assessment is based on the simplifying assumptions that a correlation exists between the concentration in the medium and the magnitude of the physiological health of the species or communities of concern.

4.1 Potential Exposure Pathways

The most significant exposure pathway for aquatic biota is direct contact with sediment interstitial water (benthic species) and/or the overlying water column (pelagic species). Other pathways are direct contact with sediment, respiration of water, and ingestion of contaminated food and sediment. Hydrophobic contaminants such as polychlorinated biphenyls (PCBs) and pesticides preferentially partition into sediments, especially those with high total organic carbon (TOC) content, while more soluble compounds such as the shorter-chained phthalates are found to a greater degree in pore water. These physicochemical interactions of media and contaminants, in turn, influence ecological exposure and contaminant bioavailability. Another factor influencing bioavailability of contaminants and thus the exposure pathways for biota is surface water hardness, which determines bioavailability and toxicity of some inorganic compounds (metals) to aquatic biota.

Amphibians receive a majority of their exposure via dermal/respiratory exposure to surface water, contact with contaminated sediments, and ingestion of contaminated prey. Contact with contaminated sediments may be an especially significant exposure route for hibernating amphibians. Amphibians have been shown to uptake significant quantities of some contaminants transdermally (including dermal respiration). Other less significant exposure routes for this group are ingestion of contaminated surface water and incidental ingestion of soil/sediment.

4.2 Exposure Assessment Approach

4.2.1 Aquatic and Benthic Communities

The simple exposure approach described in the following paragraph served as a generic exposure model for entire communities of both the pelagic (water column) and benthic (bottom) habitats of aquatic ecosystems. Since it incorporates all major, direct contaminant exposure pathways and scenarios for sediment and surface water

compounds, its use permitted community-level risk estimates. This model incorporates actual compound concentrations in sediment and the water column to which benthic and pelagic invertebrates and vertebrates are chronically exposed. These exposures are assessed without the use of dietary exposure or bioconcentration models, using acute and chronic toxicity thresholds such as EPA and State of Vermont ambient water quality criteria (AWQC), aquatic LOELs, and NOAA sediment guidelines.

We assume that, in general, members of the aquatic community are in continuous contact with dissolved contaminants in the water column. Water column concentrations are, therefore, compared with the applicable criteria or guideline to indicate the potential for effects. EPA has developed AWQC for the protection of the most sensitive species of an aquatic community. Contaminant concentrations in the water column which are less than AWQC would be interpreted as having no impact and posing no risk to the entire aquatic community.

Similarly, members of the benthic community are in continuous contact with contaminants in the sediment. Sediment concentrations are, therefore, compared to NOAA sediment criteria and interpreted to indicate ecological risks, or the potential for adverse effects. Use of one criteria, of course, presumes that benthic invertebrate communities do occur in the pond, seep, or stream or river sediments considered in this ERA.

This exposure assessment approach does not incorporate indirect exposures via bioaccumulation and/or food chain transfers of contaminants for several reasons. Site-specific data on aquatic primary producers (phytoplankton, vascular plants), zooplankton, and other links in aquatic food chains are not available with which to develop such complex exposure models. Secondly, both the AWQC and NOAA sediment guidelines have been designed to incorporate considerations of both contaminant toxicity and bioaccumulation. Therefore, these criteria do permit screeening-level recognition of potential bioaccumulation-mediated ecological risks for each compound.

4.3 Exposure Scenarios

Average and worst-case exposure scenarios were evaluated for all surface water and sediment exposure zones, respectively, by using the arithmetic mean and maximum detected compound concentrations in the exposure assessment models for each separate scenario evaluated. The average exposure scenario, thus, pertains to an overall exposure zone that includes one or more sampling locations (e.g., Seep C = surface water/sediment No. SW/SD-3, SW/SD-4, SW/SD-3/4) for which data from

multiple sampling events were averaged together. The worst-case exposure for each scenario, in contrast, is a point-specific exposure assessment at the sampling station at which the spatial and temperal maximum was reported.

Exposure scenarios included:

- Exposure of pelagic, invertebrate and vertebrate aquatic biota to surface water of the on-site ponds, ground water seeps, and Connecticut River.

- Exposure of benthic invertebrates to sediments of these same three subsets of sampling locations throughout the study area.

5.0 Toxicity Assessment

5.1 Ecotoxicological Data Sources

Ecotoxicological data reviewed during endpoint selection include:

- NOAA Sediment Guidelines (Long and Morgan, 1990, 1991)
- USEPA Ambient Water Quality Criteria documents (see references)
- Vermont AWQC

Literature citations for sources of all other data presented in the tables and text of this report are integrated into the references for the main body of the report.

5.2 Quantitative Dose-Response Data Used in Toxicity Assessment

All organic and inorganic compounds, for which AWQC, aquatic LOELs, and/or NOAA sediment guidelines are available were evaluated. Toxicity endpoints thus included both acute and chronic thresholds for response. These compound-specific endpoints are presented for both sediment and surface water in Tables 5-1 and 5-2.

Endpoints selected for toxicity assessment at the community level for pelagic biota, such as invertebrates, fish, and amphibians, are the acute and chronic Ambient Water Quality Criteria and Lowest Observed Effects Levels (LOEL) published by EPA in 1976 and 1987 and adopted by the State of Vermont Water Resources Board on April 17, 1991 (AWQC; see Table 5-1). Since, a chronic federal AWQC was not listed for silver, the value listed as the Vermont AWQC was used to assess chronic exposure to silver. These criteria are considered to be protective of entire, diverse aquatic communities, including algae, invertebrate, and vertebrate fauna.

Endpoints selected for toxicity assessment at the community level for benthic invertebrates living in contact with pond, seep or river sediments are the NOAA sediment guidelines (Long and Morgan, 1990, 1991), that are applicable to both marine and freshwater benthic organisms (see Table 5-2).

Section 5
Tables and Figures

Table 5-1
Toxicity Benchmarks for
Compounds Detected in Surface Water
BFI Rockingham Landfill, Rockingham, Vermont

	Ambient Water Quality Criteria	
	Acute mg/L	Chronic mg/L
Volatiles Organic Compounds		
Vinyl chloride	-	-
Chloroethane	-	-
Methylene chloride	-	-
Acetone	-	-
Carbon disulfide	-	-
1,1-Dichloroethene	11.6*	-
1,1-Dichloroethane	-	-
c,t-1,2-Dichloroethene	11.6*	-
1,2-Dichloroethane	118	20
Chloroform	28.9*	1.24*
2-butanone	-	-
1,1,1-Trichloroethane	-	-
4-methyl-2-pentanone	-	-
2-hexanone	-	-
Toluene	17.5	-
Ethylbenzene	32	-
Total xylenes	-	-
Tetrahydrofuran	-	-
Semivolatile Organic Compounds		
phenol	10.2	2.56
4-methylphenol	-	-
bis (2-ethylhexyl) phthalate	-	-
4-chloro-3-methylphenol	0.03*	-
1,4-dichlorobenzene	1.12*	0.763*
2-methylphenol	-	-
bis(2-chloroisopropyl) ether	-	-
2,4 dinitrophenol	-	-
4 nitrophenol	0.23*	0.15*
diethylphthalate	-	-
Pesticides		
delta-BHC	-	-
Aldrin	0.003	-
Heptachlor Epoxide***	0.00052	3.80E-06
4-4'-DDE	1.05	-
Endrin	0.00018	2.30E-05
Alpha Chlordane	0.0024	4.30E-06
Inorganic Compounds		
aluminum	-	0.75
arsenic	0.36	0.048
barium		
beryllium	0.13	0.0053
cadmium**	0.00179	0.00066
calcium	-	-
chromium	0.016	0.011
cobalt	-	-
copper**	0.0922	0.00654
iron	-	1
lead**	0.03378	0.00132
magnesium	-	-
manganese	-	-
mercury	0.0024	0.000012
nickel**	0.789	0.08771
potassium	-	-
selenium	0.26	0.035
silver**	0.00123	0.00012****
sodium	-	-
thallium	1.4	0.4
vanadium	-	-
zinc**	0.06504	0.05891
cyanide	0.022	0.0052

* *Insufficient data to develop criteria. Value presented is the L.O.E.L., as published by the EPA.*
**AWQC is based on a water hardness of 50 mg/L
*** Value listed for heptachlor epoxide AWQC is for heptachlor
****Vermont Water Quality Standards, April 17, 1991
- = No AWQC established at the time

Table 5-2
Toxicity Benchmarks for
Compounds Detected in Sediment
BFI Rockingham Landfill, Rockingham, Vermont

	NOAA Guideline ER-L mg/kg	NOAA Guideline ER-M mg/kg	Overall Apparent Effects Threshold	Subjective Degree of Confidence in ER-L/ER-M Values
Volatiles Organic Compounds				
Vinyl chloride	-	-	-	-
Chloroethane	-	-	-	-
Methylene chloride	-	-	-	-
Acetone	-	-	-	-
Carbon disulfide	-	-	-	-
1,1-Dichloroethene	-	-	-	-
1,1-Dichloroethane	-	-	-	-
c,t-1,2-Dichloroethene	-	-	-	-
Chloroform	-	-	-	-
2-butanone	-	-	-	-
1,1,1-Trichloroethane	-	-	-	-
Trichloroethene	-	-	-	-
Benzene	-	-	-	-
4-methyl-2-pentanone	-	-	-	-
2-hexanone	-	-	-	-
Tetrachloroethene	-	-	-	-
Toluene	-	-	-	-
Chlorobenzene	-	-	-	-
Ethylbenzene	-	-	-	-
Total xylenes	-	-	-	-
Tetrahydrofuran	-	-	-	-
Semivolatile Organic Compounds				
phenol	-	-	-	-
4-methylphenol	-	-	-	-
naphthalene	0.34	2.1	0.5	moderate/high
2-methylnaphthalene	0.065	0.67	0.3	low/moderate
acenaphthylene	0.15	0.65	0.15	low/low
bis (2-ethylhexyl) phthalate	-	-	-	-
anthracene	0.085	0.96	300	low/moderate
carbazole	-	-	-	-
benzo (a) anthracene	0.23	1.60	550	low/moderate
benzo (a) pyrene	0.4	2.50	700	moderate/moderate
benzo (b) fluoranthene	-	-	-	-
benzo (ghi) perylene	-	-	-	-
benzo (k) fluoranthene	-	-	-	-
chrysene	0.4	2.8	0.9	moderate/moderate
dibenzo (a,h) anthracene	0.06	0.26	0.1	moderate/moderate
fluoranthene	0.6	3.6	1	high/high
fluorene	0.035	0.64	0.35	low/low
indeno (1,2,3-cd) pyrene	-	-	-	-
pyrene	0.35	2.2	1000	moderate/moderate
phenanthrene	0.225	1.38	0.26	moderate/moderate
4-chloro-3-methylphenol	-	-	-	-
Total PAH	4	35	22	low/low
Pesticides and PCBs				
4,4'-DDE	0.002	0.015	NSD	low/low
4,4'-DDD	0.002	0.02	NSD	moderate/low
4,4'-DDT	0.001	0.007	0.006	low/low
Inorganic Compounds				
aluminum	-	-	-	-
arsenic	33	85	50	low/moderate
barium	-	-	-	-
beryllium	-	-	-	-
cadmium	5	9	5	high/high
calcium	-	-	-	-
chromium	80	145	-	moderate/moderate
cobalt	-	-	-	-
copper	70	390	300	high/high
iron	-	-	-	-
lead	35	110	300	moderate/high
magnesium	-	-	-	-
manganese	-	-	-	-
mercury	0.15	1.3	1	moderate/high
nickel	30	50		moderate/moderate
potassium	-	-	-	-
selenium	-	-	-	-
silver	1	2.2	1.7	moderate/moderate
sodium	-	-	-	-
thallium	-	-	-	-
vanadium	-	-	-	-
zinc	120	270	260	high/high
cyanide	-	-	-	-

NSD = Not sufficient data

- No NOAA sediment guideline established

6.0 Risk Characterization

The following discussions of potential risks are organized by exposure zone. A discussion of the quantitative risks, or chemical-specific Hazard Quotients (HQs) and overall Hazard Indices (HI), is presented first as a basis for subsequent considerations of ecological risks for each exposure zone. Average and maximum "aggregate risks" or HIs (sum of all compound-specific HQs), are summarized for each exposure scenario. Risk calculations, HQs, and HIs for pelagic and benthic communities are based on:

- Acute and chronic, Federal or Vermont AWQC
- LOELs published by EPA *in lieu* of AWQC
- NOAA ER-L and ER-M sediment criteria

The risk estimates are presented in Tables 6-1 through 6-17. These summary tables of compound-specific HQs for each exposure scenario serve to identify those compounds that have the greatest influence on potential ecological risks. The highest HQs and HIs calculated, using either Balsam or ADL data, were selected for discussion purposes and conclusions regarding risk. The relative influence of the maximum, point-specific HQs (using compound maxima) as a factor influencing zone-wide risks and the spatial distribution of risks for each biotic community within a particular zone, also is evident in these summary tables. The following discussions of quantitative risk estimates, therefore, address the extent to which the HIs are "driven" by particular compounds, and offer possible explanations for the likely source(s) of these potential risks.

Ecological risk estimates were also calculated for the inferred background/upgradient levels of inorganic compounds (metals), detected at the upgradient sample locations in both the Connecticut River (RW/RS-3) and the seeps (Seep Background, SS-30). A discussion of background metals levels for these media locations was presented in Section 3.1.4 and compound concentration levels were presented in Tables 3-2 and 3-14. A brief account of these potential background risks from metals, which are quantified in Tables 6-2 and 6-14, also is provided for each exposure scenario in the following discussions.

6.1 Risk Quantification

In the following discussions, Hazard Quotients (HQs) greater than 1.0 are considered as "potentially significant risks." "Low potential risks" are defined as HQs ranging between 1 and 10. "Moderate potential risks" are considered as HQs greater than 10 but less than 100. "High potential risks" are those resulting from HQs greater than

100. The same terminology is applied to the aggregate Hazard Indices (HIs) that represent the sum of all individual, chemical-specific HQs for a particular medium/location.

6.1.1 Surface Water

6.1.1.1 Overview of Surface Water Risks VOCs for which AWQC are available pose no risk in surface water, and risks from semivolatiles for which AWQC are available are virtually insignificant. The highest chronic risk estimate resulting from a semivolatile is a maximum chronic HQ of 1 for phenol at Seep C. A maximum acute surface water risk estimate of HQ=2 was also determined for this location for 4-chloro-3-methylphenol (Table 6-8).

PCBs and pesticides were either not detected in surface water by Balsam's laboratory analyses (seeps and ponds), or were not analyzed for by Balsam (river water). No PCBs were detected in any surface water collected by Arthur D. Little for oversight purposes, whereas several trace levels of pesticides were detected in some Arthur D. Little samples (see Table 3-15). At one river (RW-3) and two seep (SW-2 and SW-3/4) locations, these trace levels of pesticides in surface water result in some low potential risks.

Metals contribute significantly to the risk estimates for surface water. At all surface water locations several individual hazard quotients for metals exceed one. The risk drivers among the metals include iron, aluminum, and lead.

Surface water samples at the seeps consistently exhibit higher contaminant concentrations and HQs than do the samples collected from the Connecticut River and the two onsite ponds.

6.1.1.2 Retention Ponds No potentially significant risks are evident in pond surface water from VOCs, SVOCs, or PCBs/pesticides. No analyses of surface water were performed by Balsam for Pond 2, which is frequently dry. HQs exceed 1 for aluminum, chromium, copper, iron, lead, silver, and zinc, with a maximum chronic HQ of 17 for lead in Pond 1. Aggregate, chronic HIs for all compounds range up to a maximum HI of 57 in Pond 1.

6.1.1.3 Seeps No potentially significant risks are evident from VOCs, SVOCs, or PCBs/pesticides in Balsam's surface water data for most seep locations. However, the maximum chronic HQ for phenol is 1 at Seep C. Arthur D. Little's pesticide analyses, however, indicated a low risk (HQ=2) for exposure to trace levels of heptachlor epoxide in surface water at Seep B, and for trace levels of endrin (HQ=9)

and alpha chlordane (HQ=1) in surface water at Seep C. HQs also exceed 1 at one or more seep locations for arsenic, aluminum, cadmium, chromium, copper, cyanide, iron, lead, mercury, nickel, and zinc, with maxima as follows:

- iron - maximum HQ = 505 at Seep area C
- lead - maximum HQ = 389 at Seep area A
- aluminum - maximum HQ = 266 at Seep area H
- mercury - maximum HQ = 83 at Seep area A
- copper - maximum HQ = 70 at Seep area A
- zinc - maximum HQ = 67 at Seep area A
- chromium - maximum HQ = 29 at Seep areas G and H
- silver - maximum HQ = 18 at Seep area C
- cadmium - maximum HQ = 6 at Seep area C
- cyanide - maximum HQ = 3 at Seep area E
- nickel - maximum HQ = 5 at Seep area A, and
- arsenic - maximum HQ = 2 at Seep area E

Aggregate, acute and chronic HIs for all compounds range up to a maximum HI of 1,171 at Seep A.

6.1.1.4 Connecticut River No potentially significant risks are evident in river water from VOCs, or SVOCs, at either the background or downstream locations. As noted above, pesticides/PCBs were not analyzed for by Balsam in the river water. However, PCB/pesticide analyses of river water by Arthur D. Little indicated a low potential risk (HQ=3) from exposure to alpha-chlordane in surface water at sample location RW-3 (Table 6-15). HQs for metals in river water exceeded 1 for aluminum, chromium, iron, and lead, with a maximum chronic HQ of 47 for iron. Aggregate, chronic Hazard Indices (HIs) for all compounds range up to 100 at the non-background locations. HQs at the "background" river station also exceeded 1 for both aluminum (max. HQ=5) and iron (max. HQ=7), and the chronic aggregate HI maximum at this background location is 13.

6.1.1.5 Comparison of Surface Water Risks Using Arthur D. Little vs. Balsam Data Ecological risks were estimated based on the analytical oversight data from samples collected by Arthur D. Little during Balsam's Round 3 sampling event (see Table 6-15). Oversight sampling was conducted for sample locations:

- River surface water (RW-2A)
- River Background (RW-3)
- Surface water at Seep B (SW-2), Seep C (SW-3/4), Seep E (SW-6), Seep G (SW-9 and SW-32), and SW-35 (sample from closed pipe section flowing to Seep G)

No oversight surface water sampling was conducted on Ponds 1, 2, or 3, nor at Seeps A, D, F, H, and Background Seep. In general, at the shared sampling locations good correspondence was found between the compound-specific risks (HQs) and aggregate risks (HIs) for VOCs, SVOCs, and inorganic compounds, generated using the two independent datasets (see Table 6-17). No potentially significant risks are evident in either dataset for VOCs or SVOCs.

The following discussion highlights discrepancies in the risk calculations for pesticides and inorganics, between the two datasets, for shared sampling locations within each of the exposure zones.

Connecticut River - "Background." The average acute and chronic, aggregate surface water HIs for compounds detected at the Connecticut River background location, based on a single oversight sample, are 0.04 and 3, as compared with average HIs of 0.3 and 5 (maximum HIs of 0.4 and 13) based on Balsam's 1991 and 1992 data. The oversight chronic maximum HI of 4 is mostly due to one pesticide, alpha chlordane (0.014 ug/L; chronic HQ=3), whereas the maximum aggregate HI of 18 calculated from the Balsam data is attributed primarily to the levels of aluminum (HQ=5) and iron (HQ=7). Pesticide analyses were not conducted on the Balsam surface water samples. These minor differences in the aggregate HIs may merely reflect the limited size of the oversight dataset.

Connecticut River. Only inorganic compounds exhibit HQs that exceed 1, in RW-1, RW-2 and/or RW-2A (oversight); pesticides were neither analyzed for by Balsam nor detected in the oversight sample. Acute and chronic aggregate HIs for metals in a single oversight sample of Connecticut River water are 0.007 and 3, respectively, while the HIs calculated with Balsam's data from three events averaged 0.7 and 18 (with maxima of 3 and 100). These HIs differ because:

- Aluminum, iron, and lead account for 95% of the maximum HI calculated with Balsam data for three sampling rounds, and were detected at much lower concentrations during the single RI oversight sampling event

- Chromium, which accounts for 4% of the maximum HI in river water (at RW-2), based on Balsam data, was not detected in a single oversight sample

These discrepancies may merely reflect the insufficient coverage, by the single 1992 oversight sampling event, of the temporal variation in contamination levels that was documented during Balsam's three rounds of data collection between October 1991 and October 1992. Nevertheless, the acute and chronic HIs derived from oversight data for river water are comparable, falling within one order of magnitude of the average HIs generated from the Balsam data for a two year period.

Seeps. In most cases, the average chronic and acute aggregate HIs calculated using oversight vs. Balsam data, are comparable or differ by a single order of magnitude. Greater discrepancies between maximum HQs and HIs, calculated with oversight vs. Balsam data, are usually due to differences in metal concentrations. Examples of these discrepancies in HQs and HIs of the seep surface water samples collected by Arthur D. Little and Balsam, include:

- Seep B - Iron was not detected in the oversight analyses, whereas a chronic maximum HQ of 145 was calculated for iron using Balsam data. Oversight analyses revealed several pesticides, including heptachlor epoxide (HQ=2), whereas no pesticides were detected in Balsam's water sample at Seep B.

- Seep C - The aggregate HIs for this location did not differ significantly from those generated using the Balsam data. However, none of the pesticides detected in the oversight samples, such as endrin (HQ=9) and alpha chlordane (HQ=1), were detected in corresponding Balsam samples.

- Seep E - The oversight data for iron translates into a chronic maximum HQ of 4. as contrasted with an iron HQ of 49, based on the Balsam data. Average aggregate chronic HIs at this seep also differ by only one order of magnitude between the Balsam and oversight data. Acute HQs and HIs at this location, however, are very similar using both datasets.

- Seep G - Chromium was not detected in the oversight data, but was reported by Balsam at a maximum concentration of 0.314 mg/L, resulting in an acute maximum HQ of 20, and a chronic maximum HQ of 29.

6.1.2 Sediment

6.1.2.1 Overview of Sediment Risks Sediment-mediated ecological risks could not be calculated for VOCs, and many other specific contaminants, due to a lack of NOAA guidelines. Based on the NOAA guidelines for selected SVOCs (mostly PAHs), pesticides, and metals, sediments pose much less ecological risk than surface water samples from coincident locations. Estimated sediment ecological risks are

generally low for both individual compounds (HQs) and aggregate HIs. The highest chemical-specific HQ is that calculated for phenanthrene (HQ=10 based on the oversight data) which was detected at Seep B with numerous other SVOCs that contribute to the highest site-wide aggregate maximum ER-L of 54. Additionally, 4,4-DDT (HQ=8), which was detected (together with 4,4-DDD) at Seep area E. These pesticides contributed about 33% of the maximum aggregate ER-L HI of 30 for this seep location; the balance of this point-specific maximum aggregate HI is derived from the chemical-specific HQs for selected PAHs and metals.

6.1.2.2 Ponds No potentially significant risks are evident in the sediment of Ponds 1, 2 and 3 from VOCs, SVOCs, PCBs/pesticides, and most inorganics; HQs of 1 were calculated for copper and nickel in Pond 1. Pond 1 also has the highest maximum, chronic, aggregate ER-L HI, for sediments, totalling 5.

6.1.2.3 Seeps No potentially significant risks from VOCs are evident in seep sediments. Low potential risks, however, are evident for a few SVOCs, specifically for a few of the polynuclear aromatic hydrocarbons (PAHs), such as phenanthrene (HQ=10 at Seep B) and fluorene (HQ=8 at Seep B). An aggregate HI of 46 is estimated for PAHs in Seep B sediments, so that PAHs contribute most of the aggregate risk (HI=54) for Seep B. PCBs were not detected in any samples. Pesticides were detected only at Seep area E, resulting in an aggregate pesticide HI of 10 for 4,4-DDD and 4,4-DDT. It should be noted, however, that PCB/pesticide analyses were not performed on samples from Seep area H or the Seep Background. Inorganics pose the only other potentially low, chemical-specific risks, with HQs greater than 1, but less than 10, for arsenic, mercury, nickel, and zinc, with a maximum chronic (ER-L) HQ of 5 for zinc at Seep B.

Aggregate, maximum chronic HIs in seep sediments exceed 1.0 at one or more seep locations, with a few locations in excess of 10, such as:

- HI=54 at Seep area B (driven by PAHs and metals)
- HI=30 at Seep area E (driven mostly by PAHs and the two pesticides)

It is also noteworthy that the ER-L and ER-M, aggregate HIs at the *background seep*, respectively are 9 and 2 based on a single sampling event.

6.1.2.4 Connecticut River No potentially significant risks are evident in river sediment from VOCs and SVOCs. PCBs/pesticides were not analyzed in river sediment by Balsam. Inorganic sediment HQs do not exceed 1 for either the background or downstream station. The maximum, acute aggregate HI is 3 for the background station, whereas that for the downstream stations (RS1 and RS2) is 2.

6.1.2.5 Comparison of Sediment Risks Using Arthur D. Little vs. Balsam Data Ecological risks from exposures to sediments of the site area were estimated based on the analytical oversight data from samples collected by Arthur D. Little during Balsam's Round 3 sampling event (see Table 6-16). Oversight sampling of sediments was conducted at the following sample locations:

- Connecticut River (RS-2A)
- Connecticut River Background (RS-3)
- Seep B (SS-2), Seep C (SS-3/4), Seep E (SS-6), Seep G (SS-9 and SS-33)

No oversight sediment sampling was conducted in Ponds 1, 2, and 3, or in Seeps A, D, F, H, and the Background Seep.

The oversight analytical data and resulting risk estimates (HQs and HIs) concur very well with the corresponding Balsam data. As with the risks estimated for surface water contaminants, the aggregate HIs calculated with oversight data for the Connecticut River, river background, and most seeps are slightly lower than those calculated using the Balsam data. At Seeps B and G, the oversight data result in slightly but insignificantly higher, maximum aggregate HIs, than the maximum aggregate HIs based on Balsam data, due to higher SVOC levels detected in the single oversight sample.

6.2 Qualitative Ecological Risks

The following discussion briefly highlights the qualitative significance of the foregoing risk ecological risk calculations discussed above. A brief account of these risks is provided for each of the exposure zones, which include the onsite seeps and ponds, terrestrial seeps between Route 5 and the river, and the Connecticut River itself.

The ecological implications of various uncertainty factors, pertaining to the exposure models used in this ERA, also are discussed below in the Uncertainty Section (Section 7.4).

6.2.1 Risks at the Organism Level

6.2.1.1 Retention Ponds Although the maximum surface water risks in Pond 1 are moderate (HI=57), and driven by naturally occurring inorganics such as aluminum, chromium, iron, lead, silver, and zinc, this pond is only shallowly flooded for short periods of time and does not support any fish populations. No surface water was sampled from Pond 2, which also provides no aquatic habitat. Although ecological

exposures of aquatic organisms are realistic more for Pond 3, which is permanently flooded and inhabited by fish and frogs, only low risks (maximum HI=7) were estimated in this area, again driven by naturally occurring inorganics such as iron and lead.

Risks to organisms from exposure to contaminants in sediments of the onsite ponds are insignificant for Ponds 2 and 3. Even maximum sediment risks estimated among the ponds, estimated as low in Pond 1 (maximum HI=5) for benthic invertebrates, were driven mostly by copper and nickel. Since Pond 1 is only flooded following rainfall events, this low risk can be considered as qualitatively insignificant at the organismal and higher levels of ecosystem integration.

6.2.1.2 Terrestrial Seeps Potential surface water risks to individual organisms range from insignificant to high, with the greatest risk occurring at terrestrial Seep A (maximum HI=1,171), located within the landfill. These risks are driven mostly by inorganics, whereas trace levels of a few, sporadically detected pesticides amounted to a low (sum of HQs=10), aggregate risk for alpha chlordane and endrin at Seep C. Even the highest risk estimates for surface water of the terrestrial seeps, onsite (Seep A) and along Route 5 (Seeps B, C, and E), are of little ecological concern at the organismal level. Moreover, the highest current risks are of no long-term ecological concern, because:

- Seep A will be capped
- All of the forested, terrestrial seeps located between Route 5 and the Connecticut River lack true aquatic habitats and biota
- These roadside and riverside seeps are unlikely to receive significant levels of landfill-derived contaminants, in either overburden or bedrock ground water, after the landfill is capped and while the leachate interceptor trench continues to function effectively

Sediment-mediated risks at the terrestrial seeps range from insignificant to moderate, with a the maximum aggregate risk being moderate (HI=54) at Seep B, and are driven mostly by polynuclear aromatic hydrocarbons (PAHs) and inorganics. Pesticides also drive seep sediment risks, although these were only sporadically detected at trace levels in the oversight samples, contributing a maximum subtotal pesticide HQ of 10, at Seep E (4,4-DDD and 4,4-DDT).

6.2.1.3 Connecticut River Low to moderate, surface water risks (maximum HI=100) to aquatic biota in the Connecticut River are entirely attributed to elevated levels of naturally occurring inorganics, among which iron (HQ=47) is the most influential risk driver. However, this maximum risk is comparable to that observed at the "background" river location (maximum HI=13) at RW-3, so that the site's influence on background risks to aquatic biota of the Connecticut River appears to be negligible. However, SW-RW-3 is downgradient of Seep E and may be influenced by site-derived compounds. Therefore, for the August 1993 sampling a new background location was identified (RW-4) and sampled. Data for the new background location results in a lower HQ/HI than was computed for the site-affected "background" location using 1991 and 1992 data. At the same time, however, the HQs/HIs for all downstream river locations were significantly lower in August 1993 than in 1991 or 1992. The approximate HQs for iron in surface water is 0.3 at the new background location, and the new aggregate surface water HI is 3. The HQs for iron in the three sample downstream river samples do not exceed 1. This decease in risk associated with the most recent samples may, at least in part, be attributable to functional effectiveness of the leachate interceptor trench.

Sediment risks in the river range from insignificant to low, with a maximum aggregate HI of 2.0, driven entirely by inorganic compounds for which individual HQs are all less than 1.0. At the organismal level, therefore, sediments at these river locations do not pose any ecological risk.

6.2.2 Risks at the Population Level

No significant risks are expected at the population level for any of the exposure zones, even under worst-case conditions. Very few, if any, individuals of aquatic species and forest-dwelling amphibians are likely to be exposed to even the highest detected levels of site-derived contamination, which are consistently found in terrestrial seeps. Risks to individual aquatic organisms inhabiting Pond 3 also are insignificant, at the population level, in view of the small size of this manmade pond, and the vast expanses of undisturbed, aquatic habitats found locally in surrounding areas.

6.3 Reassessment of Risks Based on New 1993 Data

Subsequent to the completion of this ecological risk assessment, surface water and sediment samples were collected in August and September, 1993, by the Balsam and split with Arthur D. Little. The analytical results for the August and September, 1993 samples were compared with the historical maximum compound concentrations presented in Tables 6-1 through 6-14. This comparison was conducted with validated Balsam data for all analytes and locations that were available. For compounds not

analyzed by Balsam, (i.e, SVOCs, pesticides and PCBs), the analytical results from the unvalidated Arthur D. Little split-samples were used. Point by point comparisons were made for locations that were sampled during the August and September 1993 sampling. If the new concentration was significantly different (increase by 1 order of magnitude), then it was noted and a new hazard quotient (HQ) was manually computed (but not added to the risk quotient tables), to estimate the incremental increase in risk. Locations that were not sampled and therfore have not been evaluated, include: surface water and sediment from Ponds 1, 2, 3, and Seep A, D, H, as well as surface water from seeps B, C, and G. In addition, sediment samples from Seeps B, C, and E were analyzed only for inorganics by both Balsam and Arthur D. Little.

This comparison indicated that most of the compound concentrations in surface water and sediment of the Connecticut River, landfill retention ponds, and seeps are not increasing. However, several new compounds have been detected and the concentrations of some previously detected compounds (especially inorganics) have increased significantly in surface water and sediment of the Connecticut River and seeps. Nevertheless, since even these few increases do not add significant ecological risk increments, the risk estimates, conclusions, and recommendations, as originally stated in the Draft ERA Report, dated October 6, 1993, have not changed.

These newly detected compounds and increased concentrations, however, are noted below for consideration during future monitoring.

Connecticut River. Two new VOCs, acetone and tetrachloroethene, and four new SVOCs were detected in the surface water. In the sediment, seven new SVOCs were detected, and the concentrations of two inorganic analytes, nickel and zinc, were significantly higher.

Seep C. In the sediments of Seep C one new inorganic, cadmium, was detected, and the concentration of lead was significantly increased.

Seep E. In the surface water of Seep E aluminum and zinc were detected at significantly higher concentrations. The incremental risk from zinc for acute exposure increased from 2 to 47 and for chronic exposure from 4 to 52. The HQ increases for zinc were the greatest incremental risk increase based on the new data. In Seep E sediments the concentrations of nickel and zinc significantly increased, and four pesticides and eight SVOCs were detected that were either previously undetected or increased significantly in concentration.

Seep F. Three new compounds were detected in the surface water of Seep F. In the sediments of Seep F 13 inorganics were either previously undetected or significantly increased. The increased concentrations of lead, nickel, and zinc resulted in HQs which exceeded 1. In addition, three new SVOCs were detected in Seep F.

Seep G. Seep G sediment had 14 new or significantly different inorganic values; of these, only the concentration of zinc resulted in an HQ that exceeded 1. There were two new pesticide/PCBs and eight SVOCs detected. It is important to note that this is the first time a PCB, Aroclor 1242, has been detected in the study area. The reported Aroclor concentration, 34 ug/kg, resulted in a NOAA ER-L based HQ of less than 1.

Even the most significant increases of inorganic compound concentrations at a few seep sediments are qualitatively insignificant from a risk perspective, due to a lack of true aquatic habitat at these seeps. These temporal concentration fluctuations, thus, should not cause any adverse ecological risks to either the seep or nearby river habitats, although they should be routinely monitored to verify that these are mearly fluctuations rather than the beginning of a trend of increasing deposition rates at the seeps.

6.4 Conclusions

Qualitative ecological risks from site-derived contaminants in surface water and sediments are insignificant, with surface water consistently posing higher HIs than associated sediments at coincident locations. Actively flowing seeps consistently exhibit the highest risks, followed by the onsite retention ponds, with risks in the Connecticut River being the lowest. However, the aquatic ecological exposure scenarios evaluated for the ponds, seeps, and river exposure zones are realistic only for Pond 3 and the Connecticut River, both of which are permanently flooded habitats. The low risks to biota of Ponds 1 and 2, considered ecologically insignificant at a population, local, and regional level, are not expected to increase in the future, since leachate migration into these ponds should cease after the landfill is capped.

Although the least contaminated seeps located near the river are potentially accessible to aquatic biota from the river during temporary periods of river flooding, such temporary access and exposure would be accompanied by significant dilution of the contaminant concentrations emanating from these seeps. Considering the highly conservative exposure assumptions made in this ERA, however, even the highest of the quantitative ecological risks can safely be regarded as overestimates of actual zone-specific and site-wide risks. Overall, therefore, current ecological risks are of little, if any, concern at the organismal, population, and community levels of

ecosystem integration. The slight risks attributable to past discharges of contaminated ground water, to the retention ponds, terrestrial seeps, and Connecticut River, moreover, are expected to be fully eliminated with landfill closure and the continued effectiveness of the leachate interceptor trench. Current ecological risks from continuing discharges of site-derived contaminants, migrating via bedrock ground water to discharge points at the riverside seeps, are very low or non-existent for most contaminants. Although the risks from these bedrock aquifer contaminants are already insignificant, both at the seeps (no aquatic biota) and in the Connecticut River (dilution/mixing factors), these risks also are likely to be further reduced after the landfill is capped.

Section 6
Tables and Figures

TABLE 6-1
RISK CHARACTERIZATION FOR COMPOUNDS DETECTED
IN CONNECTICUT RIVER WATER AND SEDIMENT
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	River Water							River Sediments						
				Hazard Quotients**							Hazard Quotients***			
	Maximum mg/L	Average mg/L	Location of Maximum	Average acute	Average chronic	Maximum acute	Maximum chronic	Maximum mg/kg	Average mg/kg	Location of Maximum	Average ER-L	Average ER-M	Maximum ER-L	Maximum ER-M
Volatile Organic Compounds:														
acetone				-	-	-	-	0.13	0.06	SD-RS-2B	-	-	-	-
2-butanone				-	-	-	-	0.029	0.013	SD-RS-2B	-	-	-	-
Semivolatile Organic Compounds:														
4-methylphenol	0.002 J	0.002	SW-RW-2	-	-	-	-				-	-	-	-
bis (2-ethylhexyl) phthalate				-	-	-	-	0.26	0.125	SD-RS2C	-	-	-	-
Pesticides/PCBs: N/A														
Inorganic Compounds (total):														
aluminum	24.9 J E	4.388 E	SW-RW-2	-	**6**	-	**33**	11000 E	7858	SD-RS-2B	-	-	-	-
arsenic				-	-	-	-	2.8 E	1.9	SD-RS-2B	0.06	0.02	0.08	0.03
barium	0.128 E	0.0269 E	SW-RW-2	-	-	-	-	44.6 E	31.2	SD-RS-2B	-	-	-	-
beryllium	0.0011 E	0.0008 E	SW-RW-2	0.006	0.2	0.008	0.2	0.59	0.5 E	SD-RS-2B	-	-	-	-
calcium	14	11.917	SW-RW-1,2	-	-	-	-	5390 E	2855 E	SD-RS-2B	-	-	-	-
chromium	0.04 E	0.0084 E	SW-RW-2	0.5	0.8	**3**	**4**	18.9	13.8	SD-RS-2B	0.2	0.1	0.2	0.1
cobalt	0.026 E	0.0065 E	SW-RW-2	-	-	-	-	11.5 E	8.2	SD-RS-2B	-	-	-	-
copper				-	-	-	-	25.2 E	18.2	SD-RS-2B	0.3	0.05	0.4	0.06
iron	47 J E	8.352 E	SW-RW-2	-	**8**	-	**47**	21900 E	15900	SD-RS-2B	-	-	-	-
lead	0.0198 J E	0.0037 E	SW-RW-2	0.1	**3**	0.6	**15**	9.7	6.8	SD-RS-2B	0.2	0.06	0.3	0.09
magnesium	17.5 E	4.23 E	SW-RW-2	-	-	-	-	6290 E	4670 E	SD-RS-1B	-	-	-	-
manganese	1.6 J E	0.332 E	SW-RW-2	-	-	-	-	625 E	387 E	SD-RS-2B	-	-	-	-
nickel	0.0463 E	0.0126 E	SW-RW-2	0.02	0.1	0.06	0.5	22.1 E	16.7	SD-RS-2B	0.6	0.3	0.7	0.4
potassium	6.55 E	2.363 E	SW-RW-2	-	-	-	-	1430 E	1040	SD-RS-1B	-	-	-	-
sodium	16.7 E	7.33 E	SW-RW-2	-	-	-	-				-	-	-	-
vanadium	0.0476 E	0.0097 E	SW-RW-2	-	-	-	-	21.9 E	15.9	SD-RS-2B	-	-	-	-
zinc	0.0026	0.0017	SW-RW-2	0.03	0.03	0.04	0.04	80.2 E	54.5	SD-RS-2B	0.5	0.2	0.7	0.3
TOTAL HAZARD INDEX				0.7	**18**	**3**	**100**				**2**	0.8	**2**	**1**

NOTE:
** Surface Water hazard quotients are based on Federal Ambient Water Quality Criteria found on Table 5-1
*** Sediment hazard quotients are based on NOAA sediment guidlines found on Table 5-2
N/A = Not analyzed for during the 10/91, 3/92 and 10/92 rounds
J = Concentration is estimated
E = Exceeds upgradient concentration (inorganics only)

TABLE 6-2
RISK CHARACTERIZATION FOR COMPOUNDS DETECTED
IN CONNECTICUT RIVER WATER AND SEDIMENT (BACKGOUND)
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM,VERMONT

	River Water (Background)						River Sediment (Background)					
			Hazard Quotients**						Hazard Quotients***			
	Maximum mg/L	Average mg/L	Average acute	Average chronic	Maximum acute	Maximum chronic	Maximum mg/kg	Average mg/kg	Average ER-L	Average ER-M	Maximum ER-L	Maximum ER-M
Volatile Organic Compounds:												
methylene chloride			-	-	-	-	0.18	0.105	-	-	-	-
acetone	0.005 J	0.005	-	-	-	-			-	-	-	-
2-butanone			-	-	-	-	0.05	0.042	-	-	-	-
Semivolatile Organic Compounds:												
fluoranthene			-	-	-	-	0.071 J	0.071	0.1	0.02	0.1	0.02
pyrene			-	-	-	-	0.057 J	0.057	0.2	0.03	0.2	0.03
Pesticides/PCBs: N/A												
Inorganic Compounds (total):												
aluminum	3.96 J	1.434	-	2	-	5	9240	7643	-	-	-	-
arsenic			-	-	-	-	2.1	1.8	0.05	0.02	0.06	0.02
barium	0.0256	0.0132	-	-	-	-	39	32.3	-	-	-	-
cadmium			-	-	-	-	1.3 J	0.73	0.1	0.08	0.3	0.1
calcium	15.3	13.8	-	-	-	-	2150	1890	-	-	-	-
chromium	0.006	0.0035	0.2	0.3	0.4	0.5	19.3	16.2	0.2	0.1	0.2	0.1
cobalt			-	-	-	-	8.8	7.2	-	-	-	-
copper			-	-	-	-	19	15.4	0.2	0.04	0.3	0.05
iron	7.13 J	2.67	-	3	-	7	16500	13800	-	-	-	-
lead			-	-	-	-	9.8	8	0.2	0.07	0.3	0.09
magnesium	2.24	1.92	-	-	-	-	4660	3870	-	-	-	-
manganese	0.285 J	0.139	-	-	-	-	314	238	-	-	-	-
nickel			-	-	-	-	18.2	15.8	0.5	0.3	0.6	0.4
potassium	1.9	1.73	-	-	-	-	1060	762	-	-	-	-
selenium			-	-	-	-	0.067	0.42	-	-	-	-
sodium	7.27	5.68	-	-	-	-			-	-	-	-
vanadium	0.0078	0.0038	-	-	-	-	18.9	16.1	-	-	-	-
zinc	0.0032 J	0.0022	0.03	0.04	0.05	0.05	64	46.3	0.4	0.2	0.5	0.2
TOTAL HAZARD INDEX			0.3	5	0.4	13			2	0.9	3	1

NOTE:
** Surface Water hazard quotients are based on Federal Ambient Water Quality Criteria found on Table 5-1
*** Sediment hazard quotients are based on NOAA sediment guidlines found on Table 5-2
N/A = Not analyzed for during the 10/91, 3/92 and 10/92 rounds
J = Concentration is estimated

TABLE 6-3
RISK CHARACTERIZATION FOR COMPOUNDS DETECTED
IN DRAINAGE POND 1 WATER AND SEDIMENT BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Pond 1 Water						Pond 1 Sediment					
			Hazard Quotients**						Hazard Quotients***			
	Maximum mg/L	Average mg/L	Average acute	Average chronic	Maximum acute	Maximum chronic	Maximum mg/kg	Average mg/kg	Average ER-L	Average ER-M	Maximum ER-L	Maximum ER-M
Volatile Organic Compounds:												
chloroethane			-	-	-	-	0.01 J	0.072	-	-	-	-
acetone	0.016	0.0105	-	-	-	-	0.47 J	0.079	-	-	-	-
2-butanone			-	-	-	-	0.27 J	0.04	-	-	-	-
4-methyl-2-pentanone			-	-	-	-	0.003 J	0.003	-	-	-	-
2-hexanone			-	-	-	-	0.01 J	0.007	-	-	-	-
toluene	0.012 J	0.0073	0.0004	-	0.0007	-			-	-	-	-
Semivolatile Organic Compounds:												
phenol	0.14 J	0.06	0.006	0.02	0.01	0.05	0.11 J	0.11	-	-	-	-
bis (2-ethylhexyl) phthalate			-	-	-	-	0.92 J	0.557	-	-	-	-
benzo (b) fluoranthene			-	-	-	-	0.065 JT	0.065 T	-	-	-	-
benzo (k) fluoranthene			-	-	-	-	0.065 JT	0.065 T	-	-	-	-
fluoranthene			-	-	-	-	0.068 J	0.068	0.1	0.02	0.1	0.02
pyrene			-	-	-	-	0.064 J	0.064	0.2	0.03	0.2	0.03
2-methylphenol	0.21 J	0.077	-	-	-	-			-	-	-	-
4-nitrophenol	0.003 J	0.003	0.013	0.02	0.013	0.02			-	-	-	-
diethylphthalate	0.011 J	0.008	-	-	-	-			-	-	-	-
Total PAH							0.130	0.130	0.03	0	0.03	0.004
Pesticides/PCBs:												
None detected												
Inorganic Compounds (total):												
aluminum	3.06	1.973	-	3	-	4	21200	11247	-	-	-	-
arsenic	0.0052 J	0.0042	0.01	0.09	0.01	0.11	5.5 J	3.4	0.1	0.04	0.2	0.06
barium	0.095	0.0702	-	-	-	-	99.1	49.1	-	-	-	-
beryllium			-	-	-	-	0.24	0.24	-	-	-	-
cadmium	0.00056	0.00056	0.3	0.8	0.3	0.8			-	-	-	-
calcium	240 J	140.8	-	-	-	-	3370	2330	-	-	-	-
chromium	0.0121	0.0093	0.6	0.8	0.8	1	34.7	18.9	0.2	0.1	0.4	0.2
cobalt	0.0126	0.0089	-	-	-	-	21.5	11.5	-	-	-	-
copper	0.0248	0.0113	1	2	3	4	68.3	33.3	0.5	0.09	1	0.2
iron	14.9	8.25	-	8	-	15	40100	22300	-	-	-	-
lead	0.0222	0.0105	0.3	8	0.7	17	17.8	9.5	0.3	0.09	0.5	0.2
magnesium	35.6	20.85	-	-	-	-	10700	8780	-	-	-	-
manganese	6.18	35.55	-	-	-	-	677	381	-	-	-	-
nickel	0.0108 J	0.0097	0.01	0.1	0.01	0.1	41.5	23.5	0.8	0.5	1	0.8
potassium	26.5	17.117	-	-	-	-	3630	1906	-	-	-	-
silver	0.0017	0.0017	1	14	1	14			-	-	-	-
sodium	69.8	40.7	-	-	-	-	77.2	50.4	-	-	-	-
vanadium	0.0242	0.0106	-	-	-	-	45	25	-	-	-	-
zinc	0.0695	0.03	0.5	0.5	1	1	108 J	62.4	0.5	0.2	0.9	0.4
TOTAL HAZARD INDEX			4	37	7	57			3	1	5	2

NOTE:
** Surface Water hazard quotients are based on Federal Ambient Water Quality Criteria found on Table 5-1
*** Sediment hazard quotients are based on NOAA sediment guidlines found on Table 5-2
J = Concentration is estimated
T = Concentration is used in computing total PAH for those PAHs lacking chemical-specific NOAA sediment sediment guidelines.

TABLE 6-4
RISK CHARACTERIZATION FOR COMPOUNDS DETECTED
IN DRAINAGE POND 2 SEDIMENT
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Pond 2 Sediment					
			Hazard Quotients***			
	Maximum	Average	Average		Maximum	
	mg/kg	mg/kg	ER-L	ER-M	ER-L	ER-M
Volatile Organic Compounds**						
acetone	0.026 J	0.011	-	-	-	-
2-butanone	0.009	0.006	-	-	-	-
total xylenes	0.002 J	0.002	-	-	-	-
tetrahydrofuran	0.01 J	0.001	-	-	-	-
Semivolatile Organic Compounds:						
None detected						
Pesticides/PCBs:						
None detected						
Inorganic Compounds (total):						
aluminum	7460 J	5785	-	-	-	-
arsenic	2.3	1.8	0.05	0.02	0.07	0.03
barium	25 J	20.2	-	-	-	-
beryllium	4.7	1.7	-	-	-	-
cadmium	0.94	0.54	0.1	0.06	0.2	0.1
calcium	2850 J	2220	-	-	-	-
chromium	14.5	10.6	0.1	0.07	0.2	0.1
cobalt	7.5	6.6	-	-	-	-
copper	22.3	17.7	0.3	0.05	0.3	0.06
iron	17100 J	13733	-	-	-	-
lead	6.2 J	4.9	0.1	0.04	0.2	0.06
magnesium	3940	3070	-	-	-	-
manganese	305 J	243	-	-	-	-
nickel	16.1	13.8	0.5	0.3	0.5	0.3
potassium	1300	968	-	-	-	-
sodium	163 J	118	-	-	-	-
thallium	0.48	0.32	-	-	-	-
vanadium	19.4	14.3	-	-	-	-
zinc	40.6 J	36.6	0.3	0.1	0.3	0.2
TOTAL HAZARD INDEX			1	0.7	2	0.8

NOTE:
** Tetrahydrofuran was analyzed for only during the 10/91 round.
**** Sediment hazard quotients are based on NOAA sediment guidlines found on Table 5-2
J = Concentration is estimated

TABLE 6-5
RISK CHARACTERIZATION FOR COMPOUNDS DETECTED
IN DRAINAGE POND 3 WATER AND SEDIMENT
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Pond 3 Water						Pond 3 Sediment					
			Hazard Quotients**						Hazard Quotients***			
	Maximum mg/L	Average mg/L	Average acute	Average chronic	Maximum acute	Maximum chronic	Maximum mg/kg	Average mg/kg	Average ER-L	Average ER-M	Maximum ER-L	Maximum ER-M
Volatile Organic Compounds:												
chloroethane			-	-	-	-	0.59	0.074	-	-	-	-
methylene chloride	0.062	0.042	-	-	-	-	0.006 J	0.006	-	-	-	-
acetone			-	-	-	-	0.18	0.029	-	-	-	-
carbon disulfide			-	-	-	-	0.095	0.02	-	-	-	-
chloroform			-	-	-	-	0.1	0.019	-	-	-	-
2-butanone			-	-	-	-	0.028 J	0.012	-	-	-	-
Semivolatile Organic Compounds:												
phenol	0.013	0.0077	8E-04	0	0	0.01			-	-	-	-
4-methylphenol	0.001 J	0.0001	-	-	-	-			-	-	-	-
bis (2-ethylhexyl) phthalate			-	-	-	-	0.18	0.14	-	-	-	-
benzo (b) fluoranthene			-	-	-	-	0.058 JT	0.034 T	-	-	-	-
benzo (k) fluoranthene			-	-	-	-	0.058 JT	0.034 T	-	-	-	-
fluoranthene			-	-	-	-	0.057 J	0.034	0.06	0.01	0.1	0.02
pyrene			-	-	-	-	0.054 J	0.3	0.9	0.1	0.2	0.02
2-methylphenol	0.004 J	0.004	-	-	-	-						
Total PAH							0.116	0.068	0.02	0.002	0.03	0.003
Pesticides/PCBs:												
None detected												
Inorganic Compounds (total)*:												
aluminum	0.927	0.361	-	0.5	-	1	10000	7710	-	-	-	-
arsenic			-	-	-	-	3.9 J	1.9	0.06	0.02	0.1	0.05
barium	0.0331	0.021	-	-	-	-	47.9	26.7	-	-	-	-
beryllium			-	-	-	-	0.27	0.22	-	-	-	-
calcium	47	26.197	-	-	-	-	3000	1660	-	-	-	-
chromium			-	-	-	-	18.1	12.1	0.2	0.08	0.2	0.1
cobalt			-	-	-	-	12.6	8.1	-	-	-	-
copper			-	-	-	-	48	23.8	0.3	0.06	0.7	0.1
iron	3.65	1.646	-	2	-	4	19700 J	14883	-	-	-	-
lead	0.0025	0.0012	0.04	0.9	0.07	2	8.8	6.8	0.2	0.06	0.3	0.08
magnesium	6.41	3.5	-	-	-	-	5590	3637	-	-	-	-
manganese	1.58	0.75	-	-	-	-	237	181	-	-	-	-
nickel	0.0096	0.0093	0.01	0.1	0.01	0.1	22.3	16.8	0.6	0.3	0.7	0.4
potassium	5.09	3.69	-	-	-	-	1720	923	-	-	-	-
sodium	9.85	5.71	-	-	-	-	76.8	42.9	-	-	-	-
vanadium							22.7	15.6	-	-	-	-
zinc							61.9 J	46.2	0.4	0.2	0.5	0.2
TOTAL HAZARD INDEX			0.05	3	0.09	7			2	0.7	2	0.9

NOTE:
** Surface Water hazard quotients are based on Federal Ambient Water Quality Criteria found on Table 5-1
*** Sediment hazard quotients are based on NOAA sediment guidlines found on Table 5-2
J = Concentration is estimated
T = Concentration is used in computing total PAH for those PAHs lacking chemical-specific NOAA sediment sediment guidelines.

TABLE 6-6
RISK CHARACTERIZATION FOR COMPOUNDS DETECTED
IN SEEP AREA A
BFI-RCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep A Water						Seep A Sediment					
			Hazard Quotients**						Hazard Quotients***			
	Maximum	Average	Average		Maximum		Maximum	Average	Average		Maximum	
	mg/L	mg/L	acute	chronic	acute	chronic	mg/kg	mg/kg	ER-L	ER-M	ER-L	ER-M
Volatile Organic Compounds:												
methylene chloride			-	-	-	-	0.005 J	0.003	-	-	-	-
acetone	1.2	0.85	-	-	-	-	0.23 J	0.081	-	-	-	-
carbon disulfide			-	-	-	-	0.002 J	0.002	-	-	-	-
c,t-1,2-dichloroethene	0.002 J	0.002	-	-	-	-	0.017 J	0.01	-	-	-	-
2-butanone	1.6	1.05	-	-	-	-	0.151 J	0.054	-	-	-	-
1,1,1-trichloroethane	0.003 J	0.003	-	-	-	-			-	-	-	-
4-methyl-2-pentanone	0.025	0.063	-	-	-	-	0.027 J	0.013	-	-	-	-
2-hexanone	0.39 J	0.2	-	-	-	-	0.075 J	0.029	-	-	-	-
toluene	0.13	0.13	0.007	-	0.007	-	0.013 J	0.008	-	-	-	-
ethylbenzene	0.017	0.017	0.0005	-	0.0005	-	0.002 J	0.002	-	-	-	-
total xylenes	0.038	0.038	-	-	-	-	0.016 J	0.009	-	-	-	-
Semivolatile Organic Compounds:												
phenol	0.28 J	0.189	0.02	0.07	0.03	0.1	0.052 J	0.0475	-	-	-	-
4-methylphenol	0.93	0.86	-	-	-	-			-	-	-	-
acenaphthylene			-	-	-	-	0.067 J	0.067	0.4	0.1	0.4	0.1
bis (2-ethylhexyl) phthalate			-	-	-	-	1.7 J	0.611	-	-	-	-
di-n-octyl phthalate			-	-	-	-	0.023 J	0.023	-	-	-	-
benzo (b) fluoranthene			-	-	-	-	0.029 JT	0.029 T	-	-	-	-
benzo (k) fluoranthene			-	-	-	-	0.029 JT	0.029 T	-	-	-	-
fluoranthene			-	-	-	-	0.041 J	0.041	0.07	0.01	0.07	0.01
pyrene			-	-	-	-	0.035 J	0.035	0.1	0.02	0.1	0.02
phenanthrene			-	-	-	-	0.05 J	0.05	0.2	0.04	0.2	0.04
2-methylphenol	0.006	0.006	-	-	-	-			-	-	-	-
diethylphthalate	0.018 J	0.018	-	-	-	-			-	-	-	-
Total PAH							0.058	0.058	0.01	0.002	0.01	0.002
Pesticides/PCBs:												
None detected												

TABLE 6-6
RISK CHARACTERIZATION FOR COMPOUNDS DETECTED
IN SEEP AREA A
BFI-RCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep A Water						Seep A Sediment							
			Hazard Quotients**							Hazard Quotients***				
	Maximum mg/L	Average mg/L	Average acute	Average chronic	Maximum acute	Maximum chronic	Maximum mg/kg		Average mg/kg		Average ER-L	Average ER-M	Maximum ER-L	Maximum ER-M
Inorganic Compounds (total):														
aluminum	142	79.8	-	**107**	-	**190**	9290	E	5505		-	-	-	-
arsenic	0.0521 J	0.033	0.09	0.7	0.1	1	3 J	E	2.6	E	0.08	0.03	0.09	0.04
barium	0.982	0.59	-	-	-	-	67.8	E	31.4		-	-	-	-
calcium	443 J	365	-	-	-	-	3920	E	2703	E	-	-	-	-
chromium	0.231	0.135	**8**	**12**	**14**	**21**	19.3	E	12.8		0.2	0.09	0.2	0.1
cobalt	0.167 J	0.094	-	-	-	-	11.2	E	7.7		-	-	-	-
copper	0.46	0.244	**26**	**37**	**50**	**70**	21.2	E	18.9	E	0.3	0.05	0.3	0.05
iron	344	204.5	-	**205**	-	**344**	20300	E	16700	E	-	-	-	-
lead	0.514 J	0.272	**8**	**206**	**15**	**389**	33.1	E	15.1		0.4	0.1	0.9	0.3
magnesium	166 J	105.2	-	-	-	-	5640	E	3740		-	-	-	-
manganese	13 J	9.09	-	-	-	-	295 J		256		-	-	-	-
mercury	0.001	0.0006	0.3	**50**	0.4	**83**	0.16	E	0.09	E	0.6	0.07	**1**	0.1
nickel	0.454	0.259	0.3	**3**	0.6	**5**	21.3	E	16.9		0.6	0.3	0.7	0.4
potassium	61.8 J	45.6	-	-	-	-	2270	E	1150	E	-	-	-	-
sodium	132 J	97.6	-	-	-	-	56.1 J	E	53.6	E	-	-	-	-
vanadium	0.32 J	0.175	-	-	-	-	24.2	E	16.5		-	-	-	-
zinc	3.96 J	2.024	**31**	**34**	**61**	**67**	45.6		29.4		0.2	0.1	0.4	0.2
TOTAL HAZARD INDEX			**75**	**655**	**142**	**1171**					**3**	1.0	**5**	**1**

NOTE:
** Surface Water hazard quotients are based on Federal Ambient Water Quality Criteria found on Table 5-1
*** Sediment hazard quotients are based on NOAA sediment guidlines found on Table 5-2
J = Concentration is estimated
T = Concentration is used in computing total PAH for those PAHs lacking chemical-specific NOAA sediment sediment guidelines.
E= Exceeds upgradient concentration

TABLE 6-7
RISK CHARACTERIZATION FOR COMPOUNDS DETECTED
IN SEEP AREA B
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep B Water*						Seep B Sediment*					
			Hazard Quotients****						Hazard Quotients****			
	Maximum	Average	Average		Maximum		Maximum	Average	Average		Maximum	
	mg/L	mg/L	acute	chronic	acute	chronic	mg/kg	mg/kg	ER-L	ER-M	ER-L	ER-M
Volatile Organic Compounds:												
vinyl chloride	0.062 J	0.038	-	-	-	-			-	-	-	-
acetone			-	-	-	-	0.555 J	0.284	-	-	-	-
c,t-1,2-dichloroethene	0.27	0.107	-	-	-	-	0.019 J	0.013	-	-	-	-
2-butanone	1.75	0.9	-	-	-	-	0.485 J	0.249	-	-	-	-
4-methyl-2-pentanone	0.42	0.158	-	-	-	-	0.075 J	0.032	-	-	-	-
2-hexanone	0.605	0.219	-	-	-	-	0.1325	0.0507	-	-	-	-
toluene	0.0835	0.047	0.003	-	0.005	-	0.0098 J	0.0098	-	-	-	-
ethylbenzene	0.0195	0.01	0.0003	-	0.0008	-	0.008	0.007	-	-	-	-
total xylenes	0.087 J	0.056	-	-	-	-	0.031 J	0.017	-	-	-	-
Semivolatile Organic Compounds***												
phenol	0.17 J	0.068	0.007	0.03	0.02	0.07	0.195 J	0.195	-	-	-	-
4-methylphenol	0.99 J	0.341	-	-	-	-	0.66	0.427	-	-	-	-
acenaphthylene			-	-	-	-	0.094 J	0.081	0.5	0.1	0.6	0.1
anthracene			-	-	-	-	0.089 J	0.082	1	0.09	1	0.09
benzo (a) anthracene			-	-	-	-	0.535 J	0.358	2	0.2	2	0.3
benzo (a) pyrene			-	-	-	-	0.365 J	0.275	0.7	0.1	0.9	0.1
benzo (b) fluoranthene			-	-	-	-	0.86 JT	0.56 T	-	-	-	-
benzo (ghi) perylene			-	-	-	-	0.23 JT	0.153 T	-	-	-	-
benzo (k) fluoranthene			-	-	-	-	0.628 JT	0.383 T	-	-	-	-
chrysene			-	-	-	-	0.35	0.298	0.7	0.1	0.9	0.1
dibenzo (a,h) anthracene			-	-	-	-	0.082 J	0.063	1	0.2	1	0.3
fluoranthene			-	-	-	-	0.855 J	0.672	1	0.2	1	0.2
indeno (1,2,3-cd) pyrene			-	-	-	-	0.28 JT	0.19 T	-	-	-	-
pyrene			-	-	-	-	0.655 J	0.558	2	0.3	2	0.3
phenanthrene			-	-	-	-	0.28 J	0.193	0.9	0.1	1	0.2
4-chloro-3-methylphenol	0.005	0.005	0.2	-	0.2	-	0.069	0.069	-	-	-	-
1,4-dichlorobenzene	0.00011	0.00011	1E-04	1E-04	1E-04	1E-04			-	-	-	-
diethylphthalate	0.5 J	0.028	-	-	-	-			-	-	-	-
Total PAH			-	-	-	-	1.998	1.286	0.3	0.04	0.5	0.06
Pesticides/PCBs:												
None detected												

TABLE 6-7
RISK CHARACTERIZATION FOR COMPOUNDS DETECTED
IN SEEP AREA B
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep B Water*						Seep B Sediment*							
			Hazard Quotients****						Hazard Quotients****					
	Maximum	Average	Average		Maximum		Maximum		Average		Average		Maximum	
	mg/L	mg/L	acute	chronic	acute	chronic	mg/kg		mg/kg		ER-L	ER-M	ER-L	ER-M
Inorganic Compounds (total):														
aluminum	0.0361	0.026	-	0.03	-	0.05	7850 J		4123		-	-	-	-
arsenic	0.0152 J	0.0118	0.03	0.2	0.04	0.3	64.8 J	E	37.6	E	1	0.4	2	0.8
barium	1.43	0.687	-	-	-	-	1344 J	E	1118	E	-	-	-	-
cadmium	0.0022	0.0014	0.8	2	1	3	0.87	E	0.78	E	0.2	0.09	0.2	0.1
calcium	259.5	156.2	-	-	-	-	55150 J	E	23363	E	-	-	-	-
chromium			-	-	-	-	13		6.2		0.08	0.04	0.2	0.09
cobalt	0.0141	0.0103	-	-	-	-	8.3	E	6.9		-	-	-	-
copper			-	-	-	-	15.7		10.2		0.1	0.03	0.2	0.04
iron	145.5	58.3	-	58	-	146	148000	E	103867	E	-	-	-	-
lead			-	-	-	-	21.9 J		11.6		0.3	0.1	0.6	0.2
magnesium	112	96.7	-	-	-	-	4840	E	3370		-	-	-	-
manganese	5.17	1.93	-	-	-	-	1080	E	653		-	-	-	-
nickel	0.0478	0.031	0.04	0.4	0.06	0.5	18.7	E	8.9		0.3	0.2	0.6	0.4
potassium	260	171.5	-	-	-	-	1380	E	835		-	-	-	-
sodium	813.5	435.5	-	-	-	-	1005 J	E	424	E	-	-	-	-
thallium			-	-	-	-	0.76	E	0.44	E	-	-	-	-
vanadium	0.0033	0.002	-	-	-	-	17.7 J	E	12.2		-	-	-	-
zinc	0.315	0.169	3	3	5	5	637	E	408	E	3	2	5	2
TOTAL HAZARD INDEX			4	64	6	155					15	4	21	6

NOTE:
* Includes duplicate sample SW-SW7 (3/92 round) and SD-SS7 (3/92 round) averaged with SW-SW2 (3/92 round) and SD-SS2 (3/92 round) respectively prior to data analysis.
*** 1,4-Dichlorobenzene was analyzed for only during the 10/92 round
**** Surface Water hazard quotients are based on Federal Ambient Water Quality Criteria found on Table 5-1
*****Sediment hazard quotients are based on NOAA sediment guidlines found on Table 5-2
J = Concentration is estimated
T = Concentration is used in computing total PAH for those PAHs lacking chemical-specific NOAA sediment sediment guidelines.

TABLE 6-8
RISK CHARACTERIZATION FOR COMPOUNDS DETECTED
IN SEEP AREA C
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep C Water						Seep C Sediment					
			Hazard Quotients***						Hazard Quotients****			
	Maximum mg/L	Average mg/L	Average acute	Average chronic	Maximum acute	Maximum chronic	Maximum mg/kg	Average mg/kg	Average ER-L	Average ER-M	Maximum ER-L	Maximum ER-M
Volatile Organic Compounds**												
vinyl chloride	0.17	0.169	-	-	-	-	0.45 J	0.105	-	-	-	-
chloroethane	0.89	0.39	-	-	-	-	0.2 J	0.094	-	-	-	-
methylene chloride	0.45	0.166	-	-	-	-			-	-	-	-
acetone	1.3	1.1	-	-	-	-	17 J	5.103	-	-	-	-
1,1-dichloroethene			-	-	-	-	0.009 J	0.0083	-	-	-	-
1,1-dichloroethane	3	0.67	-	-	-	-	1.3 J	0.277	-	-	-	-
c,t-1,2-dichloroethene	4.3	0.904	-	-	-	-	2.2 J	0.456	-	-	-	-
1,2-dichloroethane	0.012 J	0.012	0.0001	0.0006	0.0001	0.0006			-	-	-	-
2-butanone	14	5.9	-	-	-	-	18 J	5.11	-	-	-	-
1,1,1-trichloroethane	0.64 J	0.17	-	-	-	-	0.39	0.095	-	-	-	-
trichloroethene			-	-	-	-	0.05	0.027	-	-	-	-
benzene			-	-	-	-	0.008 J	0.008	-	-	-	-
4-methyl-2-pentanone	1	0.39	-	-	-	-	1.2 J	0.342	-	-	-	-
2-hexanone	1.6	0.61	-	-	-	-	3.8 J	0.86	-	-	-	-
tetrachloroethene			-	-	-	-	0.012 J	0.01	-	-	-	-
toluene	3	1.047	0.06	-	0.2	-	2.1 J	0.5	-	-	-	-
chlorobenzene			-	-	-	-	0.004 J	0.004	-	-	-	-
ethylbenzene	0.23 J	0.118	0.004	-	0.007	-	0.36	0.086	-	-	-	-
total xylenes	0.89 J	0.426	-	-	-	-	1.2 J	0.453	-	-	-	-
tetrahydrofuran	0.53 J	0.39	-	-	-	-	0.28 J	0.16	-	-	-	-
Semivolatile Organic Compounds:												
phenol	3.6 J	0.92	0.09	0.4	0.4	1	1.6 J	0.565	-	-	-	-
4-methylphenol	24 J	7.178	-	-	-	-	7.1	1.65	-	-	-	-
naphthalene			-	-	-	-	0.75 J	0.432	1	0.2	2	0.4
2-methylnaphthalene			-	-	-	-	0.46 J	0.363	6	0.5	7	0.7
bis (2-ethylhexyl) phthalate			-	-	-	-	0.88 J	0.667	-	-	-	-
benzo (a) anthracene			-	-	-	-	0.11 J	0.092	0.4	0.06	0.5	0.07
benzo (a) pyrene			-	-	-	-	0.12 J	0.097	0.2	0.04	0.3	0.05
benzo (b) fluoranthene			-	-	-	-	0.25 JT	0.159 T	-	-	-	-
benzo (ghi) perylene			-	-	-	-	0.084 JT	0.084 T	-	-	-	-
benzo (k) fluoranthene			-	-	-	-	0.25 JT	0.189 T	-	-	-	-
chrysene			-	-	-	-	0.15 J	0.108	0.3	0.04	0.4	0.05
fluoranthene			-	-	-	-	0.3 J	0.226	0.4	0.06	0.5	0.08
pyrene			-	-	-	-	0.25 J	0.187	0.5	0.09	0.7	0.1
phenanthrene			-	-	-	-	0.15 J	0.117	0.5	0.08	0.7	0.1
4-chloro-3-methylphenol	0.062	0.062	2	-	2	-	0.058 J	0.058	-	-	-	-
2-methylphenol	0.11	0.085	-	-	-	-			-	-	-	-
diethylphthalate	0.12 J	0.12	-	-	-	-			-	-	-	-
Total PAH			-	-	-	-	0.584	0.432	0.1	0.01	0.1	0.02
Pesticides/PCBs:												
None detected												

TABLE 6-8
RISK CHARACTERIZATION FOR COMPOUNDS DETECTED
IN SEEP AREA C
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep C Water						Seep C Sediment							
			Hazard Quotients***						Hazard Quotients****					
	Maximum	Average	Average		Maximum		Maximum		Average		Average		Maximum	
	mg/L	mg/L	acute	chronic	acute	chronic	mg/kg		mg/kg		ER-L	ER-M	ER-L	ER-M
Inorganic Compounds (total):														
aluminum	2.11	0.64	-	0.9	-	3	6190 J		3424		-	-	-	-
arsenic	0.018	0.01	0.03	0.2	0.05	0.4	12.4 J	E	6.8	E	0.2	0.1	0.4	0.1
barium	3.85	2.642	-	-	-	-	2120 J	E	812	E	-	-	-	-
beryllium			-	-	-	-	0.43		0.36		-	-	-	-
cadmium	0.0037	0.0018	1	3	2	6					-	-	-	-
calcium	655	458	-	-	-	-	44200	E	35228	E	-	-	-	-
chromium			-	-	-	-	20.8 J	E	10.5		0.1	0.07	0.3	0.1
cobalt	34.6	0.02	-	-	-	-	20.8 J	E	12.6	E	-	-	-	-
copper	0.009	0.0054	0.6	0.8	1	1	16.4		10.3		0.1	0.03	0.2	0.04
iron	505	286	-	286	-	505	338000 J	E	260460	E	-	-	-	-
lead	0.0041 J	0.0018	0.05	1	0.1	3	11.4 J		9.4		0.3	0.09	0.3	0.1
magnesium	139	114	-	-	-	-	3510		2472		-	-	-	-
manganese	12.2	7.05	-	-	-	-	3650	E	2154	E	-	-	-	-
nickel	0.0616	0.046	0.06	0.5	0.08	0.7	14.3		9.9		0.3	0.2	0.5	0.3
potassium	231	167	-	-	-	-	13.1		928		-	-	-	-
silver	0.0021	0.0018	1	15	2	18					-	-	-	-
sodium	582	383	-	-	-	-	1410	E	797	E	-	-	-	-
vanadium	0.0223	0.009	-	-	-	-	17.7 J	E	13.4		-	-	-	-
zinc	0.485	0.219	3	4	7	8	132		113		0.9	0.4	1	0.5
cyanide			-	-	-	-	2.3	E	1	E	-	-	-	-
TOTAL HAZARD INDEX			9	312	15	546					11	2	15	3

NOTE:
** Tetrahydrofuran was analyzed for only during the 10/91 round
*** Surface Water hazard quotients are based on Federal Ambient Water Quality Criteria found on Table 5-1
****Sediment hazard quotients are based on NOAA sediment guidlines found on Table 5-2
J = Concentration is estimated
T = Concentration is used in computing total PAH for those PAHs lacking chemical specific NOAA sediment guidelines.
E= Exceeds upgradient concentration (inorganics only)

TABLE 6-9
RISK CHARACTERIZATION FOR COMPOUNDS DETECTED
IN SEEP AREA D
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep D Water						Seep D Sediment					
			Hazard Quotients***						Hazard Quotients****			
	Maximum mg/L	Average mg/L	Average acute	Average chronic	Maximum acute	Maximum chronic	Maximum mg/kg	Average mg/kg	Average ER-L	Average ER-M	Maximum ER-L	Maximum ER-M
Volatile Organic Compounds**												
methylene chloride			-	-	-	-	0.013 J	0.009	-	-	-	-
acetone	0.01	0.0075	-	-	-	-	0.004 J	0.004	-	-	-	-
2-butanone	0.001	0.001	-	-	-	-			-	-	-	-
tetrahydrofuran	0.091	0.091	-	-	-	-			-	-	-	-
Semivolatile Organic Compounds:												
fluoranthene			-	-	-	-	0.036 J	0.036	0.06	0.01	0.06	0.01
diethylphthalate	0.005	0.005	-	-	-	-			-	-	-	-
Pesticides/PCBs:												
None detected												
Inorganic Compounds (total):												
aluminum	4.64 J	2.736	-	4	-	6	10500 E	6567	-	-	-	-
arsenic			-	-	-	-	6.7 E	4.2 E	0.1	0.05	0.2	0.08
barium	0.182	0.167	-	-	-	-	113 E	51.3 E	-	-	-	-
calcium	76.2	67.2	-	-	-	-	4020 E	1981	-	-	-	-
chromium	0.0056	0.0041	0.3	0.4	0.4	0.5	16.3 E	10.3	0.1	0.07	0.2	0.1
cobalt	0.018	0.0129	-	-	-	-	20.6 E	9.7 E	-	-	-	-
copper			-	-	-	-	22.9 E	14.2	0.2	0.04	0.3	0.06
iron	20.3 J	14.35	-	14	-	20	45800 E	22747 E	-	-	-	-
lead	0.0075 J	0.004	0.1	3	0.2	6	18.5	9.7	0.3	0.09	0.5	0.2
magnesium	24.5	22	-	-	-	-	5620 E	3533	-	-	-	-
manganese	4.73 J	3.69	-	-	-	-	2860 E	1102 E	-	-	-	-
nickel	0.122	0.0122	0.02	0.1	0.2	1	21.4 E	13	0.4	0.3	0.7	0.4
potassium	31.4 J	26.6	-	-	-	-	1610 E	1038 E	-	-	-	-
sodium	115 J	87.3	-	-	-	-	50.5 E	32.2 E	-	-	-	-
thallium			-	-	-	-	0.46 J E	0.35 E	-	-	-	-
vanadium	0.0087	0.0051	-	-	-	-	23.1 E	14	-	-	-	-
zinc			-	-	-	-	63.9	33.4	0.3	0.1	0.5	0.2
TOTAL HAZARD INDEX			0.4	22	0.7	34			2	0.6	3	1

NOTE:
** Tetrahydrofuran was analyzed for only during the 10/91 round
*** Surface Water hazard quotients are based on Federal Ambient Water Quality Criteria found on Table 5-1
**** Sediment hazard quotients are based on NOAA sediment guidlines found on Table 5-2
J = Concentration is estimated
E= Exceeds upgradient concentration (inorganics only)

TABLE 6-10
RISK CHARACTERIZATION FOR COMPOUNDS DETECTED
IN SEEP AREA E
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep E Water*						Seep E Sediment*					
			Hazard Quotients****						Hazard Quotients*****			
	Maximum mg/L	Average mg/L	Average acute	Average chronic	Maximum acute	Maximum chronic	Maximum mg/kg	Average mg/kg	Average ER-L	Average ER-M	Maximum ER-L	Maximum ER-M
Volatile Organic Compounds*:**												
chloroethane	0.66	0.233	-	-	-	-			-	-	-	-
acetone	1.5	0.857	-	-	-	-	0.16 J	0.049	-	-	-	-
1,1-dichloroethane	0.29 J	0.09	-	-	-	-			-	-	-	-
c,t-1,2-dichloroethene	0.1 J	0.035	-	-	-	-			-	-	-	-
chloroform	0.03 J	0.013	0.0004	0.01	0.001	0.02			-	-	-	-
2-butanone	2.7	1.44	-	-	-	-	0.11 J	0.0096	-	-	-	-
4-methyl-2-pentanone	0.58	0.27	-	-	-	-			-	-	-	-
2-hexanone	0.15 J	0.089	-	-	-	-			-	-	-	-
toluene	0.52	0.157	0.009	-	0.03	-			-	-	-	-
ethylbenzene	0.027 J	0.022	0.0007	-	0.0008	-			-	-	-	-
total xylenes	0.14 J	0.047	-	-	-	-			-	-	-	-
tetrahydrofuran	0.135	0.135	-	-	-	-			-	-	-	-
Semivolatile Organic Compounds†:												
phenol	0.075 J	0.054	0.005	0.02	0.007	0.03			-	-	-	-
4-methylphenol	0.032	0.031	-	-	-	-			-	-	-	-
bis (2-ethylhexyl) phthalate			-	-	-	-	0.41 J	0.217	-	-	-	-
anthracene			-	-	-	-	0.16	0.16	2	0.2	2	0.2
carbazole			-	-	-	-	0.099	0.099	-	-	-	-
benzo (a) anthracene			-	-	-	-	0.23 J	0.148	0.6	0.09	1	0.1
benzo (a) pyrene			-	-	-	-	0.13 J	0.101	0.3	0.04	0.3	0.05
benzo (b) fluoranthene			-	-	-	-	0.2 JT	0.171 T	-	-	-	-
benzo (ghi) perylene			-	-	-	-	0.041 JT	0.041 T	-	-	-	-
benzo (k) fluoranthene			-	-	-	-	0.17 JT	0.18 T	-	-	-	-
chrysene			-	-	-	-	0.24 J	0.156	0.4	0.06	0.6	0.09
fluoranthene			-	-	-	-	0.75 J	0.327	0.5	0.09	1	0.2
fluorene			-	-	-	-	0.059 J	0.059	2	9E-05	2	9E-05
indeno (1,2,3-cd) pyrene			-	-	-	-	0.064 JT	0.064 T	-	-	-	-
pyrene			-	-	-	-	0.66 J	0.288	0.8	0.1	2	0.3
phenanthrene			-	-	-	-	0.8 J	0.298	1	0.2	4	0.6
2-methylphenol	0.012	0.012	-	-	-	-			-	-	-	-
bis(2-chlorisopropyl)ether	0.066 J	0.066	-	-	-	-			-	-	-	-
diethylphthalate	0.006	0.006	-	-	-	-			-	-	-	-
Total PAH			-	-	-	-	0.475	0.456	0.1	0.01	0.1	0.01
Pesticides/PCBs:												
4,4'-DDD			-	-	-	-	0.0049 J	0.0049	2	0.2	2	0.2
4,4'-DDT			-	-	-	-	0.008 J	0.008	8	1	8	1

TABLE 6-10
RISK CHARACTERIZATION FOR COMPOUNDS DETECTED
IN SEEP AREA E
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep E Water*						Seep E Sediment*					
			Hazard Quotients****						Hazard Quotients*****			
	Maximum mg/L	Average mg/L	Average acute	Average chronic	Maximum acute	Maximum chronic	Maximum mg/kg	Average mg/kg	Average ER-L	Average ER-M	Maximum ER-L	Maximum ER-M
Inorganic Compounds (total):												
aluminum	0.11	0.056	-	0.07	-	0.1	16500 J E	13048 E	-	-	-	-
arsenic	0.112 J	0.033	0.09	0.7	0.3	**2**	13.6 E	6.3 E	0.2	0.07	0.4	0.2
barium	0.321 J	0.258	-	-	-	-	174 E	108 E	-	-	-	-
beryllium			-	-	-	-	0.77 E	0.53 E	-	-	-	-
cadmium			-	-	-	-	0.83 E	0.59 E	0.1	0.07	0.2	0.09
calcium	270	186	-	-	-	-	20700 E	13168 E	-	-	-	-
chromium			-	-	-	-	27.6 E	21.6 E	0.3	0.1	0.3	0.2
cobalt	0.0219	0.011	-	-	-	-	16.7 E	15.3 E	-	-	-	-
copper	0.0066	0.0031	0.3	0.5	0.7	1	29 J E	26.2 E	0.4	0.07	0.4	0.07
iron	49	25.5	-	**26**	-	**49**	76300 E	46550 E	-	-	-	-
lead			-	-	-	-	27.5 J E	14.3	0.4	0.1	0.8	0.3
magnesium	228	162.5	-	-	-	-	9.4 #	7568 E	-	-	-	-
manganese	12.2	4.98	-	-	-	-	3810 E	1787 E	-	-	-	-
nickel	0.0309	0.024	0.03	0.3	0.04	0.4	32.3 E	25.3 E	0.8	0.5	1	0.6
potassium	52.7	36.4	-	-	-	-	2250 E	1813 E	-	-	-	-
silver	0.00017	0.00017	0.1	1	0.1	1			-	-	-	-
sodium	593 J	389	-	-	-	-	574 E	429 E	-	-	-	-
thallium			-	-	-	-	0.67 J E	0.45 E	-	-	-	-
vanadium	0.0023	0.0018	-	-	-	-	32.3 J E	27.4 E	-	-	-	-
zinc	0.127	0.09	1	2	2	2	503 E	314 E	3	1	4	2
cyanide	0.013	0.007	0.3	1	0.6	3			-	-	-	-
TOTAL HAZARD INDEX			2	31	4	59			23	4	30	6

NOTE:

* Includes duplicate sample SW-SW7 (10/91 and 10/92 rounds) and SD-SS7 (10/92 round) averaged with SW-SW6 (10/91 and 10/92 rounds) and SD-SS6 (10/92 round) respectively prior to data analysis.

*** Tetrahydrofuran was analyzed for only during the 10/91 round.

***Surface Water hazard quotients are based on Federal Ambient Water Quality Criteria found on Table 5-1

***** Sediment hazard quotients are based on NOAA sediment guidlines found on Table 5-2

† bis(2-Chloroisopropyl)Ether was analyzed for only during the 10/91 round.

J = Concentration is estimated

T = Concentration is used in computing total PAH for those PAHs lacking chemical specific NOAA sediment guidelines.

E= Exceeds upgradient concentration (inorganics only)

#= Maximum concentration value is less than average concentration.

TABLE 6-11
RISK CHARACTERIZATION FOR COMPOUNDS DETECTED
IN SEEP AREA F
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep F Water						Seep F Sediment					
			Hazard Quotients**						Hazard Quotients***			
	Maximum mg/L	Average mg/L	Average acute	Average chronic	Maximum acute	Maximum chronic	Maximum mg/kg	Average mg/kg	Average ER-L	Average ER-M	Maximum ER-L	Maximum ER-M
Volatile Organic Compounds:												
None detected												
Semivolatile Organic Compounds:												
4-methylphenol	0.001 J	0.001	-	-	-	-			-	-	-	-
Pesticides/PCBs:												
None detected												
Inorganic Compounds (total):												
aluminum	55.9 J	21.2	-	**28**	-	**75**	2850	2850	-	-	-	-
arsenic	0.0267 J	0.01	0.03	0.21	0.07	0.6	1.3	1.3	0.04	0.02	0.04	0.02
barium	0.393 J	0.175	-	-	-	-	8.8	8.8	-	-	-	-
beryllium	0.002	0.001	0.01	0.2	0.02	0.4			-	-	-	-
calcium	158	102	-	-	-	-	1090	1090	-	-	-	-
chromium	0.09	0.036	**2**	**3**	**6**	**8**	4.6	4.6	0.06	0.03	0.06	0.03
cobalt	0.0835	0.032	-	-	-	-	6	6	-	-	-	-
copper	0.0256	0.0147	**2**	**2**	**3**	**4**	7.5	7.5	0.1	0.02	0.1	0.02
iron	97 J	37.74	-	**38**	-	**97**	10100	10100	-	-	-	-
lead	0.0675 J	0.025	0.7	**19**	**2**	**51**	3.2	3.2	0.09	0.03	0.09	0.03
magnesium	47.7	26.1	-	-	-	-	1510	1510	-	-	-	-
manganese	8.67	4.66	-	-	-	-	158	158	-	-	-	-
mercury	0.0001	0.0001	0.04	**8**	0.04	**8**			-	-	-	-
nickel	0.167	0.064	0.08	0.7	0.2	**2**	6.9	6.9	0.2	0.1	0.2	0.1
potassium	23.9	14.4	-	-	-	-			-	-	-	-
selenium	0.0026	0.0023	0.009	0.07	0.01	0.07			-	-	-	-
sodium	106	86.6	-	-	-	-			-	-	-	-
vanadium	0.103	0.04	-	-	-	-	7.3	7.3	-	-	-	-
zinc	0.0454	0.044	0.7	0.7	0.7	0.8			-	-	-	-
TOTAL HAZARD INDEX			**5**	**101**	**11**	**247**			0.5	0.2	0.5	0.2

NOTE:
** Surface Water hazard quotients are based on Federal Ambient Water Quality Criteria found on Table 5-1
***Sediment hazard quotients are based on NOAA sediment guidlines found on Table 5-2
J = Concentration is estimated

TABLE 6-12
RISK CHARACTERIZATION FOR COMPOUNDS DETECTED
IN SEEP AREA G
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep G Water							Seep G Sediment						
				Hazard Quotients**							Hazard Quotients***			
	Maximum mg/L	Average mg/L	Location of Maximum	Average acute	Average chronic	Maximum acute	Maximum chronic	Maximum mg/L	Average mg/L	Location of Maximum	Average ER-L	Average ER-M	Maximum ER-L	Maximum ER-M
Volatile Organic Compounds:														
methylene chloride				-	-	-	-	0.009 J	0.0073	SD-SS34	-	-	-	-
acetone	0.0043 J	0.0059	SW-SW9	-	-	-	-				-	-	-	-
2-butanone	0.0039 J	0.0039	SW-SW9	-	-	-	-				-	-	-	-
4-methyl-2-pentanone	0.0014 J	0.0014	SW-SW9	-	-	-	-				-	-	-	-
Semivolatile Organic Compounds:														
2,4 Dinitrophenol	0.001	0.001	SW-SW32	-	-	-	-				-	-	-	-
Pesticides/PCBs:														
None detected														
Inorganic Compounds (total):														
aluminum	2.3	1.43	SW-SW9	-	2	-	3	6150	4390	SD-SS9	-	-	-	-
arsenic			SW-SW9	-	-	-	-	3.4 E	2.2 E	SD-SS34	0.07	0.03	0.1	0.04
barium	0.0657	0.0618	SW-SW9	-	-	-	-	20.2	17.2	SD-SS32	-	-	-	-
beryllium	0.0047	0.0019	SW-SW9	0.01	0.4	0.04	0.9				-	-	-	-
cadmium	0.00028	0.0002	SW-SW9	0.1	0.3	0.2	0.4				-	-	-	-
calcium	95.5	74.1	SW-SW9	-	-	-	-	2080	1907	SD-SS9	-	-	-	-
chromium	0.314	0.08	SW-SW9	5	7	20	29	10.4	7.4	SD-SS9	0.09	0.05	0.1	0.07
cobalt	0.0049	0.0035	SW-SW9	-	-	-	-	7.4	5.4	SD-SS9	-	-	-	-
copper	0.0194	0.0117	SW-SW9	1	2	2	3	14.9	13.1	SD-SS9	0.2	0.03	0.2	0.04
iron	7.09	4.5	SW-SW9	-	5	-	7	14300	11370	SD-SS9	-	-	-	-
lead	0.0071	0.0038	SW-SW9	0.1	3	0.2	5	4.9	3.8	SD-SS9	0.1	0.03	0.1	0.04
magnesium	18	13.5	SW-SW9	-	-	-	-	3440	2417	SD-SS9	-	-	-	-
manganese	2.04	1.72	SW-SW9	-	-	-	-	274	223	SD-SS9	-	-	-	-
nickel	0.0085	0.0063	SW-SW9	0.008	0.07	0.01	0.1	13.9	10.4	SD-SS9	0.3	0.2	0.5	0.3
potassium	11.7	0.011	SW-SW9	-	-	-	-	845	457	SD-SS9	-	-	-	-
sodium	95.8	71.5	SW-SW9	-	-	-	-				-	-	-	-
vanadium	0.0083	0.0052	SW-SW9	-	-	-	-	13.2	10.1	SD-SS9	-	-	-	-
zinc	0.0808	0.068	SW-SW9	1	1	1	1	53.2	28.9	SD-SS9	0.2	0.1	0.4	0.2
TOTAL HAZARD INDEX				8	20	23	50				1	0.5	1	0.7

NOTE:
** Surface Water hazard quotients are based on Federal Ambient Water Quality Criteria found on Table 5-1
***Sediment hazard quotients are based on NOAA sediment guidlines found on Table 5-2
J = Concentration is estimated

TABLE 6-13
RISK CHARACTERIZATION FOR COMPOUNDS DETECTED
IN SEEP AREA H
BFI_ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep H Water						Seep H Sediment					
			Hazard Quotients**						Hazard Quotients***			
	Maximum mg/L	Average mg/L	Average acute	Average chronic	Maximum acute	Maximum chronic	Maximum mg/kg	Average mg/kg	Average ER-L	Average ER-M	Maximum ER-L	Maximum ER-M
Volatile Organic Compounds:												
acetone	0.46	0.305	-	-	-	-			-	-	-	-
2-butanone	0.49	0.325	-	-	-	-			-	-	-	-
4-methyl-2-pentanone	0.03	0.019	-	-	-	-			-	-	-	-
2-hexanone	0.099	0.054	-	-	-	-			-	-	-	-
Semivolatile Organic Compounds:												
phenol	0.015 J	0.01	0.001	0.004	0.001	0.006			-	-	-	-
4-methylphenol	0.098	0.074	-	-	-	-			-	-	-	-
2-methulphenol	0.056	0.053	-	-	-	-			-	-	-	-
diethylphthalate	0.005 J	0.005	-	-	-	-			-	-	-	-
Pesticides/PCBs: N/A												
Inorganic Compounds (total):												
aluminum	199 J	0.1	-	0.1	-	**266**	6330	6295	-	-	-	-
arsenic	0.0196 J	0.011	0.03	0.23	0.05	0.4	2.1 E	1.9	0.06	0.02	0.06	0.02
barium	1.175 J	0.677	-	-	-	-	32.7	30.15	-	-	-	-
beryllium	0.0047	0.0029	0.02	0.5	0.04	0.9			-	-	-	-
calcium	169	139	-	-	-	-	3510 E	2815 E	-	-	-	-
chromium	0.314	0.158	**10**	**14**	**20**	**29**	10.7	10.6	0.1	0.07	0.1	0.07
cobalt	0.174	0.088	-	-	-	-	6.9	6.6	-	-	-	-
copper			-	-	-	-	12.9	12.6	0.2	0.03	0.2	0.03
iron	366 J	0.183	-	0.2	-	**366**	14200	13800	-	-	-	-
lead	0.119 J	0.06	**2**	**45**	**4**	**90**	5.2	5	0.1	0.05	0.1	0.05
magnesium	163	117.8	-	-	-	-	3440	3405	-	-	-	-
manganese	9.93 J	5.076	-	-	-	-	357	352	-	-	-	-
mercury			-	-	-	-	0.11 E	0.07 E	0.5	0.05	0.7	0.08
nickel	0.393	0.204	0.3	**2**	0.5	**4**	12.3	12.3	0.4	0.2	0.4	0.2
potassium	53.6	50.1	-	-	-	-	871	848	-	-	-	-
sodium	278	233.5	-	-	-	-			-	-	-	-
vanadium	0.353	0.177	-	-	-	-	13.3	12.3	-	-	-	-
zinc	0.929	0.466	**7**	**8**	**14**	**16**			-	-	-	-
TOTAL HAZARD INDEX			**19**	**71**	**38**	**772**			1.4	0.5	**2**	0.5

NOTE:
** Surface Water hazard quotients are based on Federal Ambient Water Quality Criteria found on Table 5-1
*** Sediment hazard quotients are based on NOAA sediment guidlines found on Table 5-2
N/A = Not analyzed for during the 10/91, 3/92 and 10/92 rounds
J = Concentration is estimated
E= Exceeds upgradient concentration (inorganics only)

TABLE 6-14
RISK CHARACTERIZATION FOR COMPOUNDS DETECTED
IN BACKGROUND SEEP SEDIMENT
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	Seep Sediment (Background)					
			Hazard Quotients**			
	Maximum	Average	Average		Maximum	
	mg/kg	mg/kg	ER-L	ER-M	ER-L	ER-M
Volatile Organic Compounds:						
None detected						
Semivolatile Organic Compounds:						
bis (2-ethylhexyl) phthalate	0.12 J	0.12	-	-	-	-
benzo (a) anthracene	0.16 J	0.16	0.7	0.1	0.7	0.1
benzo (a) pyrene	0.17 J	0.17	0.4	0.07	0.4	0.07
benzo (b) fluoranthene	0.27 JT	0.27 T	-	-	-	-
benzo (ghi) perylene	0.85 JT	0.85 T	-	-	-	-
benzo (k) fluoranthene	0.1 JT	0.1 T	-	-	-	-
chrysene	0.22 J	0.22	0.6	0.08	0.6	0.08
fluoranthene	0.37 J	0.37	0.6	0.1	0.6	0.1
indeno (1,2,3-cd) pyrene	0.093 JT	0.093 T	-	-	-	-
pyrene	0.41 J	0.41	1	0.2	1	0.2
phenanthrene	0.3 J	0.3	1	0.2	1	0.2
Total PAH	1.313	1.313	0.3	0.04	0.3	0.04
Pesticides/PCBs: N/A						
Inorganic Compounds (total):						
aluminum	8170	8170	-	-	-	-
arsenic	2	2	0.06	0.02	0.06	0.02
barium	44.1	44.1	-	-	-	-
beryllium	0.44	0.44	-	-	-	-
calcium	2270	2270	-	-	-	-
chromium	14.8	14.8	0.2	0.1	0.2	0.1
cobalt	7.9	7.9	-	-	-	-
copper	17.6	17.6	0.3	0.05	0.3	0.05
iron	16200	16200	-	-	-	-
lead	23.8	23.8	0.7	0.2	0.7	0.2
magnesium	4230	4230	-	-	-	-
manganese	804	804	-	-	-	-
nickel	17.5	17.5	0.6	0.4	0.6	0.4
potassium	951	951	-	-	-	-
vanadium	16.8	16.8	-	-	-	-
zinc	247	247	2	0.9	2	0.9
TOTAL HAZARD INDEX			9	2	9	2

NOTE:
* Frequency of detection refers to the number of times a constituent was detected, per sample group size, during the 10/91, 3/92 and 10/92 rounds.
** Sediment hazard quotients are based on NOAA sediment guidlines found on Table 5-2
N/A = Not analyzed for during the 10/91, 3/92 and 10/92 rounds
J = Concentration is estimated
T = Concentration is used in computing total PAH for those PAHs lacking chemical specific NOAA sediment guidelines.

TABLE 6-15
RISK CHARACTERIZATION FOR COMPOUNDS
DETECTED IN ROUND 3 OVERSIGHT SURFACE WATER
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM,VERMONT

	River Water										Seep Surface Water					
Sample Location	BFI-Landfill RW-2A		HQ Acute	HQ Chronic	BFI - Rockingham RW-3		HQ Acute	HQ Chronic	BFI - Rockingham RW-3		HQ Acute	HQ Chronic	BFI - Rockingham SW-2		HQ Acute	HQ Chronic	BFI - Rockingham SW-3/4		HQ Acute	HQ Chronic
Sampling Date					10/15/92				10/15/92				10/14/92				10/13/92			
Volatile Organic Compounds (ug/L)																				
Vinyl Chloride																	4	J		
Chloroethane																	900	J		
Methylene Chloride																	52			
Acetone																	2000	J		
Carbon Disulfide																	2	J		
1,1-Dichloroethane																	4	J		
1,2-Dichloroethane																	2	J	0.00002	0.0001
2-Butanone																	3800			
1,1,1-Trichloroethane																				
Benzene																	2	J		
4-Methyl-2-pentanone																	300	J		
2-Hexanone																	260	J		
Toluene																	280	J	0.02	
Ethylbenzene																	31		0.001	
Total Xylenes																	180			
Semivolatile Organic Compounds (ug/L)																				
Phenol																	260	J	0.03	0.1
4-Methylphenol																	4700			
Diethylphthalate																				
Pesticides and PCBs (ug/L)																				
delta-BHC													0.020	J						
Aldrin																	0.11	J	0.04	
Heptachlor epoxide													0.0078	J	0.02	2				
4,4'-DDE													0.010	J	0.01					
Endrin																	0.021	J	0.1	9
alpha-Chlordane									0.014	J	0.006	3					0.0054	J	0.002	1
Inorganics (ug/L)																				
Aluminum	218			0.3													337			0.5
Barium	11.2	J			11.2	J							358	J			4440	J		
Calcium	16100	E			15200	E			15500	E			44400				513000			
Cobalt													12.2							
Iron	737			0.7	248			0.2	263			0.3					415000			415
Lead	2.3	E	0.07	2	2.5	E	0.07	2					2.6		0.08	2	6.4		0.2	5
Magnesium	1970				1820				1830				112000				139000			
Manganese	77.0				37.9				38.9				16.8				7500			
Nickel													53.7		0.07	0.6	62.4		0.08	0.7
Potassium	2210	E			1900				1650				248000				231000			
Sodium	7690	E			6590				6650				276000				447000			
Vanadium																	15.8	J		
Zinc													295		5	5	184		3	3
Cyanide																				
Total Hazard Index			**0.07**	**3**			**0.07**	**2**			**0.01**	**4**			**5**	**10**			**19**	**592**

J = Concentration is estimated
E = Concentration exceeds upgradient river water concentration (note: upgradient seep surface water concentration was not collected.)
HQ= Surface Water hazard quotients are based on Federal Ambient Water Quality Criteria found on Table 5-1.

TABLE 6-16
RISK CHARACTERIZATION FOR COMPOUNDS
DETECTED IN ROUND 3 OVERSIGHT SEDIMENT DATA
BFI-ROCKINGHAM LANDFILL
ROCKINGHAM, VERMONT

	River Sediment								Seep Sediment							
Sample Location	BFI - Rockingham RWS-2A		HQ		BFI - Rockingham RWS-3B		HQ		BFI - Rockingham SS-2		HQ		BFI - Rockingham SS-3/4		HQ		BFI - Rockingham SS-3/4		HQ	
Sampling Date	10/14/92		ER-L	ER-M	10/15/92		ER-L	ER-M	10/13/92		ER-L	ER-M	10/13/92		ER-L	ER-M	10/13/92		ER-L	ER-M
Volatile Organic Compounds (ug/Kg)																				
Carbon Disulfide													4	J			5	J		
Ethylbenzene													6	J			7	J		
Total Xylenes													68				85			
Semivolatile Organic Compounds (ug/Kg)																				
4-Methylphenol																	57	J		
4-Chloro-3-methylphenol													66	J			80	J		
Acenaphthylene									270	J	2	0.4	110	J	0.7	0.2				
Dibenzofuran									190	J										
Fluorene									280	JT	8	0.4	54	JT	2	0.1				
Phenanthrene									2200		10	2	670	J	3	0.5	140	J	0.6	0.1
Anthracene									460		5	0.5	160	J	2	0.2				
Carbazole									420				69	J						
Fluoranthene					93	J	0.2	0.03	2400		4	0.7	1200	J	2	0.3	270	J	0.5	0.08
Pyrene					85	J	0.2	0.04	1800		5	0.8	950	J	3	0.4	220	J	0.6	0.1
Benzo (a) anthracene									1000		4	0.6	440	J	2	0.3	120	J	0.5	0.08
Chrysene					55	J	0.1	0.02	1100		3	0.4	460	J	1	0.2	150	J	0.4	0.05
Bis (2-ethylhexyl) phthalate																	65	J		
Benzo (b) fluoranthene									1200	T			470	JT			150	JT		
Benzo (k) fluoranthene									580	T			290	JT			98	JT		
Benzo (a) pyrene									790		2	0.3	420	J	1	0.2	110	J	0.3	0.04
Indeno (1,2,3-cd) pyrene									340	JT			220	JT			72	JT		
Dibenzo (a,h) anthracene									150	J	3	0.6	71	J	1	0.3				
Benzo (ghi) perylene									150	JT			150	JT						
Total PAH									2550		0.6	0.07	1184		0.3	0.03	320		0.08	0.009
Pesticides and PCBs (ug/Kg)																				
delta-BHC					1.0	J														
Heptachlor					3.9	J							0.36	J			0.64	J		
Heptachlor epoxide									0.34	J			1.1	J						
Dieldrin					0.37	J			0.20	J										
4,4'-DDE					0.51	J	0.3	0.03					0.95	J	0.5	0.1	0.24	J	0.1	0.02
Endosulfan II					0.75	J			1.8	J										
4,4'-DDD					0.88	J	0.4	0.04	2.0	J	1	0.1								
4,4'-DDT									3.7	J	4	0.5								
Endrin aldehyde									6.0				11	J			7.8	J		
Gamma Chlordane																	1.4	J		
Inorganics (mg/Kg)																				
Aluminum	6000				8410				3450				3660				4200			
Barium	22.8				40.4	E			182	E			204	E			198	E		
Calcium	1800				1900				2460	E			24000	E			23100	E		
Chromium	9.5	E	0.1	0.1	15.7	E	0.2	0.1	5.7	J	0.07	0.04	6.1	J	0.08	0.04	6.8	J	0.09	0.05
Cobalt	7.2				8.9	E							6.3				6.7			
Copper	14.8		0.2	0.04	20.3	E	0.3	0.05	15.0		0.2	0.04	11.7		0.2	0.03	30.8	E	0.4	0.08
Iron	14600				15900				97300	E			94000	E			92200	E		
Lead	6.7	J	0.2	0.1	13.4	J E	0.4	0.1	18.5	J	0.5	0.2	13.6	J	0.4	0.1	14.1	J	0.4	0.1
Magnesium	3330				4220				1990				2410				2620			
Manganese	344	E			261				205				1230	E			1270	E		
Nickel	12.8		0.4	0.3	16.2		0.5	0.3	6.1	J	0.2	0.1	6.1	J	0.2	0.1	6.5	J	0.2	0.1
Potassium	824				1010				472				649				754			
Sodium													354	J E			344	J E		
Vanadium	15.0				19.8	E			20.1	E			22.4	E			21.0	E		
Zinc	45.1	J	0.4	0.2	58.6	J	0.5	0.2	242	J	2	0.9	74.0	J	0.6	0.3	69.6	J	0.6	0.3
Cyanide																				
Total Hazard Index			1	0.6			3	1			54	8			19	3			5	1

Note:
* Sediment hazard quotients based on NOAA sediment guidelines found on Table 3-2.
J= Concentration is estimated
T= Concentration used in computing total PAH.

TABLE 6-17
SUMMARY OF AGGREGATE HAZARD INDICIES FOR ALL EXPOSURE ZONES
BFI-ROCKINGHAM LANDILL
ROCKINGHAM, VERMONT

	Surface Water								Sediment							
	Average				Maximum				Average				Maximum			
	acute		chronic		acute		chronic		ER-L		ER-M		ER-L		ER-M	
Exposure Zones	Baseam	ADL	Baseam	ADL	Baseam	ADL	Baseam	ADL	Baseam	ADL	Baseam	ADL	Baseam	ADL	Baseam	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	-	546	-	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 then one oversite sampling location corresponds to this exposure zone.

Section 7

7.0 Uncertainty Analysis

Uncertainty is inherent in each step of the risk estimation process, beginning with imperfect information regarding site contamination patterns. Limitations include the adequacy of sampling, data quality, the assumptions made in the averaging of contaminant concentrations, and the selection of measurement endpoints. In this assessment, uncertainties are dealt with principally by making conservative choices which tend to overestimate risks when faced with uncertainty. Some of the principal uncertainties and associated conservative assumptions are discussed below.

7.1 Uncertainty and Limitations of the Site Characterization

Sediment and surface water analytical data, from samples collected independently by Balsam in 1991-1992 and Arthur D. Little in 1992, were used in the ERA. The data collected during the investigation went through intensive Contract Laboratory Program (CLP) validation, and no rejected analytical values were used in this assessment. Only CLP data were used, and no modeling was conducted to estimate exposure point concentrations. However, since samples are taken from representative locations, rather than all possible locations, information on contaminant distribution is still imperfect with some degree of remaining uncertainty.

Factors associated with the site contamination assessment that introduce uncertainty into this ERA include:

- Uncertain origin and representativeness of exposure zone contaminants
- Determination of background conditions
- Treatment of Tentatively Identified Compounds
- Use of average and maximum detected concentrations
- Effect of analytical detection limits

These issues are discussed further below.

7.1.1 Uncertain Origin and Representativeness of Exposure Zone Contaminants

For each compound positively detected during the remedial investigation, statistical data regarding the average and maximum concentration were compiled using Balsam's three rounds of data. Only one round of oversight data was included in this ERA, so that a lower degree of confidence can be assigned regarding the representativeness of these risks from exposure to compounds detected only once, in the oversight samples. Several pesticides were detected only once in the river sediment, and therefore, the risks estimated for these analytes may not be representive of the river exposure zone. Since the statistical relationship of such compounds to known disposal practices is unknown, and pesticides also may occur in

the Connecticut River upstream of the site area, risk estimates for pesticides could be neither representative of the exposure zone as a whole, nor related to past disposal practices.

7.1.2 Determination of Background Conditions

Since naturally occurring, inorganic compounds were evaluated as contaminants of concern, a portion of the estimated risk is based on metal concentrations that may predate the on-site disposal activities. Metals concentrations found at the selected locations, were presumed to represent naturally occurring upgradient levels for the seeps and Connecticut River. However, the background seep may be influenced by stormwater runoff from Route 5, and the "upgradient" river location (RW/RS-3) actually is downgradient from the point at which site-derived contaminants from Seep E enter the river floodplain. Thus, a high degree of uncertainty must be assigned to the use of this location as an indicator of Connecticut River background conditions.

Note: Prior to surface water sampling in September, 1993, a new background location for the Connecticut River, SW-RW-4, was identified. SW-RW-4 is located approximately 900 feet upstream from SW-RW-3 in an area that appears not to be affected by site-derived contamination. However, we have not evaluated the potential influence of riverfront residences on this location.

Since no upgradient ponds were available for sampling, the incremental, site-derived risks from inorganics in the onsite retention ponds also cannot be inferred. All risks from exposure to metals in the sediments and surface water of the onsite ponds, thus, are conservatively assumed to be site-influenced.

7.1.3 Treatment of Tentatively Identified Compounds

Tentatively identified compounds, or TICs, are compounds that were not on the target compound list (TCL), but were identified as peaks on chromatograms. A contract laboratory program (CLP) laboratory is required to identify the 30 highest peaks. Compounds are identified by matching the peaks with known mass spectra; however, the assigned identity is highly uncertain and the quantification of the sample is inaccurate. None of the sediment and surface water data used in the ERA consisted of compounds that were tentatively identified during the remedial investigation.

7.1.4 Use of Average and Maximum Detected Concentration

The risk characterization is based on estimated risk for both an average and a maximum exposure scenario. Both of these scenarios have intrinsic uncertainty associated with them that may affect the estimation for the site. In computing the average contaminant concentrations and associated risks, the spatial distribution of contaminants and variability in their concentration levels are collapsed and aggregated into one value. Because of the limited sample size, the calculated

averages may differ from actual, zone-wide conditions. Localized areas of elevated concentrations, however rare, also may unrealistically inflate the perceived zone-wide average risks, if such "hot spots" happen to be captured by the sampling program. Hence, the risk estimates presented here may overestimate or underestimate actual, average risk for a particular exposure zone. This is most likely for the seep and river areas within which very few samples were taken.

The maximum detected concentration was used to quantify maximum risk, but some uncertainty always exists as to whether this is truly the maximum concentration present in the study area. Even with a comprehensive sampling program, the sampled media include only a small fraction of the entire study area. In addition, a large percentage of the point-specific maxima were reported as "J" qualified data. Data with "J" qualifiers indicate that the numerical value is an estimated value. Risk estimates for all classes of COCs were affected, since "J" values were used in calculating risk quotients, for at least one COC within each chemical class.

7.1.5 Effects of Analytical Detection Limits

Uncertainty also exists in the hazard identification as a result of analytical detection limits. Typically, non-detects are included in the computation of average exposure concentrations as one-half the reported detection limit. The detection limit (DL) is the lowest amount that can be reliably distinguished above the random noise of an analytical instrument. Due to irregularity associated with analytical instruments, reproducible quantitation is not possible at the detection limit. Generally, a factor of three to five is applied to the DL to obtain the quantitation limit (QL). The QL is considered to be the lowest level at which a chemical may accurately be seen and reproduced. QLs adjusted due to the preparation of a particular sample or analytical method used to analyze a sample are sample quantitation limits (SQL). Analytical adjustments, such as preparatory dilution of a sample (due to an extremely high level of one compound), could result in non-detects at high SQLs, for all other compounds included as analytes for a particular method.

The exposure point concentrations, resulting from the inclusion of non-detects as one-half the SQL in the computation of average concentration levels, can be unrealistically high if the SQLs were elevated. To minimize this uncertainty, Balsam used a method of averaging data where non-detects for a particular analyte were excluded from the calculation of averages, if their inclusion resulted in a calculated average concentration that exceeded the maximum detected concentration, due to an elevated SQL. This method reduced the chance of overestimating average risk as an artifact of non-detects and elevated SQLs.

7.2 Exposure Modelling and Site-specific Assumptions

Uncertainty associated with risk modelling is proportional to the complexity of the exposure model used, its inadequacies, and the uncertainty inherent in exposure parameter estimation. To minimize this uncertainty during the current ERA, simple risk quotient models were used to evaluate risks to entire communities of aquatic biota from all compounds, rather than dietary exposure models for selected contaminants and indicator species.

Exposure parameters were chosen to reflect worst case scenarios for exposures of aquatic biota, the likelihood of which varies significantly among the individual sampling locations. Several, highly conservative assumptions made in this ERA included:

- The leachate interceptor trench along Route 5 is ineffective
- No significant attenuation of site-derived contaminants, discharged from the seeps and into the Connecticut River, will occur over time or during subsurface/overland migration
- On-site retention ponds are inhabited by aquatic biota, either permanently (Pond 3) or temporarily (Ponds 1 and 2)
- terrestrial seeps located along Route 5 and those closer to the river are accessible throughout the year to forest-dwelling amphibians, and to aquatic biota of the Connecticut River during periods of river flooding in the site area
- Exposure of at least some individual organisms will occur to both the average and maximum contaminant concentrations
- All contaminants of concern in sediment and surface water are bioavailable to aquatic species of each exposure zone
- The surface water hardness value of 50 mg/L, used to calculate AWQC for hardness-dependent inorganics, is representative of actual conditions in the ponds, seeps, and Connecticut River

The ecological risk implications of each of these assumptions and exposure parameters are discussed below in Section 7.4, with respect to their realism and influence on the degree to which this ERA may have overestimated the actual risks to local biota and ecosystems.

7.3 Effects Measurement Endpoints

There is uncertainty concerning the applicability of the AWQC and NOAA toxicity values, used in this ERA to assess the toxicity of contaminants to biological communities of the aquatic and terrestrial seep habitats evaluated. Site-specific factors that may invalidate the use of AWQC and NOAA guidelines, respectively, for biota of the surface water column and sediments, include:

- Potential absence of pelagic and/or benthic biota from the retention ponds and/or terrestrial seeps
- Interspecific differences in sensitivity to contaminants
- Genetic differences within the same species, between local populations and the test organisms used in toxicity tests, such as greater sensitivity or tolerance (acclimation) of the local races

Several of these uncertainty factors are briefly discussed below.

7.3.1 Selection of Endpoints for Pelagic Biota in Surface Water

The endpoints used to evaluate risks to pelagic species of the aquatic community contain inherent uncertainty. For example, some chronic AWQC (EPA, 1987) for freshwater biota have been found to be over 100 times lower than the "lowest no observed adverse effects level" (NOAEL) for certain species. Therefore, the use of either Federal or Vermont AWQC as acute or chronic toxicity thresholds, in the aquatic risk evaluation performed here for biota of the pelagic niche, may have overestimated the risks to pelagic biota by as much as two orders of magnitude.

In the ecotoxicological literature, wide ranges are sometimes reported for LOELs and toxicity thresholds, both among and within individual species. Due to inherent genetic variation within a species and/or the use of different experimental design among published studies, the lowest reported level or other endpoint selected as an AWQC or LOEL may or may not be appropriate for a particular site. Biological populations surviving in the impacted areas also may be less/more sensitive than test organisms and/or may have gradually become acclimated to the chronic pollution levels via selection and resultant genetic drift. To minimize this uncertainty, only those LOELs published by U.S. EPA (1987) in conjunction with official AWQC, were applied in the calculation of surface water mediated risks.

7.3.2 Selection of Endpoints for the Benthic Community

The NOAA sediment guidelines (Long and Morgan, 1990), used here to evaluate benthic invertebrate contact with sediments, have each been assigned a degree of confidence. The confidence factors for the analytes used in the ERA are presented in Table 5-2.

7.3.3 Other Uncertainties

Other uncertainties are that the ecological risks estimated here:

- Don't account for potential synergistic or antagonistic effects of organismal exposure to multiple contaminants
- Don't account for any indirect, food chain mediated exposure risks to biota such as predatory vertebrates
- Are not weighted to reflect the realistic percentage of an organisms lifetime during which exposures actually occur

7.4 Ecological Implications of Uncertainties

The exposure model parameters and assumptions, outlined above as sources of uncertainty, are briefly discussed below with respect to their ecological risk implications for aquatic biota of the site area.

7.4.1 Leachate Trench and Contaminant Attenuation

In October 1992, a leachate interceptor trench was installed along the northwest side of Route 5, to intercept contaminated overburden groundwater migrating from the landfill to the terrestrial seeps located near the road and closer to the Connecticut River. After installation, the seeps nearest to Route 5 effectively dried up, whereas those closer to the river (Seeps F, G, and H) continued to flow, presumably due to ground water discharges from the bedrock aquifer. These observations, together with the likelihood that some ground water contaminant attenuation will occur over time and across the distance between the landfill and these seeps, suggest that these assumptions of interceptor trench dysfunction and zero attenuation are highly conservative and perhaps unrealistic.

In August and September of 1993 surface water and sediment samples were collected from the seeps and Connecticut River downgradient from the interceptor trench. These data have been reviewed and compared to the data from the 1991 and 1992 sampling rounds (see Section 6.3). From this review it appears that chemical concentrations, in general, are not increasing. This apparent stabilization and/or decrease is, in part, attributed to the proper functioning of the interceptor trench.

However, the concentrations of several compounds, particularly, zinc, lead and aluminum have increased at several locations and therefore should be considered during future monitoring.

7.4.2 Presence of Aquatic Biota

It was assumed that aquatic biota inhabit the ponds, seeps, and river. This is realistic only for the Connecticut River and Pond 3, the latter of which is the only permanent surface water body onsite and reportedly is inhabited by catfish and frogs. In contrast, aquatic biota are very unlikely to inhabit either the sediments or temporary surface waters of onsite Ponds 1 and 2, due to their hydrology, the chronic human activity onsite, and the poor quality of habitat that they provide. Terrestrial seeps closest to Route 5 (Seeps B, C, and E), which were effectively dried up by installation of the interceptor trench, also do not provide habitat for aquatic biota. It is extremely unlikely that the aquatic biota from the Connecticut River could ever gain access to these now-dry seeps, even under unprecedented conditions of river flooding, since they occur at elevations of between 90-100 feet above the river's floodplain.

Even the seeps closer to the river (Seeps F, G, and H), which continue to receive bedrock ground water discharges, do not offer permanent habitat for pelagic or benthic species of aquatic organisms. These three "seeps" are actually erosional gulleys that lack standing pools of water and have a clay/silt substrate in their channels, so that they do not provide the riffle niches typically required by freshwater invertebrates. Access by and exposure of aquatic biota from the river to these lower seeps, thus, is a realistic exposure scenario for these lower seep areas only during periods of extensive river flooding.

7.4.3 Exposures to Average and Maximum Contamination

As noted above, except for Pond 3 and the Connecticut River, exposures of aquatic biota to the average and maximum pond and/or seep concentrations of site-derived contaminants are not likely to occur to any significant degree, due to the location and hydrology of these areas. During those rare occasions when these ponds and the lower seeps (Seeps F, G, and H) actually are flooded, however, the few individual aquatic organisms that might be exposed would likely benefit from the dilution of any contaminants being discharged from the seeps.

7.4.4 Contaminant Bioavailability and Surface Water Hardness

Since bioavailability of organic contaminants is determined to a large degree by the total organic carbon content (TOC) of sediments, a high degree of uncertainty must be assigned to the conservative assumption that organic contaminants are 100% bioavailable. Similarly, the assumption that inorganics in surface water and sediments are 100% bioavailable to aquatic biota is very conservative, since surface and

interstitial water hardness affects the bioavailability and toxicity of several metals. The use of a hardness value of 50 mg/L at all sampling locations, as an adjustment factor for calculating AWQC for inorganics, is most realistic for the Connecticut River. This assumption is less realistic for the onsite ponds and the terrestrial seeps, since these exposure zones exhibited much higher hardness values than the river, thus reducing the aquatic bioavailability and toxicity of the metals detected at these non-river locations.

Collectively, the foregoing exposure modelling parameters and site-specific assumptions have introduced a highly conservative bias into the risk estimates presented here, resulting in added uncertainty regarding the extent to which these ecological risks have been overestimated.

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Appendix A

Appendix A
Selected Excerpts from Balsam's Environmental Risk Assessment

BALSAM℠
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October 18, 1993 Balsam Project 6458

Mr. Edward Hathaway
U. S. Environmental Protection Agency
Region 1
J. F. K. Federal Building
Boston, Massachusetts

RE: Transmittal of Draft Ecological Risk Assessment Site Characterization
DSI Superfund Site

Dear Ed:

As requested by Mr. David Turton of Arthur D. Little (ADL), we are enclosing Section 2.0 of our draft ecological risk assessment for the DSI Superfund site. It is our understanding that ADL wished to incorporate this document in their ecological risk assessment as an appendix.

If you have any questions regarding this transmittal, please feel free to call us.

Sincerely,

Michael A. Deyling

Michael A. Deyling, C.G., P.Hg.
Project Manager

Leonard C. Sarapas, P.E., P.H.
Vice President, Engineering

bf\S9837D

enc.

cc: David Turton, ADL (w/enc.)
Derek Vallence, BFI (w/enc.)

2.0 SITE CHARACTERIZATION

2.1 PHYSICAL CHARACTERIZATION

The DSI site is located in Rockingham, Vermont along Route 5 approximately 0.5 miles south of the Windham/Windsor county line. A locus is presented as Figure 2.1. The DSI landfill encompasses approximately 120 acres owned by DSI.

The facility accepted primarily municipal solid waste from initiation of waste disposal in 1968 until November 1991 when the facility discontinued receipt of waste. Subsequent to November 1991, placement of an interim cover was completed on the landfill to promote drainage and establish a vegetative cover to minimize erosion.

The landfill is located on a glacial terrace along the Connecticut River valley. The landfill elevation ranges from approximately 460 feet mean sea level (MSL) at the base to 550 feet MSL at the top. The Connecticut River is located approximately 500 feet southeast of the landfill at an elevation of approximately 290 feet MSL. As can be seen from the relative elevations shown on Figure 2.1, with the exception of the glacial terrace, the site is characterized by steep topography.

Bedrock is exposed north and west of the site, and dips steeply to the southeast. Bedrock consists of a sequence of inter-layered black to gray phyllite and slate classified as the Littleton Formation. Foliation generally trends north-northeast to north-northwest, and the primary fracture set strike follows this trend with steep to vertical dips. A secondary fracture set was identified with a strike approximately perpendicular to the foliation. As with the primary fracture set, dips of fractures were near vertical.

Overburden deposits forming the glacial terrace consist of glacial lacustrine deposits. Overburden thickness ranges from zero feet toward the north and

northwest, to approximately 200 feet southeast of the landfill. A thin basal till, consisting of silt with rock fragments, was identified in some areas of the site overlying bedrock. In other areas, a dense silty sand was observed overlying bedrock. The thickest overburden deposits consist of varved clayey silt. Stratification throughout the overburden deposits was observed to be horizontal, consistent with the lacustrine depositional environment.

Two hydrogeologic systems are present at the site. The first zone consists of a perched zone of varying thickness in overburden underlying the landfill and areas to the southeast (downgradient). Horizontal ground water flow in the perched zone is toward the south-southeast. Calculated horizontal ground water interstitial velocities range from 5 to 27 feet per year. Perched ground water discharges as seeps along the steep topography, and had previously discharged at underdrains associated with the Route 5 roadway south of the landfill prior to the construction of the Route 5 slope stabilization and seepage control system. Discharge volumes are variable depending upon seasonal changes in precipitation and infiltration.

Vertical gradients in overburden indicate a potential downward component of flow; however, the low permeability of the varved overburden silt and clay deposits and the observance of unsaturated overburden conditions in these deposits at elevations below 420 feet MSL indicate that the stratified silts and clays restrict downward ground water movement.

The second zone consists of a bedrock ground water system which is recharged by precipitation infiltration upgradient of the landfill and in areas underlying the landfill where bedrock is in close proximity to the base of refuse. Ground water movement is controlled by fracture patterns in bedrock on a local scale; however, bedrock topography, proximity to the Connecticut River and potentiometric data from bedrock monitoring wells indicate that bedrock ground water generally flows

toward and discharges to the Connecticut River. Calculated ground water velocities in bedrock range from 38 to 1,750 feet per day.

2.2 ECOLOGICAL CHARACTERIZATION

Biological observations at the site have consisted of site reconnaissance by experienced field biologists. The descriptions of the various habitats and biological communities are based on the professional experience of these biologists, discussions with state and federal resource agencies including the Vermont Department of Fish and Wildlife, Vermont Nongame and Natural Heritage Program, New Hampshire Fish and Game Department, New Hampshire Department of Environmental Services, and the U.S. Fish and Wildlife Service, and available literature describing species present in similar habitats. Reference to sources of this information is included in applicable sections.

Site walks over areas of the site were conducted on three occasions by experienced biologists, including a wetlands scientist and an aquatic biologist, as well as a toxicologist. Transects were conducted in each habitat and observations made of dominant plant species, evidence of wildlife and birds, and indications of environmental impact. In addition, Ms. Cindy Parry of the U.S. Fish and Wildlife Service visited the site (May 1992). Previous studies on the site conducted by NUS Corporation (NUS) (NUS, 1986) and the Endangerment Assessment for the Springfield Landfill Superfund site located in Springfield, Vermont (1988) were also reviewed.

State, private and federal resource agencies were contacted and agency representatives solicited for information either in the published or "gray" (e.g., fact sheets or non-peer reviewed literature published by private or government

agencies) literature that would assist in characterizing the site. The resource agencies contacted include:

- Vermont River Watch Network
- Vermont Permits and Compliance
- Vermont Agency of Natural Resources
- Vermont Department of Fish and Wildlife
- Vermont State Water Quality Office
- New Hampshire Department of Environmental Services
- New Hampshire Connecticut River Valley Resource Commission
- New Hampshire Heritage Program
- Wildlife Information Network of the Granite State
- The Nature Conservancy
- EPA Water Quality Permits and Compliance Branch
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service

State and federal wetlands inventory maps were also consulted. In addition, a computerized database search was conducted in an attempt to locate literature relating to the site or to similar habitat in central Vermont. Vermont Yankee, which has conducted several studies in the Connecticut River near their Vernon power generation facility, was also contacted for results of their studies.

The information yielded from the site reconnaissance, discussions with agency personnel, as well as review of the available literature were used to provide a characterization of the habitats and biological communities on and adjacent to the Site, to select representative species for the exposure assessment, and to provide a basis for determining whether there was likelihood that rare, endangered or particularly sensitive species inhabited the area.

2.2.1 The DSI Site

The area surrounding the landfill is typical northern hardwood-hemlock forest, consisting of an overstory of birch, northern red oak, beech and hemlock. Predominant in the understory are striped maple, hazelnut, overstory reproduction and woodland ferns including lady fern, maidenhair fern and spinulose wood fern. Several former roads and open areas surrounding the landfill were cleared to allow for movement of trucks and machinery. In these open areas several opportunistic species including grasses, sedges, poplar and early successional stages of the surrounding hardwood-hemlock forest occur. It is expected that the leaf litter overlying the soils supports many species of soil invertebrates including earthworms and adult and larval insects.

Based upon site reconnaissance work and review of available literature and information, lists of representative species which would be expected to live in these areas were assembled (Table 2.1). These lists account for those species that would: 1) typically be considered dominant in this habitat, 2) be representative of the various trophic levels, and 3) be potentially sensitive to constituents found in the area.

2.2.2 Landfill Property

Three surface water retention areas totaling less than 1 acre are located in the southern portion of the site (Figure 2.2). These areas historically retained runoff from the landfill surface and surrounding vicinity. With the exception of the pond southwest of the landfill, permanent surface water does not exist in the retention areas. In the one permanent retention pond, fish (bullhead) and amphibians (frogs) have been observed.

It is expected that the ground cover and leaf litter bordering the margins of the pond supports a number of species of soil invertebrates including earthworms and adults and larvae of insect species.

2.2.3 Forested Area East of Route 5

The area east of the landfill between Route 5 and the Connecticut River consists of approximately 11 acres of steeply sloping terrain. Interspersed among the growth of northern hardwood-hemlock forest species are areas of surface water drainage evidenced by exposed soil and sparse understory growth. These localized areas of exposed soil were most noticeable at the base of steep side slopes near the river edge. Each of the drainageways, which had been eroded by surface water, originate near the edge of Route 5 at culverts used to discharge storm water collected along Route 5. The sparsely vegetated areas in the drainageways were indicative of erosion or high flow velocities occurring during periods of storm water runoff. With the exception of some stained sediment in areas in the immediate vicinity of some of these drainageways, there did not appear to be manifestations of stressed conditions in individual plants that could be attributed to the landfill. Since these drainageways carry intermittent storm water flow, they do not provide permanent habitat for fish, amphibians or aquatic invertebrates. They could, however, serve as a potential occasional water sources for amphibian and terrestrial species during flowing conditions.

2.2.4 Connecticut River And Bordering Wetlands

2.2.4.1 Bordering Wetlands

The fringe between the base of the slope and the river's edge ranged from 20 to 100 feet in width and was vegetated by shrub-dominated patches in some areas and emergent-dominated flats in other areas. The shrub patches were dominated by alder, willow, box elder and silky dogwood with a scattered understory of

horsetail, ground nut and Virginia creeper. The emergent flats consisted of cattail, purple loosestrife, beggars ticks, bluejoint, barnyard grass, reed canarygrass and various sedges. Based upon observations of the structure and composition of the vegetative community, there did not appear to be obvious stressed vegetation present. It is expected that the ground cover and leaf litter around and in the wetlands support a number of species of soil invertebrates including worms, and the adults and larvae of insect species.

2.2.4.2 Connecticut River

Discussions with agency representatives and other studies of the Connecticut River (Aquatec, 1992) in this area indicate that several species of fish are endemic to this stretch of the river, with the recent construction of fishways on downriver dams providing access to this area of the river to migratory anadromous species. A list of endemic and migratory fish species likely to be found appears in Table 2.2. Species of phytoplankton, zooplankton, ichthyoplankton and benthic macroinvertebrates collected as part of the Vermont Yankee monitoring program (Aquatec, 1992) in the vicinity of Vernon, Vermont and likely to be found in the river near the site are listed in Tables 2.3 through 2.6, respectively.

Terrestrial and avian species likely to participate in food chains based upon the aquatic community in the river are listed in Table 2.7.

2.3 RARE OR ENDANGERED SPECIES

Discussions with resource agency representatives and the report of a site visit by a U.S. Fish and Wildlife Service (USFWS) (May 1992) representative indicated that there are no known significant natural communities of rare, threatened or endangered plant or animal species on or within one-half mile of the DSI site. The USFWS reports that the federally endangered plant, the northeastern barbed bulrush *(Scirpus ancistrochaetus)*, is found in a pond along the Connecticut River

within a three mile radius of the site. The Vermont Nongame and Natural Heritage Program (VTNNHP) also lists this species as rare and occurring within the town of Rockingham. NUS (1987) identified this species 1.75 miles south of the site along the Connecticut River.

Both the Vermont Department of Fish and Wildlife (VTDFW) and USFWS noted that transient bald eagles (*Heliaeetus leucocephalus*) and osprey (*Pandoin haliaetus*) may occasionally fly through the Rockingham area along the Connecticut River.

TABLE 2.1
LIKELY INHABITANTS OF DSI SITE AND FORESTED AREA BETWEEN ROUTE 5 AND THE CONNECTICUT RIVER

BIRDS

Black-capped chickadee	*Darus atricapillus*
Common crow	*Corvus brachyrhynchos*
Black-billed cuckoo	*Coccyzus emthropthalmus*
Yellow-billed cuckoo	*Coccyzus americanus*
Mourning dove	*Zenaida macroura*
Yellow-shafted flicker	*Colaptes auratus*
Great-crested flycatcher	*Myiarchus crinitus*
Least flycatcher	*Empidonax minimus*
American goldfinch	*Carduelis tristis*
Common grackle	*Quiscalus quiscula*
Evening grosbeak	*Coccothraustes vespertinus*
Rose-brested grosbeak	*Pheucticus ludovicianus*
Ruffed grouse	*Bonasa umbellus*
Broad-winged hawk	*Buteo platypterus*
Red-shouldered hawk	*Buteo lineatus*
Red-tailed hawk	*Buteo jamaicensis*
Ruby-throated hummingbird	*Archilochus colubris*
Blue jay	*Cyanocitta cristata*
Slate-colored junco	*Junco hyemalis*
American kestrel	*Falco sparverius*
Eastern kingbird	*Tyrannus tyrannus*
Belted kingfisher	*Ceryle alcyon*
Common nighthawk	*Chordeiles minor*
Red-brested nuthatch	*Sitta canadensis*
White-brested nuthatch	*Sitta carolinensis*
Barred owl	*Strix varia*
Great horned owl	*Bubo virginianus*
Long-eared owl	*Asio otus*
Northern Saw-whet owl	*Aegolius acadicus*
Eastern Screech owl	*Otus asio*
Short-eared owl	*Asio flammeus*
Eastern-wood pewee	*Contopus virens*
Eastern phoebe	*Sayornis phoebe*
Pigeon	*Columba livia*
American redstart	*Setophaga ruticilla*
American robin	*Turdus migratorius*
Yellow-bellied sapsucker	*Sphyrapicus varius*
Chipping sparrow	*Spizella passerina*
Field sparrow	*Spizella pusilla*

TABLE 2.1 (Continued)

LIKELY INHABITANTS OF DSI SITE AND FORESTED AREA BETWEEN ROUTE 5 AND THE CONNECTICUT RIVER

BIRDS

House sparrow	*Passer domesticus*
Song sparrow	*Melospiza nelodia*
White crowned sparrow	*Zonotrichia leucophrys*
European starling	*Sturnus vulgaris*
Barn swallow	*Hirundo rustica*
Tree swallow	*Tachycineta bicolor*
Chimney swift	*Chaetura pelagica*
Hermit thrush	*Catharus guttatus*
Swainson's thrush	*Catharus ustulatus*
Wood thrush	*Hylocichla mustelina*
Tufted titmouse	*Parus bicolor*
Rufous-sided towee	*Pipilo erythrophthalmus*
Veery	*Catharus fuscescens*
Red-eyed vireo	*Vireo olivaceus*
Black-and-white warbler	*Mniotilta varia*
Nashville warbler	*Vermivora ruficapilla*
Yellow warbler	*Dendroica petechia*
Cedar waxwing	*Bombycilla cedrorum*
Whip-poor-will	*Caprimulgus vociferus*
American woodcock	*Scolopax minor*
Downy woodpecker	*Picoides pubescens*
Hairy woodpecker	*Picoides villosus*
Common yellowthroat	*Geothlypsis trichas*

OCCASIONAL MIGRANTS

Bald eagle	*Haliaeetus leucocephalus*
Osprey	*Pandion haliaetus*

TABLE 2.1 (Continued)

LIKELY INHABITANTS OF DSI LANDFILL SITE AND FORESTED AREA SOUTH OF ROUTE 5 TO CONNECTICUT RIVER

REPTILES

Northern black racer	*Coluber constrictor constrictor*
Northern brown snake	*Storeria dekayi dekayi*
Eastern garter snake	*Thamnophis sirtalis sirtalis*
Eastern smooth green snake	*Opheodrys vernalis vernalis*
Eastern milk snake	*Lampropeltis triangula triangula*
Northern red-bellied snake	*Storaria occipitomo occipitomo*
Eastern ribbon snake	*Thamophis sauritus sauritus*
Northern ringneck snake	*Diadophis punctatus edwardsi*
Northern water snake	*Nerodia sipedon sipedon*
Stinkpot	*Sternotherus odoratus*
Eastern painted turtle	*Chrysemys picta picta*
Midland painted turtle	*Chrysemys picta marginata*
Common snapping turtle	*Chelydra serpentina*
Wood turtle	*Clemmys inscuplta*

AMPHIBIANS

Bullfrog	*Rana catesbeiana*
Green frog	*Rana clamitans*
Northern leopard frog	*Rana pipiens*
Pickerel frog	*Rana sylvatica*
Spring peeper	*Hyla crucifer*
Mudpuppy	*Necturus maculosus*
Red-spotted newt	*Notophthalmus iridescens*
Blue-spotted salamander	*Ambystoma laterale*
Dusky salamander	*Desmognathus fuscus*
Four-toed salamander	*Hemidactylium scutatum*
Jefferson salamander	*Ambystoma jeffersonianum*
Red-backed salamander	*Plathodon cinereus*
Spotted salamander	*Ambystoma maculatum*
Spring salamander	*Gyrinophilus porphyriticus*
Two-lined salamander	*Euryces bislineata*
Grey treefrog	*Hyla versicolor*
American toad	*Bufo americanus*

TABLE 2.1 (Continued)

LIKELY INHABITANTS OF DSI LANDFILL SITE AND FORESTED AREA SOUTH OF ROUTE 5 TO CONNECTICUT RIVER

MAMMALS

Big brown bat	*Eptesicus fuscus*
Little brown bat	*Myotis lucifugus*
Hoary bat	*Lasiurus cinereus*
Red bat	*Lasiurus borealis*
Bobcat	*Lynx rufus*
Northern chipmunk	*Tamias striatus*
Eastern cottontail	*Sylvilagus floridanus*
New England cottontail	*Sylvilagus transitionalis*
White-tailed deer	*Odocoileus virginianus*
Red fox	*Vulpes fulva*
Eastern mink	*Mustela vision*
Common mole	*Scalopus aquaticus*
Hairy-tailed mole	*Parascalops breweri*
Starnosed mole	*Condylura cristata*
Deer mouse	*Peromyscus manicultatus*
House mouse	*Mus musculus*
Meadow jumping mouse	*Zapus hudsonius*
White-footed mouse	*Peromyscus leucopus*
Woodland jumping mouse	*Napaeozapus insignis*
Opossum	*Didelphis narsupialis*
Porcupine	*Erethizon dorsatum*
Raccoon	*Procyon lotor*
Norway rat	*Rattus norvegicus*
Masked shrew	*Sorex cinereus*
Short-tailed shrew	*Blarina brevicauda*
Smoky shrew	*Sorex fumeus*
Water shrew	*Sorex palustris*
Striped skunk	*Mephitis mephitis*
Northern flying squirrel	*Glaucomys sabrinus*
Southern flying squirrel	*Glaucomys volans*
Eastern grey squirrel	*Sciurus carolinensis*
Red squirrel	*Tamia sciurus hudsonicus*
Boreal redback vole	*Clethrionomys gapperi*
Meadow vole	*Microtus pennsylvanicus*
Pine vole	*Pitymys pinetorum*
Long-tailed weasel	*Mustela frenata*
Woodchuck	*Marmota monax*

TABLE 2.2
FISH OF VERMONT
LIKELY TO BE ENCOUNTERED
IN THE ROCKINGHAM, VERMONT AREA

American eel	*Anquilla rostrata*
Blueblack herring	*Alosa aestivalis*
American shad	*Alosa sapidissima*
Gizzard shad	*Dorosoma cepedianum*
Rainbow smelt	*Osmerus mordax*
Striped bass	*Morone saxatilis*
White perch	*Morone americana*
Sea lamprey	*Petromyzone marinus*
Atlantic salmon	*Salmo salar*
Rainbow trout	*Oncorhynchus mykiss*
Brown trout	*Salmo trutta*
Brook trout	*Salvelinus fontinalis*
Northern pike	*Esox lucius*
Chain pickerel	*Esox niger*
Carp	*Cyprinus carpio*
Eastern silvery minnow	*Hybognathus regius*
Golden shiner	*Notemigonus crysoleucas*
Common shiner	*Luxilus cornutus*
Spottail shiner	*Notropis hudsonius*
Mimic shiner	*Notropis volucellus*
Blacknose dace	*Rhinichthys atratulus*
Longnose dace	*Rhinichthys cataractae*
Creek chub	*Semotilus atromaculatus*
Fallfish	*Semotilus corporalis*
White sucker	*Catostomus commersoni*
Longnose sucker	*Catostomus catostomus*
Yellow bullhead	*Ictalurus natalis*
Brown bullhead	*Ictalurus nebulosus*
Rock bass	*Ambloplites rupestris*
Red brest subfish	*Lepomis auritus*
Pumpkinseed	*Lepomis gibbosus*
Bluegill	*Lepomis macrochirus*
Smallmouth bass	*Micropterus dolomieui*
Largemouth bass	*Micropterus salmoides*
Black crappie	*Pomoxis nigromaculatus*
Tessellated darter	*Etheostoma olmstedi*
Yellow perch	*Perca flavescens*
Walleye	*Stizostedion vitreum vitreum*

From A List of Fishes Occurring in Vermont, Vermont Fish & Wildlife Department, Agency of Natural Resources. Modified as the result of discussions with agency representatives.

TABLE 2.3

PHYTOPLANKTON OF THE CONNECTICUT RIVER NEAR VERNON, VERMONT IN 1991

CYANOCHLORONTA
- Cyanophyceae
  - Chroococcales
  - Chroococcaceae
    - *Gomphosphaeria* sp.
    - *Merismopedia* sp.
    - *Microcystis* sp.
  - Nostocales
    - Nostocaceae
      - *Anabaena* sp.
      - *Aphanizomenon flos-aquae*
    - Oscillatoriaceae
      - *Oscillatoria* sp.

CHLOROPHYCOPHYTA
- Chlorophyceae
  - Volvocales
    - Volvoceae
      - *Volvox* sp.
    - Chlorococcales
      - Chlorococcaceae
        - *Tetraedron* sp.
      - Oocystaceae
        - *Ankistrodesmus* sp.
        - *Selenastrum* sp.
      - Scenedesmaceae
        - *Scenedesmus* sp.
        - *Scenedesmus quadricauda*
      - Hydrodictyaceae
        - *Pediastrum* sp.
        - *Pediastrum duplex*
        - *Pediastrum simplex*
    - Zygnematales
      - Zygnemataceae
        - *Mougeotia* sp.
        - *Spirogyra* sp.

TABLE 2.3 (Continued)

PHYTOPLANKTON OF THE CONNECTICUT RIVER
NEAR VERNON, VERMONT IN 1991

- Desmidiaceae
  - *Closterium* sp.
  - *Cosmarium* sp.
  - *Euastrum* sp.
  - *Staurastrum* sp.
- Ulotrichales
  - Ulotrichlaceae
    - *Ulothrix* sp.
- Cladophorales
  - Cladophoraceae
    - *Cladophora* sp.

CHRYSOPHYCOPHYTA
- Chyrsophyceae
  - Ochromonadales
    - Dinobryaceae
      - *Dinobryon* sp.
    - Synuraceae
      - *Mallomonas* sp.
      - *Synura* sp.

BACILLARIOPHYCOPHYTA
- Bacillariophyceae
  - Fragilariales
    - Fragilariaceae
      - *Asterionella* sp.
      - *Fragilaria* sp.
      - *Meridion* sp.
      - *Synedra* sp.
      - *Tabellaria* sp.
  - Naviculales
    - Naviculaceae
      - *Navicula* sp.
    - Cymbellaceae
  - Coscinodiscales
    - Coscinodiscaceae
      - *Melosira* sp.

TABLE 2.3 (Continued)

PHYTOPLANKTON OF THE CONNECTICUT RIVER NEAR VERNON, VERMONT IN 1991

PYRROPHYCOPHYTA
- Dinophyceae
  - Peridiniales
    - Ceratiaceae
      - *Ceratium* sp.

CRYPTOPHYCOPHYTA
- Cryptophyceae

From: Ecological Studies of the Connecticut River Vernon, Vermont. Report 21. Aquatec, Inc. 1992.

TABLE 2.4

ZOOPLANKTON OF THE CONNECTICUT RIVER
NEAR VERNON, VERMONT IN 1991

- PROTOZOA
  - Sarcodina
  - Mastigophora
  - Ciliata
    - Peritrichida
      - Verticellidae
        - *Vorticella* sp.
- NEMATODA
- ROTATORIA
  - Digononta
    - Bdelloida
  - Monogononta
    - Floscullariacea
      - Conochilidae
        - *Conochiloides* sp.
        - *Conochilus* sp.
        - *Conochilus unicornis*
      - Testudinellidae
        - *Filinia* sp.
    - Collothecacea
      - Collothecidae
        - *Collotheca* sp.
    - Ploima
      - Synchaetidae
        - *Polyarthra* sp.
        - *Synchaeta* sp.
      - Ploesomatidea
        - *Ploesoma* sp.
      - Gastropodidae
        - *Gastropus* sp.
      - Asplanchnidae
        - *Asplanchna* sp.
      - Brachionidea
        - *Brachionus* sp.
        - *Brachionus guaridentata*
        - *Euchlanis* sp.
        - *Kellichottia* sp.
        - *Kellicottia bostoniensis*

TABLE 2.4 (Continued)

ZOOPLANKTON OF THE CONNECTICUT RIVER NEAR VERNON, VERMONT IN 1991

Kellicottia longispina
Keratella sp.
Lecane sp.
Monostyla sp.
Notholca sp.
Platyias sp.
Platyias patulus
Trichotria sp.

TARDIGRADA

ANNELIDA
Oligochaeta

ARTHROPODA
Crustacea
Cladocera
Bosminidae
Bosmina sp.
Bosmina longirostris
Chydoridae
Ostracoda
Eucopepoda
Copepoda
Copepoda nauplii
Calandoida
Cyclopoida
Insecta
Diptera
Chironomidae

From: Ecological Studies of the Connecticut River Vernon, Vermont. Report 21. Aquatec, Inc. 1992.

TABLE 2.5

RELATIVE ABUNDANCE OF ICHTHYOPLANKTON IN THE CONNECTICUT RIVER NEAR VERNON, VERMONT 1982-1989

	Vernon Pool (%)
Clupeidae	<0.1
American shad	<0.1
Blueback herring	<0.1
Cyprinidae	12.1
Common carp	0.1
Golden shiner	<0.1
Notropis spp.	45.2
Catostomidea	0.3
White sucker	1.6
White perch	37.2
Centrarchidea	<0.1
Rock bass	<0.1
Lepomis spp.	1.3
Smallmouth bass	<0.1
Percidae	<0.1
Tessellated darter	<0.1
Yellow perch	1.0
Walleye	0.7
Indeterminate	0.3

From: Abundance, Density and Composition of Ichthyoplankton of the Connecticut River near Vernon, Vermont. Analytical Bulletin #32. Aquatec, Inc. 1990.

TABLE 2.6

BENTHIC MACROINVERTEBRATES OF THE CONNECTICUT RIVER NEAR VERNON, VERMONT IN 1991

- PLATYHELMINTHES
  - Turbellaria
    - Tricladida
      - Planariidae
        - *Dugesia* sp.
        - *Dugesia tigrina*
- NEMATODA
- BRYOZOA
  - Gymnolaemata
    - Ctenostomata
      - Paludicellidae
        - *Paludicella* sp.
    - Phylactolaemata
      - Plumatellidae
        - *Plumatella* sp.
- ANNELIDA
  - Oligochaeta
    - Haplotaxida
      - Tubificidae
        - *Branchiura sowerbyi*
  - Hirudinea
- ARTHROPODA
  - Arachnoidea
    - Acariformes
  - Crustacea
    - Cladocera
      - Leptodoridae
      - Sididae
        - *Sida crystallina*
    - Isopoda
      - Asellidae
        - *Caecidotea* sp.
    - Amphipoda
      - Gammaridae
        - *Crangonyx* sp.
        - *Gammarus* sp.

TABLE 2.6 (continued)

BENTHIC MACROINVERTEBRATES OF THE CONNECTICUT RIVER NEAR VERNON, VERMONT IN 1991

- Talitridae
  - *Hyalella* sp.
- Decapoda
  - Cambaridae

Insecta

- Plecoptera
  - Leuctridae
    - *Leuctra* sp.
  - Perlidae
    - *Acroneuria* sp.
- Ephemeroptera
  - Baetidae
  - Caenidae
    - *Caenis* sp.
  - Ephemerellidae
    - *Dannella* sp.
    - *Ephemerella* sp.
    - *Eurylophella* sp.
  - Ephemeridae
    - *Hexagenia* sp.
    - *Hexagenia limbata*
  - Heptageniidae
    - *Heptagenia* sp.
    - *Leucrocuta* sp.
    - *Stenacron* sp.
    - *Stenonema* sp.
  - Polymitarcidae
    - *Ephoron* sp.
  - Siphlonuridae
    - *Siphlonurus* sp.
  - Tricorythidae
    - *Tricorythodes* sp.
- Odonata
  - Aeschnidae
    - *Boyeria* sp.
  - Coenagrionidae
    - *Argia* sp.
    - *Enallagma* sp.

TABLE 2.6 (continued)

BENTHIC MACROINVERTEBRATES OF THE CONNECTICUT RIVER NEAR VERNON, VERMONT IN 1991

- Coleoptera
  - Corduliidae
    - *Neurocordulia* sp.
    - *Somatochlora* sp.
    - *Tetragoneuria* sp.
  - Gomphidae
    - *Dromogomphus* sp.
    - *Gomphus* sp.
  - Macromiidae
    - *Macromia* sp.
- Megaloptera
  - Sialidae
    - *Sialis* sp.
- Trichoptera
  - Calamoceratidae
    - *Heteroplectron* sp.
  - Hydropsychidae
    - *Cheumatopsyche* sp.
    - *Hydropsyche* sp.
    - *Hydropsyche alhedra*
    - *Hydropsyche bronta*
    - *Hydropsyche morosa*
    - *Macrostemum* sp.
  - Hydroptilidae
    - Hydroptilinae
      - *Agraylea* sp.
      - *Hydroptila* sp.
      - *Oxyethira* sp.
    - Orthotrichiinae
      - *Orthotrichia* sp.
  - Lepidostomatidae
    - *Lepidostom* sp.
  - Leptoceridae
    - *Ceraclea* sp.
    - *Mystacides* sp.
    - *Nectopsyche* sp.
    - *Oecetis* sp.
    - *Triaenodes* sp.
  - Limnephilidae
    - *Asynarchus* sp.
    - *Neophylax* sp.
    - *Pycnopsyche* sp.
  - Molannidae
    - *Molanna* sp.
  - Polycentropodidae
    - *Neureclipsis* sp.

TABLE 2.6 (continued)

BENTHIC MACROINVERTEBRATES OF THE CONNECTICUT RIVER NEAR VERNON, VERMONT IN 1991

- *Phylocentropus* sp.
- *Polycentropus* sp.

Coleoptera
- Elmidae
  - *Dubiraphia* sp.
  - *Optioservus* sp.
  - *Oulimnius* sp.
  - *Promoresia* sp.
  - *Stenelmis* sp.
- Gyrinidae
  - *Dineutes* sp.
- Hydrophilidae
  - *Berosus* sp.

Diptera
- Ceratopogonidae
  - *Mallochohella* sp.
- Chaoboridae
  - *Chaoborus* sp.
- Chironomidae
  - Tanypodinae
  - Orthocladiinae
    - *Rheocricotopus* sp.
  - Chironominae
    - *Demicryptochironomus* sp.
    - *Rheotanytarsus* sp.
    - *Rheotanytarsus distinctissimus*
    - *Rheotanytarsus exiguus*
    - *Tanytarsus* sp.
    - *Xenochironomus* sp.
  - Simuliidae
    - *Simulium* sp.
  - Tipulidae
    - *Antocha* sp.

MOLLUSCA
- Gastropoda
  - Basommatophora
    - Anycylidae
      - *Laevapex fuscus*
    - Physidae
      - *Physa* sp.
      - Physinae
    - Planorbidae
      - *Planorbella companulata*
  - Masogastropoda

TABLE 2.6 (continued)

BENTHIC MACROINVERTEBRATES OF THE CONNECTICUT RIVER NEAR VERNON, VERMONT IN 1991

- Hydrobiidae
  - *Amnicola limosa*
  - *Bergella subglobosa*
  - *Gillia altilis*
- Valvatidae
  - *Valvata tricarinata*

Pelecypoda

- Prionodesmacea
  - Sphaeriidae
    - *Musculium* sp.
    - *Pisidium* sp.
    - *Pisidium henslowanum*
    - *Sphaerium* sp.
  - Unionidae
    - *Elliptio complanata*
    - *Strophitus undulatus*

From: Ecological Studies of the Connecticut River Vernon, Vermont. Report 21. Aquatec, Inc. 1992.

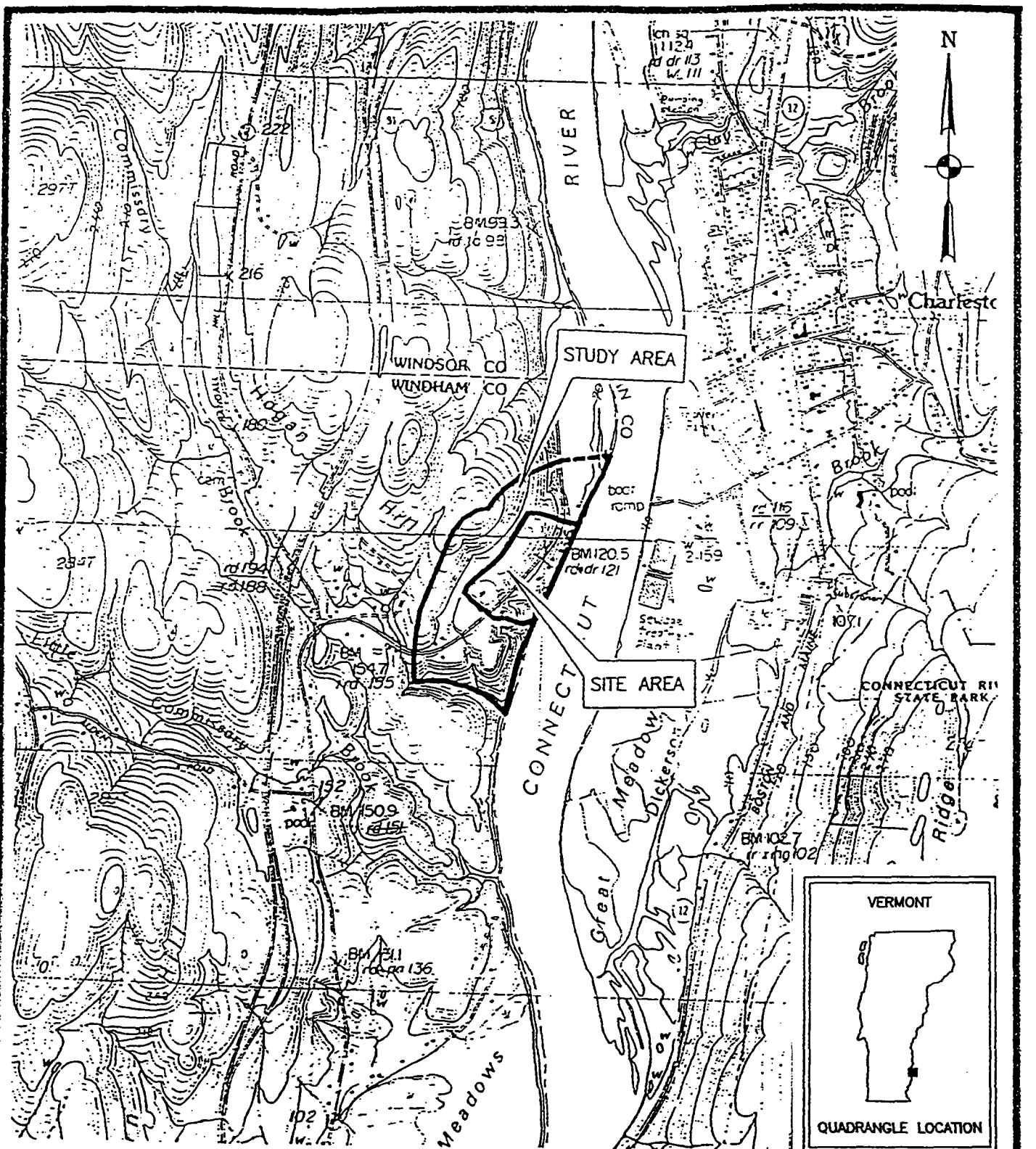
TABLE 2.7
MAMMALS AND BIRDS OF ROCKINGHAM, VERMONT
LIKELY TO HAVE CONNECTICUT RIVER-BASED FOOD SOURCES

MAMMALS

Eastern mink	Mustela vison
Muskrat	Ondatra zibethicus
Beaver	Castor canadensis
Raccoon	Procyon lotor

BIRDS

Bald eagle (migrant)	Haliaeetus leucocephalus
American osprey (migrant)	Pandion haliaetus
Belted kingfisher	Ceryle alcyon
Herring gull	Larus argentatus
Great blue heron	Ardea herodias
Green heron	Butorides striatus
American bittern	Botaurus lentiginosus
Canada goose	Branta canadensis
Mallard	Anas platyrhynchos
Black duck	Anas rubripes
Wood duck	Aix sponsa
Hooded merganser	Lophodytes cucullatus
Common merganser	Mergus merganser
Common goldeneye	Bucephala clangula



SOURCE:

USGS
BELLOWS FALLS, VERMONT–NEW HAMPSHIRE
7.5 X 15 MINUTE SERIES TOPOGRAPHICS
1985
CONTOUR INTERVALS IN METERS MSL

0 2100 4200

APPROXIMATE SCALE (FEET)

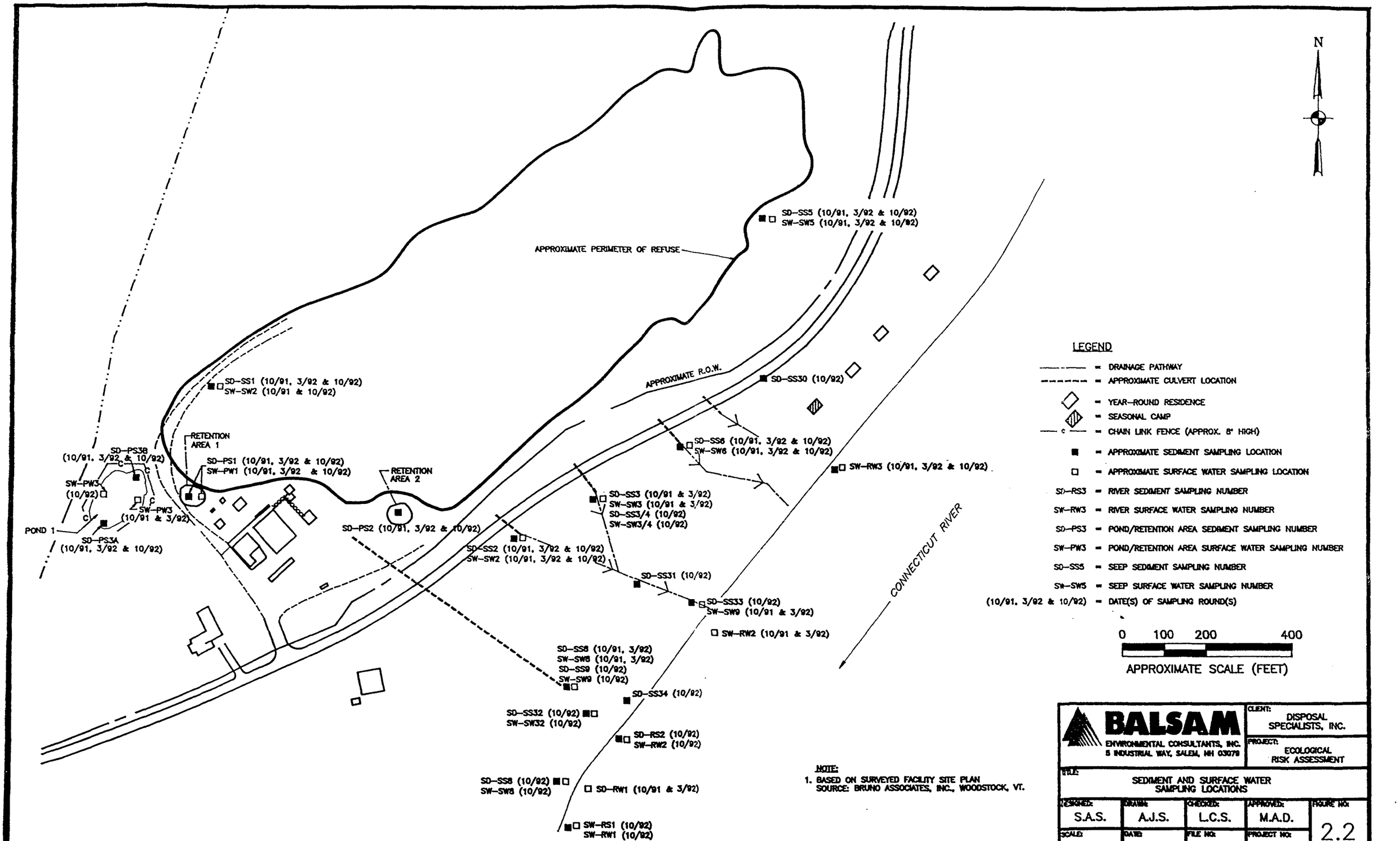
BALSAM
ENVIRONMENTAL CONSULTANTS, INC.
7 COMMUNITY DR., AUGUSTA, ME. 04330

CLIENT: DISPOSAL SPECIALISTS, INC.

PROJECT: ECOLOGICAL RISK ASSESSMENT

TITLE: SITE LOCUS

DESIGNED:	DRAWN:	CHECKED:	APPROVED:	FIGURE NO:
S.A.S.	D.J.H.	L.C.S.	M.A.D.	2.1
SCALE:	DATE:	FILE NO:	PROJECT NO:	
1"=2100'	9/2/93	6458036	6458.03	



NOTE:
1. BASED ON SURVEYED FACILITY SITE PLAN SOURCE: BRUNO ASSOCIATES, INC., WOODSTOCK, VT.

BALSAM
ENVIRONMENTAL CONSULTANTS, INC.
5 INDUSTRIAL WAY, SALEM, NH 03079

CLIENT: DISPOSAL SPECIALISTS, INC.

PROJECT: ECOLOGICAL RISK ASSESSMENT

TITLE: SEDIMENT AND SURFACE WATER SAMPLING LOCATIONS

DESIGNED:	DRAWN:	CHECKED:	APPROVED:	FIGURE NO:
S.A.S.	A.J.S.	L.C.S.	M.A.D.	2.2
SCALE: 1"=200'	DATE: 9/17/93	FILE NO: 6458034	PROJECT NO: 6458.03	

Appendix B

Appendix B
Arthur D. Little's Field Ecological Survey Notes

BFI ROCKINGHAM: ECOLOGICAL FIELD NOTES
Ecological Risk Assessment
ADL Reference 62374.62
September 28, 1993

The focus of this site visit was to examine the ecological features of the:

- Connecticut River sediment and surface water sampling locations;
- associated floodplain habitats along the West river bank;
- microhabitats within the forest ecosystem surrounding Seeps F, G, and H; and
- the Connecticut River background sampling location.

A secondary objective was to look for possible occurrences of the Barbed-bristle Bulrush (*Scirpus ancistrochaetus*), a federally endangered plant species, in marsh communities along the river floodplain. Detailed field notes were dictated into a microcassette recorder and dated, color photographs were taken at sampling stations.

The 100 scale, site topographic plan referred to in the field was dated January 15, 1992 and labelled "October 1992 Sample Locations."

Canadian Hemlock/Northern Hardwood Forest Southeast of Rte. 5

The floristic overview provided by Balsam for this area is essentially accurate. The dominant coniferous tree is Canadian Hemlock (*Tsuga canadensis*), which occurs either in nearly pure stands on ridges and north-facing slopes, or growing among a mixture of hardwood trees, among which no single species appears dominant. Slope aspect, thus, is a key determinant of the distribution and relative dominance of the hemlock in this area. Understory saplings of canopy trees (i.e. transgressives), shrubs, and the species composition of the herbaceous flora all indicate mesic (moist) soil conditions throughout the year. Even areas of exposed silt and clay associated with landslides have significant growth of mosses, indicating moisture availability. No significant or unusual symptoms of vegetative stress were observed within this forest habitat, although normal stress symptoms such as insect damage were evident.

Hydrology, Soils, and Vegetation at Riverside Seeps

The habitats observed within this hemlock/hardwood forest ecosystem are essentially identical in their soils, hydrology, and vegetation, in the vicinity of the sediment and surface water sampling locations at Seeps F, G, and H. All three areas occur within deeply-cut, erosional gullies that receive surface water runoff from the steep slopes between Rte. 5 and the river. No areas of ponding of this runoff occur within any of the gullies or stream channels, and no evidence of vernal pools was found in the area, so that no true aquatic habitats occur within the forest. Due to the heavy rains of the preceding night, distinct areas of ground water seepage were not evident, but surface runoff was flowing at several of the locations. The clay-rich, silty soils of all seep areas have eroded sufficiently to form extensive, deltaic outwash deposits of silt and clay at the interface between the forested slopes and floodplain marsh/shrub swamp habitats.

Hydrology, Soils, and Vegetation at Riverside Seeps (cont.)

Seep F (SD/SW-8). This habitat is essentially identical to that of Seeps G and H, although it has a smaller area of Speckled Alder (*Alnus rugosa*) and shrub-dominated wetland on the floodplain area between the seep/gully and the river, than that seen at Seep G. No ponding areas within gully nor any vernal pools in either the forest or floodplain habitats. Grey clay and silt deposits in the stream channel; no sand/gravel riffle microhabitat in the stream. No invertebrates seen in the stream of the gully. *Notes on Sampling Location Markers:* Balsam's site plan shows this as SD/SW-8, which was confirmed by an orange flag on a Yellow Birch tree at the mouth of the gully, stating "90 feet East to River Sample No. 1 and 12 feet Northeast to Seep No. 8." Stake labelled RW/RS-1 occurs within densely vegetated area of floodplain, currently lacking surface water. (PHOTOS)

Seep G (SD/SW-9). Exposed clayey-soils on the South slope of this deep, erosional gully, caused by chronic landslides just below and South of the outfall of the stormwater pipe. The stormwater pipe, which had been built along the bottom of this gully, is now broken at a point below which the erosion is most severe. The lower segment of pipe is now buried beneath the deltaic silt/clay deposits at Sampling Station SD/SW-9. Unstable soils on both sideslopes of this gully are indicated by the immature, secondary growth of forest trees, shrubs, and herbs on these slopes, as compared with the mature forest areas on the ridges and southeastern slopes away from the gullies. Canadian Hemlock is more abundant on the north-facing slopes, as compared with the predominance of hardwood trees on the south-facing slopes of these same gullies. No areas of surface water ponding occur in these gullies, even at the bottom of the slopes adjacent to the river floodplain, and no vernal pools occur in this area. The channel of the stream in the bottom of the gully consists almost entirely of grey, silt and clay deposits, being devoid of sand or gravel deposits common in riffle habitats. No evidence of invertebrates, nor tracks of predators such as Raccoons, were seen in this stream. *Notes on Sampling Location Markers:* Site plan shows this as SD/SW-9, but stake is labelled as SW/SD-8. Also, stakes labelled RW/RS-2 occur within densely vegetated area of floodplain currently lacking surface water. (PHOTOS)

Seep H (SW/SD-31 and SW/SD-33). Soils, hydrology, and vegetation are essentially identical to those at Seeps F and G. Canadian Hemlock again is mostly restricted to the north-facing side slopes of the gully, with hardwood trees dominating the drier, south-facing slopes. As with Seeps F and G, the Hemlock/hardwood forest at Seep H lacks permanent aquatic habitat, such as ponding areas within the gully/stream or vernal pools elsewhere in either the forested slopes or river floodplain. *Notes on Sampling Location Markers:* Site plan shows the stake closest to the river as SD/SS-33, but the stake we found here is labelled as SW/SD-9; the stake located within the gully, however, is accurately labelled as SD-31, as shown on the plan. (PHOTOS)

Connecticut River Littoral Zone and Floodplain Habitats

Along the west bank of the river are permanent shallows with abundant Water Lilies (Nymphaeaceae; inaccessible for species identification) and associated, submerged aquatic macrophytes. Along this west bank is a flat area of clayey-silt deposits, which extends from the water's edge to the toe of the steep, hemlock/hardwood forested slopes, so that no obvious demarcation can be seen between the river bank and associated floodplain. No vernal pools or permanent ponds occur along this segment of the floodplain. Abundant tracks of unidentified birds, Raccoon (*Procyon lotor*), and White-tailed Deer (*Odocoileus virginicus*), however, were seen in the wet silt deposits at the water's edge; probable bedding areas for White-tailed Deer also were seen as low-growing areas of grass surrounded by tall Cattails. Balsam's floristic description of the marsh and shrub swamp cover types within the floodplain is accurate and complete. Marsh communities dominate this segment of the floodplain, with isolated areas dominated by wetland shrubs being best developed in areas with large outwash deposits of silt and clay at the discharge points from the erosional gullies to the floodplain (e.g. Seep G). No sightings were made of the Barbed-bristle Bulrush (*Scirpus ancistrochaetus*), nor were many suitable microhabitats for this species found in the floodplain.

Background River Station. The area shown on the site plan corresponds to the location of two homes, associated docks, and motor boats, just north of a bedrock outcrop at the river's edge. This background area includes marsh vegetation on a narrow shelf of river floodplain, just north of the bedrock outcrop. *Notes on Sampling Location Markers:* Marker stakes were not found at this station. (PHOTOS)

Faunal Habitat Implications

The Canadian Hemlock/Northern Hardwood forest on the slopes between Rte. 5 and the Connecticut River is expected to provide very good wildlife habitat to a variety of vertebrates, due to the occurrence of upland forest, floodplain marsh, shallow aquatic plant communities, and deeper water river habitat over a horizontal distance of only a few hundred feet. However, due to the hydrology and substrate conditions of the seeps and their erosional gullies, in which neither surface water pools nor riffle habitat are found, these seep areas offer little if any habitat for aquatic biota such as invertebrates, fish or amphibians. All of these "seep" areas have intermittent, clay-bottom stream channels within these gullies, that lack sand and gravel, riffle-type niches and thus are unlikely to support any significant invertebrate fauna. Amphibian populations are presumed absent from the seeps, with the possible exception of forest-dwelling species such as newts, salamanders, and toads that are known to inhabit mesic forests with significant amounts of intermittent or perennial surface runoff. During periods of river flooding, however, the lower reaches of these erosional gullies would likely become inundated, thus giving aquatic species from the river temporary access to these seep sampling locations.

Appendix C

Appendix C: Photographs at the BFI Landfill Site, Rockingham, Vermont

Role Number	Frame Numbers	Date
1	1.1 through 1.23	7/27/92
2	2.32 through 2.36	9/28/93
3	3.1 through 3.12	9/28/93

Appendix C (continued)

Inventory of Photographs

Roll.Frame Number	Location and Subject
Roll No. 1 - 7/27/92:	
1.1	Landfill: Eastern aspect of stormwater Pond No. 1 showing many animal tracks on exposed sediment
1.2	Landfill: Swale leading from Pond No. 1 to Pond No. 3
1.3	Landfill: Retention Pond No. 3
1.4	Swale looking south toward runoff Pond No. 3
1.5-1.9	Landfill: Panoramic series from top of landfill, scanning north to south, overview of Connecticut River
1.10-1.15	Composite taken on top of landfill looking west scanning from north to south
1.16	Swale at north end of landfill looking southwest
1.17	Storm drain outlet pipe in Pond No. 2
1.18	Ash pile with sparse, browned vegetation
1.19	Stormwater outfall and iron-stained soils on east side of road looking east (near wells 6 and 7, slightly south)
1.20	Seep and stormwater outfall with iron-stained soils below wells 6 and 7 near the old Lester Danforth well
1.21	Erosion ravine downhill from seep/stormwater discharge below wells 6 and 7
1.22	Iron-staining at stormwater outwash (Seep E at SW-SW6/SD-SS6 (perforated, corrugated steel pipe)
1.23	Close up of old corroded, and replacement perforated pipes at Seep E (SW-SD6)

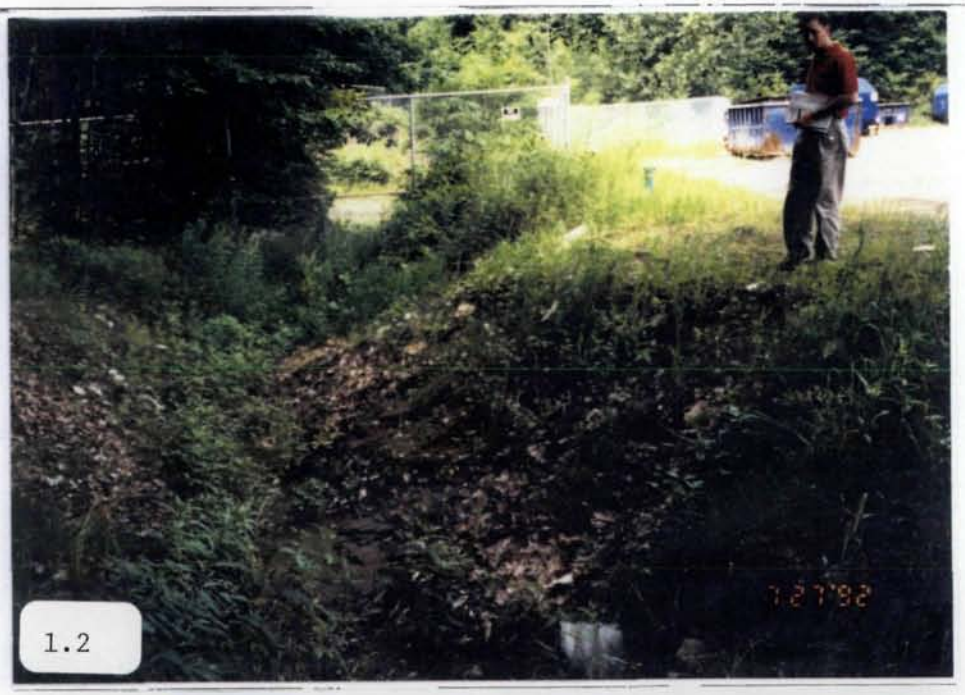
Appendix C (continued)

Roll.Frame Number	Location and Subject
Roll No. 2 - 9/28/93:	
2.32	Erosional gully upslope from Seep G (SW-SW9) looking towards the Connecticut River floodplain
2.33	Algae/moss-covered soils on eroded slope at Seep G.
2.34	Buried stormwater pipe at Seep G (SW-SW8) near edge of forest at junction with Connecticut River floodplain
2.35	View of marsh and forest edge looking upgradient towards Seep G from Connecticut River floodplain near SW-RW2 sampling location
2.36	Downstream aspect of water lily bed and adjacent marsh in Connecticut River floodplain as seen from the SW-RW2/SD-RS2 sampling location
Roll No. 3 - 9/28/93:	
3.1	Clay soils in forested runoff swale at Seep F (SW-SW8/SD-SS8) showing lack of true aquatic habitat
3.2	View of runoff swale from Seep F, looking towards forest/floodplain interface with Connecticut River in the background
3.3-3.4	Close-up and more distant, upstream views of marsh and sampling location SW-RW-2/SD-RS2 on Connecticut River floodplain
3.5	Fungal growth on otherwise healthy Speckled Alder (*Alnus rugosa*) shrub in Connecticut River floodplain between SW-RW1 and SW-RW2
3.6	Downstream aspect from forest/floodplain interface showing SW-SW9 and SD-SS33 sampling location in forested habitat of Seep H
3.7	Upstream aspect of terrestrial forest swale leading from Seep H, as seen from the floodplain/forest interface

Appendix C (continued)

Roll.Frame Number	Location and Subject
3.8	Downstream aspect of SW-SW9 and SD-SS33 sample locations at Seep H, with forest/floodplain interface and Connecticut River in background
3.9	Upstream aspect of outcrop and Cattail Marsh in Connecticut River floodplain between sample locations SW-RW2 and SW-RW3
3.10	Upstream view of boat/dock in general vicinity of "Background" river sample location SW-RW3
3.11	Landfill: Dense vegetative cover in Retention Pond No. 1 (same scene as Photo No. 1.1 taken on 7/27/92)
3.12	Landfill: Stormwater Retention Pond No. 3 showing sediment deposits and new outfall pipe


1.1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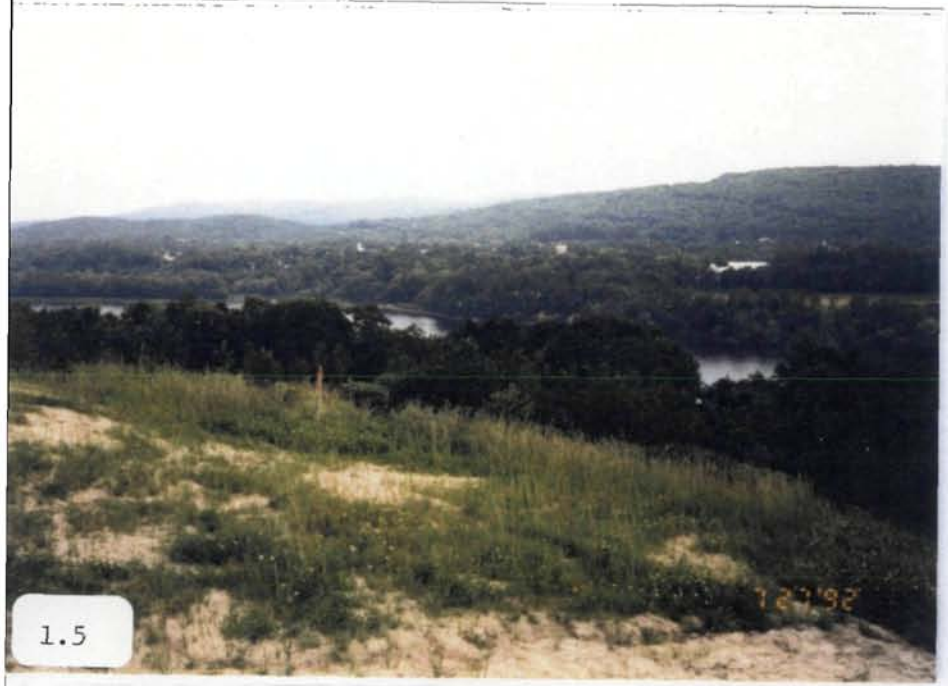
1.3


1.4


1.5


1.6


1.7


1.8

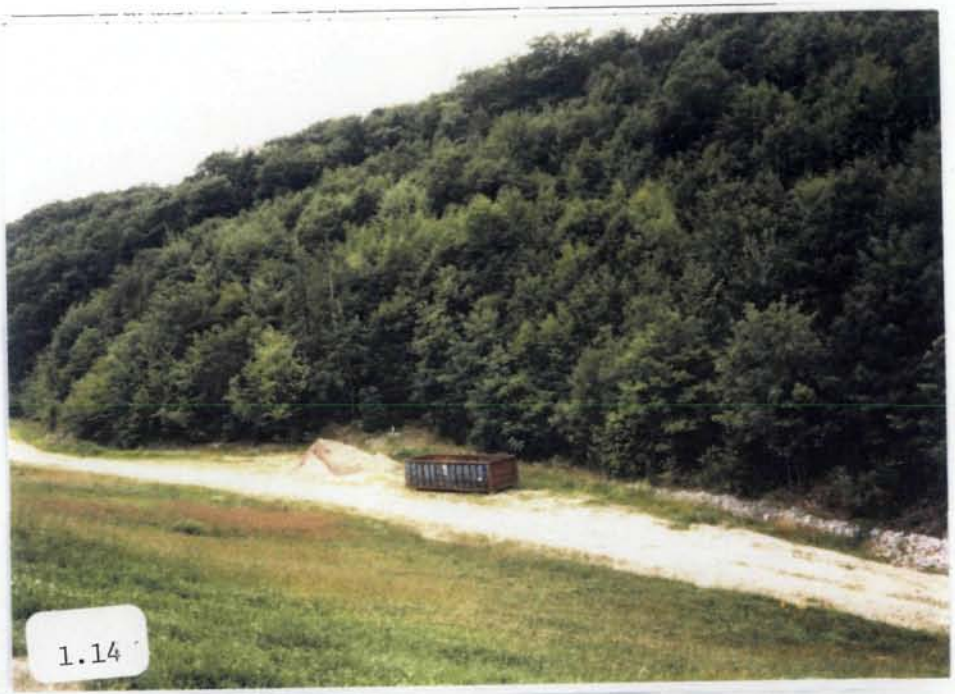

1.9
7'27'92


1.10
7'27'92


1.11


1.12

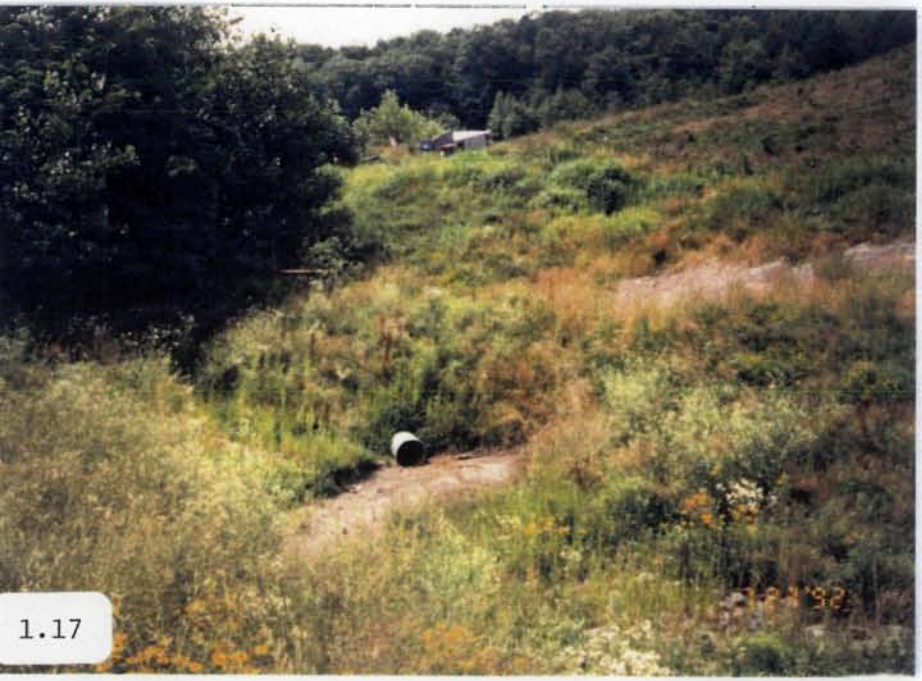
1.13



1.14

1.15

1.16



1.17

1.18

1.19

1.20


1.21


1.22


1.23


2.32


2.33


2.34


2.35

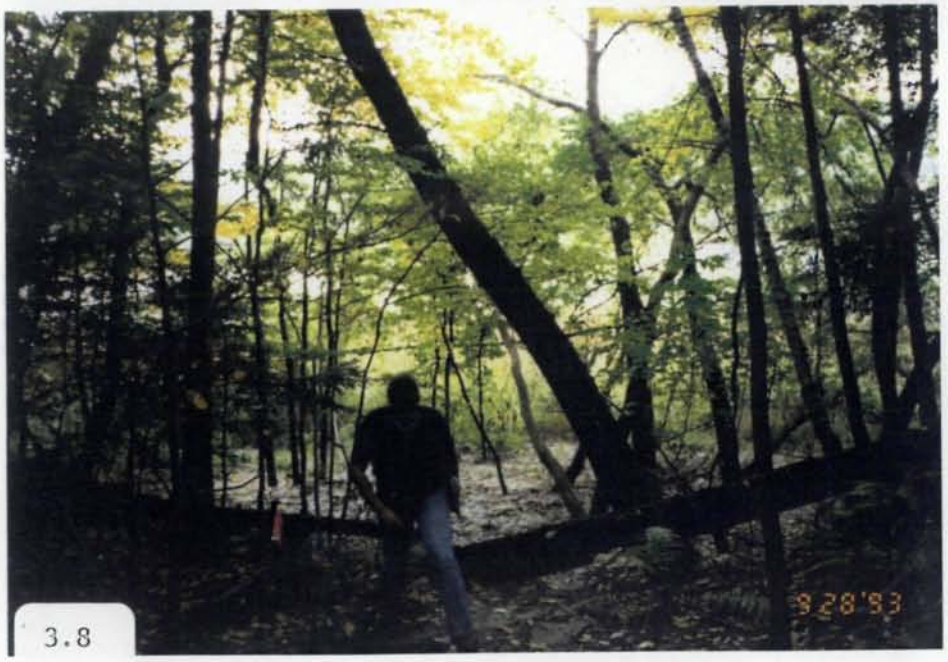

2.36

3.1

3.2

3.3

3.4



FILE NO:

ASSIGNMENT:

DATE:

3.9

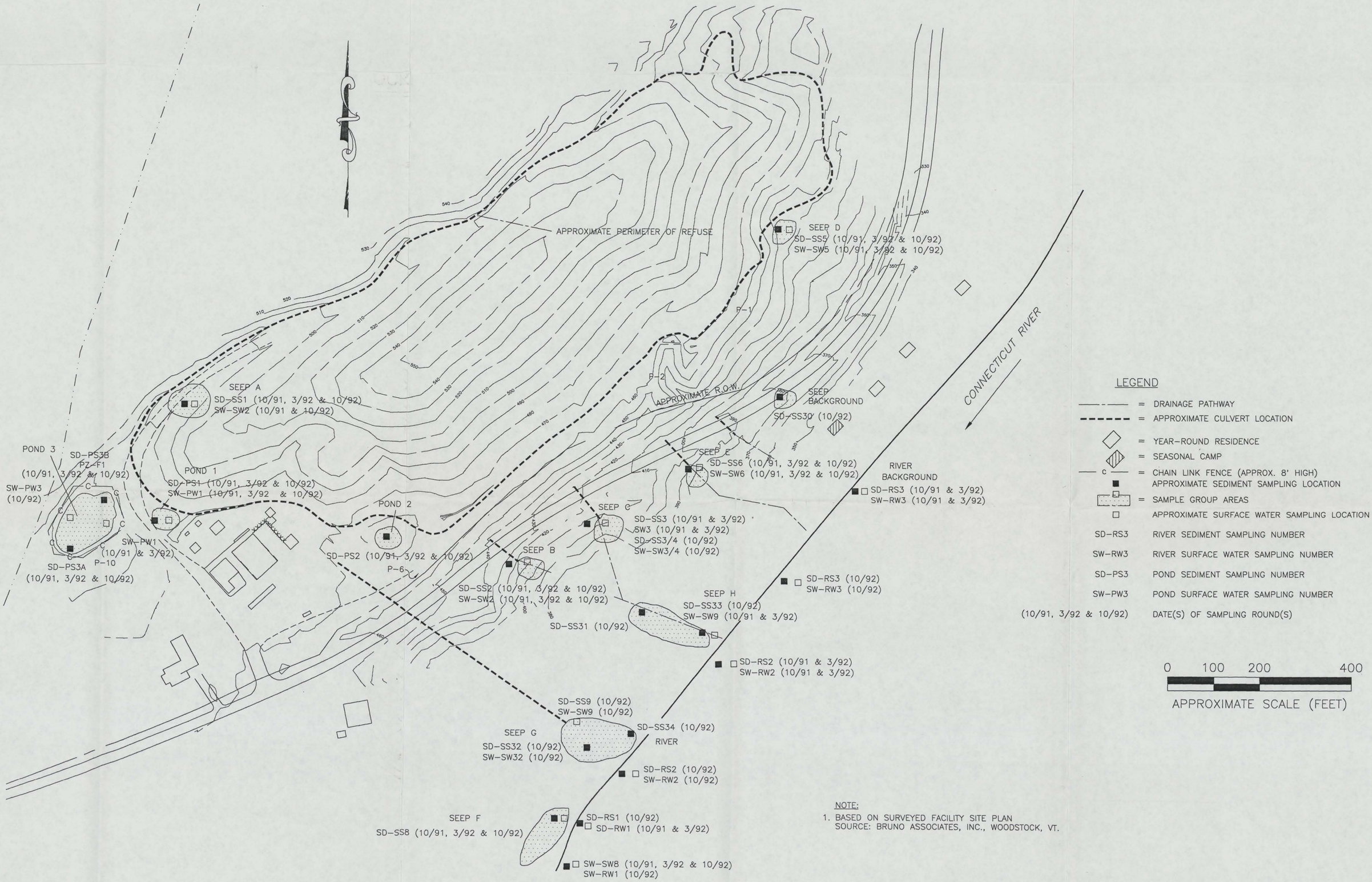
3.10

3.11

3.12

Appendix D

Appendix D
Site Topographic Plan with Sampling Locations (Map Pocket)



NOTE:

1. BASED ON SURVEYED FACILITY SITE PLAN
   SOURCE: BRUNO ASSOCIATES, INC., WOODSTOCK, VT.

PREPARED FOR: EPA REGION 1 – BFI–ROCKINGHAM		DRAWN BY: (INITIALS)	TITLE: BFI – ROCKINGHAM SITE MAP AND SAMPLE LOCATIONS
DATE: 10/93	SCALE: 1" = 100 FT.	DWG. NO. 6458034	APPROVED BY: (INITIALS)

Arthur D Little

Appendix E
Supplemental Raw Data for 1993

- Balsam's Validated August/September, 1993 Surface Water and Sediment Analytical Data

- Arthur D. Little's Unvalidated August/September, 1993 Surface Water and Sediment Analytical Data

- **BALSAM'S VALIDATED AUGUST/SEPTEMBER, 1993 SURFACE WATER AND SEDIMENT ANALYTICAL DATA**

TABLE 2-34
SURFACE WATER ANALYTICAL SUITE
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLING LOCATION	TCL VOCs Method 524.2	TCL VOCs CLP	TCL SVOCs CLP	TAL METALS Total	CONVENTIONAL PARAMETERS	HARDNESS	CYANIDE Total	Total Organic Carbon
DSI-SW-SW2	X/NS	NA/NS	X/NS	X/NS	X/NS	X/NS	NA/NS	X/NS
DSI-SW-SW3/4	X/NS	NA/NS	X/NS	X/NS	NA/NS	X/NS	X/NS	NA/NS
DSI-SW-SW6	X/X	NA/NA	X/NA	X/X	NA/NA	X/NA	X/X	X/NA
DSI-SW-SW8	X/X	NA/NA	X/NA	X/X	NA/NA	X/NA	X/X	NA/NA
DSI-SW-SW9	X/NS	NA/NS	X/NS	X/NS	NA/NS	X/NS	X/NS	NA/NS
DSI-SW-SW32	X/NS	NA/NS	X/NS	X/NS	NA/NS	X/NS	X/NS	NA/NS
DSI-SW-SW35	X/NS	NA/NS	X/NS	X/NS	NA/NS	X/NS	X/NS	NA/NS
DSI-SW-PW1	NA/NS	X/NS	X/NS	X/NS	NA/NS	X/NS	X/NS	NA/NS
DSI-SW-PW3	X/NS	NA/NS	X/NS	X/NS	NA/NS	X/NS	X/NS	NA/NS
DSI-SW-RW1	NA/X	NA/NA	X/NA	X/X	X/NA	X/NA	X/X	NA/NA
DSI-SW-RW2	X/X	NA/NA	X/NA	X/X	X/NA	X/NA	X/X	X/NA
DSI-SW-RW3	X/X	NA/NA	X/NA	X/X	X/NA	X/NA	X/X	X/NA
DSI-SW-RW4	NS/X	NS/NA	NS/NA	NS/X	NS/NA	NS/NA	NS/X	NS/NA

NOTES:

1. TCL VOCs = Target Compound List Volatile Organic Compounds
2. TCL SVOCs = Target Compound List Semi-volatile Organic Compounds
3. TAL Metals = Target Analyte List metals
4. Conventional Parameters = Ammonia, biological oxygen demand, bicarbonate alkalinity, carbonate alkalinity, hydroxyl alkalinity, total alkalinity, chloride, chemical oxygen demand, nitrate , nitrite, oil and grease, phenolics, sulfate, sulfide, phosphorus, total kjehldahl nitrogen, total dissolved solids, total suspended solids, and total organic carbon.
5. X/X = Sampled October 1992 / Sampled August 1993
6. NA = Not analyzed
7. NS = Not sampled
8. Surface water samples collected for TAL metals analysis were not filtered.
9. CLP = Contract Laboratory Program

TABLE 2-35
SURFACE WATER QA/QC SAMPLING SUMMARY
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

QA/QC SAMPLE DESIGNATION	DATE:	MATRIX SPIKE/ MATRIX SPIKE DUPLICATE	LOCATION OF DUPLICATE	LOCATION OF FIELD BLANK	TCL VOCs Method 524.2	TCL VOCs Method 8240	TCL SVOCs Method 8270	TAL METALS Total	CONVENTIONAL PARAMETERS	HARDNESS	CYANIDE Total
DSI-SW-SW7	Oct-92	-	DSI-SW-SW8	-	X	NA	X	X	NA	X	X
DSI-SW-QS1	Aug-93	-	DSI-SW-SW8	-	NA	X	NA	X	NA	NA	NA
DSI-SW-QS1A	Sep-93	-	DSI-SW-SW8	-	NA	NA	NA	X	NA	NA	NA
DSI-FB4	Oct-92	-	-	DSI-SW-SW35	X	NA	X	X	NA	NA	X
DSI-QA-EQ4	Aug-93	-	-	DSI-SW-RW2	X	NA	NA	X	NA	NA	X
DSI-SW-SW9(MS/MSD)	Oct-92	DSI-SW-SW9	-	-	X	NA	X	X	NA	X	X
DSI-SW-RW4(MS/MSD)	Aug-93	DSI-SW-RW4	-	-	X	NA	NA	NA	NA	NA	X

NOTES:

1. QA/QC = Quality Assurance/Quality Control
2. X = QA/QC sample collected.
3. - = QA/QC sample not collected.
4. NA = Not analyzed
5. One trip blank sample was submitted with each shipment for VOC analysis.

TABLE 2-36
SURFACE WATER INDICATOR PARAMETER MEASUREMENTS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE DESIGNATION	APPEARANCE		TURBIDITY (NTU)		TEMPERATURE (Centigrade)		pH (Standard units)		SPECIFIC CONDUCTANCE (umhos/cm)		DISSOLVED OXYGEN (mg/l)	
	Oct-92	Aug-93	Oct-92	Aug-93	Oct-92	Aug-93	Oct-92	Aug-93	Oct-92	Aug-93	Oct-92	Aug-93
DSI-SW-SW2	clear	NS	NR	NS	2	NS	8.1	NS	>2,000	NS	10	NS
DSI-SW-SW3/4	NR	NS	NR	NS	NR	NS	NR	NS	NR	NS	NR	NS
DSI-SW-SW6	yellow	NR	22	NA	12	NR	8.0	NR	>2,000	NR	8.9	NA
DSI-SW-SW8	cloudy	NR	NR	NA	10	16	8.2	7.8	548	1,090	8.1	NA
DSI-SW-SW9	clear	NS	23	NS	11	NS	8.0	NS	1 *	NS	10.8	NS
DSI-SW-SW32	light brown	NS	9	NS	11	NS	7.2	NS	2 *	NS	9.5	NS
DSI-SW-SW35	NR	NS	17	NS	11	NS	7.6	NS	NR	NS	8.8	NS
DSI-SW-PW1	light orange	NS	132	NS	9	NS	7.5	NS	380	NS	6.8	NS
DSI-SW-PW3	clear	NS	9	NS	8	NS	6.8	NS	178	NS	7.7	NS
DSI-SW-RW1	clear	clear	2	NA	12	26	6.9	8.5	165	337	7.9	NA
DSI-SW-RW2	clear	clear	1	NA	13	27	7.1	8.5	199	258	8.2	NA
DSI-SW-RW3	clear	clear	1	NA	11	26	5.9	7.7	151	161	8.4	NA
DSI-SW-RW4	NS	clear	NS	NA	NS	29	NS	8.4	NS	156	NS	NA

NOTES:

1. NTU = Nephelometric turbidity units
2. NR = Not recorded
3. umhos/cm = Micromhos per centimeter
4. mg/l = Milligrams per liter
5. * indicates anomalous measurement
6. NS = Not sampled

TABLE 2-37
SEEP SURFACE WATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SW-SW2		DSI-SW-SW2/4		DSI-SW-SW6		DSI-SW-SW7 *	
DATE SAMPLED:	13-Oct-92	Aug-93	13-Oct-92	Aug-93	14-Oct-92	24-Aug-93	14-Oct-92	Aug-93
VOLATILE ORGANICS METHOD: 524.2								
Acetone	ND(22)	NS	ND(4300)	NS	590 J	42 J	640 J	NS
Benzene	ND(1)	NS	ND(50)	NS	ND(10)	0.2 J	ND(10)	NS
Bromobenzene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
Bromochloromethane	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
Bromodichloromethane	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
Bromoform	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
Bromomethane	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
n-Butylbenzene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
sec-Butylbenzene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
tert-Butylbenzene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
Carbon tetrachloride	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
Chlorobenzene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
Chloroethane	ND(1)	NS	320	NS	12	11	14	NS
Chloroform	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
Carbon disulfide	ND(1)	NS	ND(50)	NS	ND(10)	0.4 J	ND(10)	NS
Chloromethane	ND(1)	NS	ND(50)	NS	ND(10)	0.5	ND(10)	NS
2-Chlorotoluene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
4-Chlorotoluene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
Dibromochloromethane	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
1,2-Dibromo-3-chloropropane	ND(1) R	NS	ND(50) R	NS	ND(10) R	ND(0.5)	ND(10) R	NS
1,2-Dibromoethane	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
Dibromomethane	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
1,2-Dichlorobenzene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
1,3-Dichlorobenzene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
1,4-Dichlorobenzene	0.11 J	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
Dichlorodifluoromethane	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
1,1-Dichloroethane	ND(1)	NS	ND(50)	NS	ND(10)	0.7	ND(10)	NS
1,2-Dichloroethane	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
2-Butanone	ND(5) R	NS	5600 J	NS	590 J	14	680 J	NS
1,1-Dichloroethene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
cis-1,2-Dichloroethene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
trans-1,2,-Dichloroethene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
1,2-Dichloropropane	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
1,3-Dichloropropane	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
2,2-Dichloropropane	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
1,1-Dichloropropene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
cis-1,3-Dichloropropene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
trans-1,3-Dichloropropene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
Ethylbenzene	ND(1)	NS	59	NS	ND(10)	ND(0.5)	ND(10)	NS
2-Hexanone	1.8 J	NS	420 J	NS	31 J	0.8 J	34 J	NS
Hexachlorobutadiene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
4-Methyl-2-Pentanone	ND(5)	NS	270	NS	60	2 J	68	NS
1-Methylethylbenzene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
p-Isopropyltoluene	ND(1)	NS	ND(50)	NS	ND(10)	0.6	ND(10)	NS
Methylene chloride	ND(1)	NS	ND(93)	NS	ND(10)	0.1 J	ND(10)	NS
Naphthalene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
n-Propylbenzene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
Styrene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
1,1,1,2-Tetrachloroethane	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
1,1,2,2-Tetrachloroethane	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
Tetrachloroethene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
Toluene	ND(1)	NS	390	NS	2.1 J	0.4 J	2 J	NS
1,2,3-Trichlorobenzene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
1,2,4-Trichlorobenzene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
1,1,1-Trichloroethane	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
1,1,2-Trichloroethane	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
Trichloroethene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
Trichlorofluoromethane	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
1,2,3-Trichloropropane	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
1,2,4-Trimethylbenzene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
1,3,5-Trimethylbenzene	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
Vinyl Chloride	ND(1)	NS	ND(50)	NS	ND(10)	ND(0.5)	ND(10)	NS
Xylenes (total)	ND(1)	NS	260	NS	ND(10)	0.8	ND(10)	NS

Notes:

1. ND = Not detected above detection limit listed in parentheses.
2. NS = Not sampled
3. J = Estimated concentration
4. R = Rejected as a result of data validation.
5. Results reported in micrograms per liter.
6. * DSI-SW-SW7 is a duplicate of DSI-SW-SW6.

TABLE 2-S7
SEEP SURFACE WATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SW-SW8		DSI-SW-SW9		DSI-SW-SW32		DSI-SW-SW35	
DATE SAMPLED:	16-Oct-92	24-Aug-93	15-Oct-92	Aug-93	15-Oct-92	Aug-93	15-Oct-92	Aug-93
VOLATILE ORGANICS METHOD: 524.2								
Acetone	ND(5) R	5 R	4.3 J	NS	ND(15)	NS	ND(5) R	NS
Benzene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Bromobenzene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Bromochloromethane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Bromodichloromethane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Bromoform	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Bromomethane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
n-Butylbenzene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
sec-Butylbenzene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
tert-Butylbenzene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Carbon tetrachloride	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	0.22 J	NS
Chlorobenzene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Chloroethane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Chloroform	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Carbon disulfide	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Chloromethane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
2-Chlorotoluene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
4-Chlorotoluene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Dibromochloromethane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
1,2-Dibromo-3-chloropropane	ND(1) R	ND(0.5)	ND(1) R	NS	ND(1) R	NS	ND(1) R	NS
1,2-Dibromoethane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Dibromomethane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
1,2-Dichlorobenzene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
1,3-Dichlorobenzene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
1,4-Dichlorobenzene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Dichlorodifluoromethane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
1,1-Dichloroethane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	3.2	NS
1,2-Dichloroethane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
2-Butanone	ND(5) R	ND(5)	ND(5) R	NS	3.9 J	NS	ND(5) R	NS
1,1-Dichloroethene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
cis-1,2-Dichloroethene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	0.97 J	NS
trans-1,2,-Dichloroethene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
1,2-Dichloropropane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
1,3-Dichloropropane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
2,2-Dichloropropane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
1,1-Dichloropropene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
cis-1,3-Dichloropropene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
trans-1,3-Dichloropropene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Ethylbenzene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
2-Hexanone	ND(5) R	ND(5)	ND(5) R	NS	ND(5) R	NS	ND(5) R	NS
Hexachlorobutadiene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
4-Methyl-2-Pentanone	ND(5)	ND(5)	ND(5)	NS	1.4 J	NS	ND(5)	NS
1-Methylethylbenzene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
p-Isopropyltoluene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Methylene chloride	ND(1.8)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1.6)	NS
Naphthalene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
n-Propylbenzene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Styrene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
1,1,1,2-Tetrachloroethane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
1,1,2,2-Tetrachloroethane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Tetrachloroethene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Toluene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
1,2,3-Trichlorobenzene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
1,2,4-Trichlorobenzene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
1,1,1-Trichloroethane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	1.8	NS
1,1,2-Trichloroethane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Trichloroethene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	0.74 J	NS
Trichlorofluoromethane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
1,2,3-Trichloropropane	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
1,2,4-Trimethylbenzene	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
1,3,5-Trimethylbenzene	ND(1)	0.1 J	ND(1)	NS	ND(1)	NS	ND(1)	NS
Vinyl Chloride	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS
Xylenes (total)	ND(1)	ND(0.5)	ND(1)	NS	ND(1)	NS	ND(1)	NS

Notes:

1. ND = Not detected above detection limit listed in parentheses.
2. NS = Not sampled
3. J = Estimated concentration
4. R = Rejected as a result of data validation.
5. Results reported in micrograms per liter.
6. * DSI-SW-SW7 is a duplicate of DSI-SW-SW6.

TABLE 2-38
SEEP SURFACE WATER ANALYTICAL RESULTS
SEMI-VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SW-SW2		DSI-SW-SW3/4		DSI-SW-SW6		DSI-SW-SW7 *		DSI-SW-SW8	
DATE SAMPLED:	14-Oct-92	Aug-93	14-Oct-92	Aug-93	14-Oct-92	Aug-93	14-Oct-92	Aug-93	16-Oct-92	Aug-93
TCL SEMI-VOLATILE ORGANICS METHOD: 8270										
Phenol	ND(10)	NS	360	NS	39	NA	38	NS	ND(10) J	NA
bis(2-Chloroethyl) Ether	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
2-Chlorophenol	ND(10)	NS	ND(500)	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
1,3-Dichlorobenzene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
1,4-Dichlorobenzene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
1,2-Dichlorobenzene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
2-Methylphenol	ND(10)	NS	110	NS	13	NA	13	NS	ND(10) J	NA
2,2'-oxybis(1-Chloropropane)	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
4-Methylphenol	3 J	NS	6700 J	NS	32	NA	30	NS	ND(10) J	NA
N-Nitroso-Di-n-propylamine	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Hexachloroethane	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Nitrobenzene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Isophorone	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
2-Nitrophenol	ND(10)	NS	ND(500)	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
2,4-Dimethylphenol	ND(10)	NS	ND(500)	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
bis(2-Chloroethoxy)Methane	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
2,4,-Dichlorophenol	ND(10)	NS	ND(500)	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
1,2,4-Trichlorobenzene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Naphthalene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
4-Chloroaniline	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Hexachlorobutadiene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
4-Chloro-3-Methylphenol	5 J	NS	62	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
2- Methylnaphthalene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Hexachlorocyclopentadiene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
2,4,6-Trichlorophenol	ND(10)	NS	ND(500)	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
2,4,5-Trichlorophenol	ND(25)	NS	ND(1270)	NS	ND(25)	NA	ND(25)	NS	ND(25) J	NA
2-Chloronaphthalene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
2-Nitroaniline	ND(25)	NS	ND(1270) J	NS	ND(25)	NA	ND(25)	NS	ND(25) J	NA
Dimethyl Phthalate	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Acenaphthylene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
2,6-Dinitrotoluene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
3-Nitroaniline	ND(25)	NS	ND(1270) J	NS	ND(25)	NA	ND(25)	NS	ND(25) J	NA
Acenaphthene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
2,4-Dinitrophenol	ND(25)	NS	ND(1270)	NS	ND(25)	NA	ND(25)	NS	ND(25) J	NA
4-Nitrophenol	ND(25)	NS	ND(1270)	NS	ND(25)	NA	ND(25)	NS	ND(25) J	NA
Dibenzofuran	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
2,4-Dinitrotoluene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Diethylphthalate	ND(10)	NS	120 J	NS	6 J	NA	6 J	NS	ND(10) J	NA
4-Chlorophenyl-phenylether	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Fluorene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
4-Nitroaniline	ND(25)	NS	ND(1270) J	NS	ND(25)	NA	ND(25)	NS	ND(25) J	NA
4,6-Dinitro-2-Methylphenol	ND(25)	NS	ND(1270)	NS	ND(25)	NA	ND(25)	NS	ND(25) J	NA
n-Nitrosodiphenylamine (1)	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
4-Bromophenyl-phenylether	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Hexachlorobenzene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Pentachlorophenol	ND(25)	NS	ND(1270)	NS	ND(25)	NA	ND(25)	NS	ND(25) J	NA
Phenanthrene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Anthracene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Carbazole	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Di-n-butylphthalate	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Fluoranthene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Pyrene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Butylbenzylphthalate	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
3,3'-Dichlorobenzidine	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Benzo(a)anthracene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Chrysene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Bis(2-ethylhexyl)phthalate	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(5) J	NA
Di-n-octyl Phthalate	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Benzo(b)fluoranthene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Benzo(k)fluoranthene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Benzo(a)pyrene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Indeno(1,2,3-cd)pyrene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Dibenz(a,h)anthracene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA
Benzo(g,h,i)perylene	ND(10)	NS	ND(500) J	NS	ND(10)	NA	ND(10)	NS	ND(10) J	NA

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. J = Estimated concentration
4. NA = Not analyzed
5. ND = Not detected above detection limit listed in parentheses.
6. Results reported in micrograms per liter.
7. (1) = Cannot be separated from Diphenylamine.
8. * DSI-SW-SW7 is a duplicate of DSI-SW-SW6.

TABLE 2-38
SEEP SURFACE WATER ANALYTICAL RESULTS
SEMI-VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SW-SW9		DSI-SW-SW32			DSI-SW-SW35		
DATE SAMPLED:	15-Oct-92	Aug-93	15-Oct-92		Aug-93	15-Oct-92		Aug-93
TCL SEMI-VOLATILE ORGANICS								
METHOD: 8270								
Phenol	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
bis(2-Chloroethyl) Ether	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
2-Chlorophenol	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
1,3-Dichlorobenzene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
1,4-Dichlorobenzene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
1,2-Dichlorobenzene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
2-Methylphenol	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
2,2'-oxybis(1-Chloropropane)	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
4-Methylphenol	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
N-Nitroso-Di-n-propylamine	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Hexachloroethane	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Nitrobenzene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Isophorone	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
2-Nitrophenol	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
2,4-Dimethylphenol	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
bis(2-Chloroethoxy)Methane	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
2,4,-Dichlorophenol	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
1,2,4-Trichlorobenzene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Naphthalene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
4-Chloroaniline	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Hexachlorobutadiene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
4-Chloro-3-Methylphenol	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
2- Methylnaphthalene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Hexachlorocyclopentadiene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
2,4,6-Trichlorophenol	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
2,4,5-Trichlorophenol	ND(25)	NS	ND(25)	J	NS	ND(25)	J	NS
2-Chloronaphthalene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
2-Nitroaniline	ND(25)	NS	ND(25)	J	NS	ND(25)	J	NS
Dimethyl Phthalate	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Acenaphthylene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
2,6-Dinitrotoluene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
3-Nitroaniline	ND(25)	NS	ND(25)	J	NS	ND(25)	J	NS
Acenaphthene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
2,4-Dinitrophenol	ND(25)	NS	1	J	NS	ND(25)	J	NS
4-Nitrophenol	ND(25)	NS	ND(25)	J	NS	ND(25)	J	NS
Dibenzofuran	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
2,4-Dinitrotoluene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Diethylphthalate	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
4-Chlorophenyl-phenylether	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Fluorene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
4-Nitroaniline	ND(25)	NS	ND(25)	J	NS	ND(25)	J	NS
4,6-Dinitro-2-Methylphenol	ND(25)	NS	ND(25)	J	NS	ND(25)	J	NS
n-Nitrosodiphenylamine (1)	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
4-Bromophenyl-phenylether	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Hexachlorobenzene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Pentachlorophenol	ND(25)	NS	ND(25)	J	NS	ND(25)	J	NS
Phenanthrene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Anthracene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Carbazole	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Di-n-butylphthalate	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Fluoranthene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Pyrene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Butylbenzylphthalate	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
3,3'-Dichlorobenzidine	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Benzo(a)anthracene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Chrysene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Bis(2-ethylhexyl)phthalate	ND(5)	NS	ND(10)	J	NS	ND(10)	J	NS
Di-n-octyl Phthalate	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Benzo(b)fluoranthene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Benzo(k)fluoranthene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Benzo(a)pyrene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Indeno(1,2,3-cd)pyrene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Dibenz(a,h)anthracene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS
Benzo(g,h,i)perylene	ND(10)	NS	ND(10)	J	NS	ND(10)	J	NS

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. J = Estimated concentration
4. NA = Not analyzed
5. ND = Not detected above detection limit listed in parentheses.
6. Results reported in micrograms per liter.
7. (1) = Cannot be separated from Diphenylamine.
8. * DSI-SW-SW7 is a duplicate of DSI-SW-SW6.

TABLE 2-39
SEEP SURFACE WATER ANALYTICAL RESULTS
TOTAL TARGET ANALYTE LIST INORGANICS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SW-SW2		DSI-SW-SW3/4		DSI-SW-SW6		DSI-SW-SW7 *	
DATE SAMPLED:	13-Oct-92	Aug-93	13-Oct-92	Aug-93	14-Oct-92	24-Aug-93	14-Oct-92	Aug-93
TOTAL METALS								
METHOD: CLP TAL								
Aluminum	36.1	NS	446	NS	71.7	2820	110	NS
Antimony	ND(2.0)	NS	ND(2.0)	NS	ND(2.0)	ND(5.0)	ND(2.0)	NS
Arsenic	7.2 J	NS	18	NS	8.1	45.0	7.2	NS
Barium	351	NS	3850	NS	205	145	226	NS
Beryllium	ND(1.0)	NS	ND(1.0)	NS	ND(1.0)	ND(3.0)	ND(1.0)	NS
Cadmium	ND(0.1)	NS	ND(0.1)	NS	ND(0.10) J	ND(0.20)	ND(0.10)	NS
Calcium	45100	NS	541000	NS	165000	41200	170000	NS
Chromium	ND(4.7)	NS	ND(4.0)	NS	ND(4.0)	ND(10.0)	ND(4.0)	NS
Cobalt	10.3	NS	13	NS	ND(4.0)	25.1	4.9 J	NS
Copper	ND(4.0)	NS	9	NS	ND(4.0)	ND(14.5)	6.6 J	NS
Iron	155	NS	340000	NS	3490	32300	3640	NS
Lead	ND(1.0) J	NS	1.8 J	NS	ND(1.0)	22.0	ND(1.0)	NS
Magnesium	112000	NS	135000	NS	218000	309000	228000	NS
Manganese	13.9	NS	7460	NS	1220	1420	1270	NS
Mercury	ND(0.1)	NS	ND(0.1)	NS	ND(0.10)	ND(0.20) J	ND(0.10)	NS
Nickel	47.8	NS	59.8	NS	30.9	90.0	26.3	NS
Potassium	260000	NS	231000	NS	49100	112000	52700	NS
Selenium	ND(2.0) J	NS	ND(2.0) J	NS	ND(2.0) J	ND(3.0)	ND(2.0)	NS
Silver	ND(4.0)	NS	ND(4.0)	NS	ND(4.0)	ND(0.40) J	ND(4.0)	NS
Sodium	278000 J	NS	423000 J	NS	389000 J	440000	400000 J	NS
Thallium	ND(3.0) J	NS	ND(3.0) J	NS	ND(3.0)	ND(3.0)	ND(3.0) J	NS
Vanadium	ND(4.0)	NS	12	NS	ND(4.0)	ND(20.0)	ND(4.0)	NS
Zinc	315	NS	247	NS	103	3040	127	NS
Cyanide	NA	NS	ND(10.0)	NS	13.0 J	ND(10.0)	ND(10.0) J	NS

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. J = Estimated concentration
4. ND = Not detected above detection limit listed in parentheses.
5. Results reported in micrograms per liter.
6. TAL = Target Analyte List
7. DSI-SW-SW7 is a duplicate of DSI-SW-SW6. DSI-SW-QS1A is a duplicate of DSI-SW-SW8.

TABLE 2-39
SEEP SURFACE WATER ANALYTICAL RESULTS
TOTAL TARGET ANALYTE LIST INORGANICS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SW-SW6		DSI-SW-QS1A *		DSI-SW-SW9		DSI-SW-SW32		DSI-SW-SW35	
DATE SAMPLED:	15-Oct-92	24-Aug-93	Oct-92	10-Sep-93	16-Oct-92	Aug-93	15-Oct-92	Aug-93	15-Oct-92	Aug-93
TOTAL METALS										
METHOD: CLP TAL										
Aluminum	7820	ND(62.1)	NS	ND(38.0)	561	NS	2300	NS	240	NS
Antimony	ND(2.0)	ND(1.0)	NS	ND(1.0)	ND(2.0)	NS	ND(2.0)	NS	ND(2.0)	NS
Arsenic	2.2	ND(1.0)	NS	ND(1.0)	ND(2.0)	NS	ND(2.0)	NS	ND(2.0)	NS
Barium	57.1	59.0	NS	57.0	65.7	NS	57.9	NS	89.3	NS
Beryllium	ND(1.0)	ND(0.60)	NS	ND(0.60)	ND(1.0)	NS	ND(1.0)	NS	ND(1.0)	NS
Cadmium	ND(0.10)	ND(0.04)	NS	ND(0.04)	ND(0.10)	NS	0.28	NS	ND(0.10) J	NS
Calcium	45300	79500	NS	76600	95500	NS	52700	NS	97500	NS
Chromium	14.0	ND(2.0)	NS	ND(2.0)	ND(4.0)	NS	ND(4.0)	NS	ND(4.0)	NS
Cobalt	7.4	ND(4.0)	NS	ND(4.0)	ND(4.0)	NS	4.9	NS	ND(4.0)	NS
Copper	25.6	ND(2.5)	NS	2.8	ND(4.0)	NS	19.4	NS	ND(4.0)	NS
Iron	14500	755 J	NS	806	1900	NS	7090	NS	5190	NS
Lead	7.3	ND(2.0)	NS	ND(0.40)	ND(1.0)	NS	7.1	NS	ND(1.0)	NS
Magnesium	13600	12900	NS	13300	18000	NS	9010	NS	17000	NS
Manganese	338	2810 J	NS	2900	2040	NS	1720	NS	3570	NS
Mercury	ND(0.10)	ND(0.20) J	NS	ND(0.20) J	ND(0.10)	NS	ND(0.10)	NS	ND(0.10)	NS
Nickel	20.2	22.3	NS	21.8	8.5 J	NS	ND(8.0)	NS	ND(8.0)	NS
Potassium	4090	11500	NS	12000	11700	NS	9530	NS	14300	NS
Selenium	ND(2.0)	ND(0.60) J	NS	ND(0.60) J	ND(2.0)	NS	ND(2.0)	NS	ND(2.0)	NS
Silver	ND(4.0)	0.53	NS	0.16	ND(4.0)	NS	ND(4.0)	NS	ND(4.0)	NS
Sodium	57100	99500	NS	100000	95800	NS	47200	NS	97500	NS
Thallium	ND(3.0)	ND(0.60)	NS	ND(0.60)	ND(3.0)	NS	ND(3.0)	NS	ND(3.0) J	NS
Vanadium	16.2	ND(4.0)	NS	ND(4.0)	ND(4.0)	NS	8.3	NS	4.3	NS
Zinc	42.9	23.3	NS	25.2	55.7	NS	80.8	NS	65.8	NS
Cyanide	ND(10.0)	ND(10.0)	NS	ND(10.0)	ND(10.0)	NS	ND(10.0)	NS	ND(10.0)	NS

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. J = Estimated concentration
4. ND = Not detected above detection limit listed in parentheses.
5. Results reported in micrograms per liter.
6. TAL = Target Analyte List
7. DSI-SW-SW7 is a duplicate of DSI-SW-SW6. DSI-SW-QS1A is a duplicate of DSI-SW-SW8.

TABLE 2-40
SEEP SURFACE WATER ANALYTICAL RESULTS
CONVENTIONAL PARAMETERS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

Analyte	Sample I.D. / Date:	SW-SW2 Oct-92	SW-SW2 Aug-93	SW-SW3/4 Oct-92	SW-SW3/4 Aug-93	SW-SW6 Oct-92	SW-SW6 Aug-93	SW-SW7 * Oct-92	SW-SW7 * Aug-93
Ammonia, as Nitrogen		176	NS	NA	NS	NA	NA	NA	NS
BOD		32.6	NS	NA	NS	NA	NA	NA	NS
Bicarbonate Alkalinity		ND(5)	NS	NA	NS	NA	NA	NA	NS
Carbonate Alkalinity		ND(5)	NS	NA	NS	NA	NA	NA	NS
Hydroxyl Alkalinity		ND(5)	NS	NA	NS	NA	NA	NA	NS
Total Alkalinity		1570	NS	NA	NS	NA	NA	NA	NS
Chloride		313	NS	NA	NS	NA	NA	NA	NS
COD		258	NS	NA	NS	NA	NA	NA	NS
Hardness		571	NS	1820	NS	1310	NA	1360	NS
Nitrate, as Nitrogen		4.8	NS	NA	NS	NA	NA	NA	NS
Nitrite, as Nitrogen		0.97	NS	NA	NS	NA	NA	NA	NS
Oil & Grease		0.6	NS	NA	NS	NA	NA	NA	NS
Phenolics		0.094	NS	NA	NS	NA	NA	NA	NS
Sulfate		ND(5)	NS	NA	NS	NA	NA	NA	NS
Sulfide		0.43	NS	NA	NS	NA	NA	NA	NS
Phosphorus		0.4	NS	NA	NS	NA	NA	NA	NS
Total Kjehldahl Nitrogen		181	NS	NA	NS	NA	NA	NA	NS
Total Dissolved Solids		1760	NS	NA	NS	NA	NA	NA	NS
Total Suspended Solids		ND(10)	NS	NA	NS	NA	NA	NA	NS
Total Organic Carbon		45.9	NS	NA	NS	NA	NA	NA	NS

Notes:
1. BOD = Biological Oxygen Demand
2. COD = Chemical Oxygen Demand
3. ND = Not Detected above detection limit listed in parentheses.
4. NA = Not Analyzed
5. NS = Not sampled
6. Data reported in milligrams per liter.
7. * SW-SW7 is a duplicate of SW-SW6.

TABLE 2-40
SEEP SURFACE WATER ANALYTICAL RESULTS
CONVENTIONAL PARAMETERS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

Analyte	Sample I.D. / Date:	SW-SW8 Oct-92	SW-SW8 Aug-93	SW-SW9 Oct-92	SW-SW9 Aug-93	SW-SW32 Oct-92	SW-SW32 Aug-93	SW-SW35 Oct-92	SW-SW35 Aug-93
Ammonia, as Nitrogen		NA	NA	NA	NS	NA	NS	NA	NS
BOD		NA	NA	NA	NS	NA	NS	NA	NS
Bicarbonate Alkalinity		NA	NA	NA	NS	NA	NS	NA	NS
Carbonate Alkalinity		NA	NA	NA	NS	NA	NS	NA	NS
Hydroxyl Alkalinity		NA	NA	NA	NS	NA	NS	NA	NS
Total Alkalinity		NA	NA	NA	NS	NA	NS	NA	NS
Chloride		NA	NA	NA	NS	NA	NS	NA	NS
COD		NA	NA	NA	NS	NA	NS	NA	NS
Hardness		169	NA	313	NS	169	NS	313	NS
Nitrate, as Nitrogen		NA	NA	NA	NS	NA	NS	NA	NS
Nitrite, as Nitrogen		NA	NA	NA	NS	NA	NS	NA	NS
Oil & Grease		NA	NA	NA	NS	NA	NS	NA	NS
Phenolics		NA	NA	NA	NS	NA	NS	NA	NS
Sulfate		NA	NA	NA	NS	NA	NS	NA	NS
Sulfide		NA	NA	NA	NS	NA	NS	NA	NS
Phosphorus		NA	NA	NA	NS	NA	NS	NA	NS
Total Kjehldahl Nitrogen		NA	NA	NA	NS	NA	NS	NA	NS
Total Dissolved Solids		NA	NA	NA	NS	NA	NS	NA	NS
Total Suspended Solids		NA	NA	NA	NS	NA	NS	NA	NS
Total Organic Carbon		NA	NA	NA	NS	NA	NS	NA	NS

Notes:
1. BOD = Biological Oxygen Demand
2. COD = Chemical Oxygen Demand
3. ND = Not Detected above detection limit listed in parentheses.
4. NA = Not Analyzed
5. NS = Not sampled
6. Data reported in milligrams per liter.
7. * SW-SW7 is a duplicate of SW-SW6

TABLE 2-41
CONNECTICUT RIVER SURFACE WATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SW-RW-1		DSI-SW-RW2		DSI-SW-RW3		DSI-SW-RW4	
DATE SAMPLED:	Oct-92	25-Aug-93	15-Oct-92	25-Aug-93	15-Oct-92	26-Aug-93	15-Oct-92	26-Aug-93
VOLATILE ORGANICS METHOD: 524.2								
Acetone	NA	5 R	ND(5) R	6 J	ND(5) R	6 J	NS	7 J
Benzene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Bromobenzene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Bromochloromethane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Bromodichloromethane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Bromoform	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Bromomethane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
n-Butylbenzene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
sec-Butylbenzene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
tert-Butylbenzene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Carbon tetrachloride	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Chlorobenzene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Chloroethane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Chloroform	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Carbon disulfide	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	0.5	NS	0.3 J
Chloromethane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
2-Chlorotoluene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
4-Chlorotoluene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Dibromochloromethane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
1,2-Dibromo-3-chloropropane	NA	ND(0.5)	ND(1) R	ND(0.5)	ND(1) R	ND(0.5)	NS	ND(0.5)
1,2-Dibromoethane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Dibromomethane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
1,2-Dichlorobenzene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
1,3-Dichlorobenzene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
1,4-Dichlorobenzene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Dichlorodifluoromethane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
1,1-Dichloroethane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
1,2-Dichloroethane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
2-Butanone	NA	ND(5)	ND(5) R	ND(5)	ND(5) R	ND(5)	NS	ND(5)
1,1-Dichloroethene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
cis-1,2-Dichloroethene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
trans-1,2,-Dichloroethene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
1,2-Dichloropropane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
1,3-Dichloropropane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
2,2-Dichloropropane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
1,1-Dichloropropene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
cis-1,3-Dichloropropene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
trans-1,3-Dichloropropene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Ethylbenzene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
2-Hexanone	NA	ND(5)	ND(5) R	ND(5)	ND(5) R	ND(5)	NS	ND(5)
Hexachlorobutadiene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
4-Methyl-2-Pentanone	NA	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	NS	ND(5)
1-Methylethylbenzene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
p-Isopropyltoluene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Methylene chloride	NA	ND(0.5)	ND(1.3)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Naphthalene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
n-Propylbenzene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Styrene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
1,1,1,2-Tetrachloroethane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
1,1,2,2-Tetrachloroethane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Tetrachloroethene	NA	ND(0.5)	ND(1)	0.06 J	ND(1)	ND(0.5)	NS	ND(0.5)
Toluene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
1,2,3-Trichlorobenzene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
1,2,4-Trichlorobenzene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
1,1,1-Trichloroethane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
1,1,2-Trichloroethane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Trichloroethene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Trichlorofluoromethane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
1,2,3-Trichloropropane	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
1,2,4-Trimethylbenzene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
1,3,5-Trimethylbenzene	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Vinyl Chloride	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)
Xylenes (total)	NA	ND(0.5)	ND(1)	ND(0.5)	ND(1)	ND(0.5)	NS	ND(0.5)

Notes

1. Samples collected from RW-1 were not analyzed for volatile organic compounds.
2. NA = Not analyzed
3. NS = Not sampled
4. ND = Not detected above detection limit listed in parentheses.
5. J = Estimated concentration
6. R = Rejected as a result of data validation.
7. Results reported in micrograms per liter.

TABLE 2-42
CONNECTICUT RIVER SURFACE WATER ANALYTICAL RESULTS
SEMI-VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SW-RW1		DSI-SW-RW2		DSI-SW-RW3		DSI-SW-RW4	
DATE SAMPLED:	15-Oct-92	Aug-93	15-Oct-92	Aug-93	15-Oct-92	Aug-93	Oct-92	Aug-93
TCL SEMI-VOLATILE ORGANICS METHOD: 8270								
Phenol	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
bis(2-Chloroethyl) Ether	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
2-Chlorophenol	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
1,3-Dichlorobenzene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
1,4-Dichlorobenzene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
1,2-Dichlorobenzene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
2-Methylphenol	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
2,2'-oxybis(1-Chloropropane)	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
4-Methylphenol	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
N-Nitroso-Di-n-propylamine	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Hexachloroethane	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Nitrobenzene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Isophorone	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
2-Nitrophenol	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
2,4-Dimethylphenol	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
bis(2-Chloroethoxy)Methane	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
2,4,-Dichlorophenol	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
1,2,4-Trichlorobenzene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Naphthalene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
4-Chloroaniline	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Hexachlorobutadiene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
4-Chloro-3-Methylphenol	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
2- Methylnaphthalene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Hexachlorocyclopentadiene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
2,4,6-Trichlorophenol	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
2,4,5-Trichlorophenol	ND(25)	NA	ND(25)	NA	ND(25)	NA	NS	NA
2-Chloronaphthalene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
2-Nitroaniline	ND(25)	NA	ND(25)	NA	ND(25)	NA	NS	NA
Dimethyl Phthalate	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Acenaphthylene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
2,6-Dinitrotoluene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
3-Nitroaniline	ND(25)	NA	ND(25)	NA	ND(25)	NA	NS	NA
Acenaphthene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
2,4-Dinitrophenol	ND(25)	NA	ND(25)	NA	ND(25)	NA	NS	NA
4-Nitrophenol	ND(25)	NA	ND(25)	NA	ND(25)	NA	NS	NA
Dibenzofuran	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
2,4-Dinitrotoluene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Diethylphthalate	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
4-Chlorophenyl-phenylether	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Fluorene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
4-Nitroaniline	ND(25)	NA	ND(25)	NA	ND(25)	NA	NS	NA
4,6-Dinitro-2-Methylphenol	ND(25)	NA	ND(25)	NA	ND(25)	NA	NS	NA
n-Nitrosodiphenylamine (1)	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
4-Bromophenyl-phenylether	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Hexachlorobenzene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Pentachlorophenol	ND(25)	NA	ND(25)	NA	ND(25)	NA	NS	NA
Phenanthrene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Anthracene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Carbazole	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Di-n-butylphthalate	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Fluoranthene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Pyrene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Butylbenzylphthalate	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
3,3'-Dichlorobenzidine	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Benzo(a)anthracene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Chrysene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Bis(2-ethylhexyl)phthalate	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Di-n-octyl Phthalate	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Benzo(b)fluoranthene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Benzo(k)fluoranthene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Benzo(a)pyrene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Indeno(1,2,3-cd)pyrene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Dibenzo(a,h)anthracene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Benzo(g,h,i)perylene	ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA

Notes:

1. NS = Not sampled
2. NA = Not analyzed
3. J = Estimated concentration
4. ND = Not detected above detection limit listed in parentheses.
5. Results reported in micrograms per liter.
6. (1) = Cannot be separated from Diphenylamine.

TABLE 2-43
CONNECTICUT RIVER SURFACE WATER ANALYTICAL RESULTS
TOTAL TARGET ANALYTE LIST INORGANICS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SW-RW1		DSI-SW-RW2		DSI-SW-RW3		DSI-SW-RW4	
DATE SAMPLED:	14-Oct-92	10-Sep-93	14-Oct-92	10-Sep-93	15-Oct-92	10-Sep-93	Oct-92	10-Sep-93
TOTAL METALS								
METHOD: CLP TAL								
Aluminum	61.1	ND(69.8)	67.2	ND(37.1)	46.4	ND(92.7)	NS	ND(52.8)
Antimony	ND(2.0)	ND(1.0)	ND(2.0)	ND(1.0)	ND(2.0)	ND(1.0)	NS	ND(1.0)
Arsenic	ND(2.0)	ND(1.0)	ND(2.0)	ND(1.0)	ND(2.0)	ND(1.0)	NS	ND(1.0)
Barium	ND(5.8)	9.6	ND(4.7)	16.5	ND(6.4)	12.5	NS	10.5
Beryllium	ND(1.0)	ND(0.60)	ND(1.0)	ND(0.60)	ND(1.0)	ND(0.60)	NS	ND(0.60)
Cadmium	ND(0.10)	ND(0.04)	ND(0.1)	ND(0.04)	ND(0.10)	ND(0.04)	NS	ND(0.04)
Calcium	14000	13400	14000	14100	15300	14700	NS	14800
Chromium	ND(4.0)	ND(2.0)	ND(4.0)	ND(2.0)	ND(4.0)	ND(2.0)	NS	ND(2.0)
Cobalt	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	NS	ND(4.0)
Copper	ND(4.0)	ND(2.0)	ND(4.0)	ND(3.3)	ND(4.0)	ND(4.3)	NS	ND(2.0)
Iron	216	ND(84.3)	304	ND(131)	209	463 J	NS	ND(262)
Lead	ND(1.0)	ND(0.40)	ND(1.0)	ND(0.40)	ND(1.0)	ND(0.40)	NS	ND(0.40)
Magnesium	1690	1610	1650	1690	1800	1720	NS	1720
Manganese	36.7	14.4 J	43.8	73.6 J	37	201	NS	108 J
Mercury	ND(0.10)	ND(0.20) J	ND(0.10)	ND(0.20) J	ND(0.10)	ND(0.20) J	NS	ND(0.20) J
Nickel	ND(8.0)	ND(6.0)	ND(8.0)	ND(6.0)	ND(8.0)	ND(6.0)	NS	ND(6.0)
Potassium	1750	1320	1900	1500	1660	1550	NS	1430
Selenium	ND(2.0)	ND(0.60) J	ND(2.0)	ND(0.60) J	ND(2.0)	ND(0.60)	NS	ND(0.60)
Silver	ND(4.0)	ND(0.08) J	ND(4.0)	ND(0.10) J	ND(4.0)	0.18	NS	ND(0.08) J
Sodium	6660	6610	6940	6870	6960	6740	NS	6500
Thallium	ND(3.0) J	ND(0.60)	ND(3.0)	ND(0.60)	ND(3.0)	ND(0.60)	NS	ND(0.60)
Vanadium	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	NS	ND(4.0)
Zinc	ND(2.0)	ND(4.8)	ND(2.3)	ND(4.9)	ND(2.2)	ND(7.2)	NS	ND(5.5)
Cyanide	ND(10.0)	ND(10.0)	ND(10.0)	ND(10.0)	ND(10.0)	ND(10.0)	NS	ND(10.0)

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. J = Estimated concentration
4. ND = Not detected above detection limit listed in parentheses.
5. Results reported in micrograms per liter.
6. TAL = Target Analyte List

TABLE 2-43
CONNECTICUT RIVER SURFACE WATER ANALYTICAL RESULTS
TOTAL TARGET ANALYTE LIST INORGANICS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SW-RW1		DSI-SW-RW2		DSI-SW-RW3		DSI-SW-RW4	
DATE SAMPLED:	14-Oct-92	10-Sep-93	14-Oct-92	10-Sep-93	15-Oct-92	10-Sep-93	Oct-92	10-Sep-93
TOTAL METALS METHOD: CLP TAL								
Aluminum	61.1	ND(69.8)	67.2	ND(37.1)	46.4	ND(92.7)	NS	ND(52.6)
Antimony	ND(2.0)	ND(1.0)	ND(2.0)	ND(1.0)	ND(2.0)	ND(1.0)	NS	ND(1.0)
Arsenic	ND(2.0)	ND(1.0)	ND(2.0)	ND(1.0)	ND(2.0)	ND(1.0)	NS	ND(1.0)
Barium	ND(5.6)	9.6	ND(4.7)	16.5	ND(6.4)	12.5	NS	10.5
Beryllium	ND(1.0)	ND(0.60)	ND(1.0)	ND(0.60)	ND(1.0)	ND(0.60)	NS	ND(0.60)
Cadmium	ND(0.10)	ND(0.04)	ND(0.1)	ND(0.04)	ND(0.10)	ND(0.04)	NS	ND(0.04)
Calcium	14000	13400	14000	14100	15300	14700	NS	14800
Chromium	ND(4.0)	ND(2.0)	ND(4.0)	ND(2.0)	ND(4.0)	ND(2.0)	NS	ND(2.0)
Cobalt	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	NS	ND(4.0)
Copper	ND(4.0)	2.0	ND(4.0)	3.3	ND(4.0)	4.3	NS	ND(2.0)
Iron	216	84.3	304	131	209	463	NS	262
Lead	ND(1.0)	ND(0.40)	ND(1.0)	ND(0.40)	ND(1.0)	ND(0.40)	NS	ND(0.40)
Magnesium	1690	1610	1650	1690	1800	1720	NS	1720
Manganese	36.7	14.4	43.8	73.6	37	201	NS	108
Mercury	ND(0.10)	ND(0.20) J	ND(0.10)	ND(0.20) J	ND(0.10)	ND(0.20) J	NS	ND(0.20) J
Nickel	ND(8.0)	ND(6.0)	ND(8.0)	ND(6.0)	ND(8.0)	ND(6.0)	NS	ND(6.0)
Potassium	1750	1320	1900	1500	1660	1550	NS	1430
Selenium	ND(2.0)	ND(0.60) J	ND(2.0)	ND(0.60) J	ND(2.0)	ND(0.60)	NS	ND(0.60)
Silver	ND(4.0)	ND(0.08) J	ND(4.0)	ND(0.10) J	ND(4.0)	0.18	NS	ND(0.08) J
Sodium	6660	6610	6940	6870	6960	6740	NS	6500
Thallium	ND(3.0) J	ND(0.60)	ND(3.0)	ND(0.60)	ND(3.0)	ND(0.60)	NS	ND(0.60)
Vanadium	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	NS	ND(4.0)
Zinc	ND(2.0)	4.8	ND(2.3)	4.9	ND(2.2)	7.2	NS	5.5
Cyanide	ND(10.0)	ND(10.0)	ND(10.0)	ND(10.0)	ND(10.0)	ND(10.0)	NS	ND(10.0)

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. J = Estimated concentration
4. ND = Not detected above detection limit listed in parentheses.
5. Results reported in micrograms per liter.
6. TAL = Target Analyte List

TABLE 2-44
CONNECTICUT RIVER SURFACE WATER ANALYTICAL RESULTS
CONVENTIONAL PARAMETERS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

Analyte	Sample I.D. / Date:	SW-RW1 Oct-92	SW-RW1 Aug-93	SW-RW2 Oct-92	SW-RW2 Aug-93	SW-RW3 Oct-92	SW-RW3 Aug-93	SW-RW4 Oct-92	SW-RW4 Aug-93
Ammonia, as Nitrogen		ND(40)	NA	ND(40)	NA	ND(40)	NA	NS	NA
BOD		6	NA	9	NA	ND(4)	NA	NS	NA
Bicarbonate Alkalinity		43.5	NA	41.4	NA	41.4	NA	NS	NA
Carbonate Alkalinity		ND(5)	NA	ND(5)	NA	ND(5)	NA	NS	NA
Hydroxyl Alkalinity		ND(5)	NA	ND(5)	NA	ND(5)	NA	NS	NA
Total Alkalinity		43.5	NA	41.4	NA	41.4	NA	NS	NA
Chloride		11.9	NA	11	NA	9.3	NA	NS	NA
COD		34	NA	34	NA	20	NA	NS	NA
Hardness		41.8	NA	41.7	NA	45.6	NA	NS	NA
Nitrate, as Nitrogen		0.13	NA	0.092	NA	0.14	NA	NS	NA
Nitrite, as Nitrogen		ND(0.5)	NA	ND(0.5)	NA	ND(0.5)	NA	NS	NA
Oil & Grease		NA	NA	NA	NA	ND(0.5)	NA	NS	NA
Phenolics		ND(0.01)	NA	0.02	NA	0.018	NA	NS	NA
Sulfate		26.5	NA	ND(5)	NA	7	NA	NS	NA
Sulfide		ND(0.1)	NA	ND(0.1)	NA	ND(0.1)	NA	NS	NA
[illegible]osphorus		0.26	NA	0.13	NA	ND(0.05)	NA	NS	NA
[illegible]al Kjehldahl Nitrogen		ND(50)	NA	ND(50)	NA	ND(50)	NA	NS	NA
Total Dissolved Solids		90	NA	90	NA	90	NA	NS	NA
Total Suspended Solids		ND(10)	NA	ND(10)	NA	ND(10)	NA	NS	NA
Total Organic Carbon		4.4	NA	4.3	NA	4.8	NA	NS	NA

Notes:

1. BOD = Biological Oxygen Demand
2. COD = Chemical Oxygen Demand
3. ND = Not Detected (Detection limit listed in parentheses).
4. NA = Not Analyzed
5. NS = Not sampled
6. Data reported in milligrams per liter.

TABLE 2-45
RETENTION POND SURFACE WATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SW-PW3			DSI-SW-PW4	
DATE SAMPLED:	23-Oct-92		Aug-93	Oct-92	Aug-93
VOLATILE ORGANICS METHOD: 524.2					
Acetone	ND(5)	R	NS	NS	NS
Benzene	ND(1)		NS	NS	NS
Bromobenzene	ND(1)		NS	NS	NS
Bromochloromethane	ND(1)		NS	NS	NS
Bromodichloromethane	ND(1)		NS	NS	NS
Bromoform	ND(1)		NS	NS	NS
Bromomethane	ND(1)		NS	NS	NS
n-Butylbenzene	ND(1)		NS	NS	NS
sec-Butylbenzene	ND(1)		NS	NS	NS
tert-Butylbenzene	ND(1)		NS	NS	NS
Carbon tetrachloride	ND(1)		NS	NS	NS
Chlorobenzene	ND(1)		NS	NS	NS
Chloroethane	ND(1)		NS	NS	NS
Chloroform	ND(1)		NS	NS	NS
Carbon disulfide	ND(1)		NS	NS	NS
Chloromethane	ND(1)		NS	NS	NS
2-Chlorotoluene	ND(1)		NS	NS	NS
4-Chlorotoluene	ND(1)		NS	NS	NS
Dibromochloromethane	ND(1)		NS	NS	NS
1,2-Dibromo-3-chloropropane	ND(1)	R	NS	NS	NS
1,2-Dibromoethane	ND(1)		NS	NS	NS
Dibromomethane	ND(1)		NS	NS	NS
1,2-Dichlorobenzene	ND(1)		NS	NS	NS
1,3-Dichlorobenzene	ND(1)		NS	NS	NS
1,4-Dichlorobenzene	ND(1)		NS	NS	NS
Dichlorodifluoromethane	ND(1)		NS	NS	NS
1,1-Dichloroethane	ND(1)		NS	NS	NS
1,2-Dichloroethane	ND(1)		NS	NS	NS
2-Butanone	ND(5)		NS	NS	NS
1,1-Dichloroethene	ND(1)		NS	NS	NS
cis-1,2-Dichloroethene	ND(1)		NS	NS	NS
trans-1,2,-Dichloroethene	ND(1)		NS	NS	NS
1,2-Dichloropropane	ND(1)		NS	NS	NS
1,3-Dichloropropane	ND(1)		NS	NS	NS
2,2-Dichloropropane	ND(1)		NS	NS	NS
1,1-Dichloropropene	ND(1)		NS	NS	NS
cis-1,3-Dichloropropene	ND(1)		NS	NS	NS
trans-1,3-Dichloropropene	ND(1)		NS	NS	NS
Ethylbenzene	ND(1)		NS	NS	NS
2-Hexanone	ND(5)	R	NS	NS	NS
Hexachlorobutadiene	ND(1)		NS	NS	NS
4-Methyl-2-Pentanone	ND(5)		NS	NS	NS
1-Methylethylbenzene	ND(1)		NS	NS	NS
p-isopropyltoluene	ND(1)		NS	NS	NS
Methylene chloride	ND(1.1)		NS	NS	NS
Naphthalene	ND(1)		NS	NS	NS
n-Propylbenzene	ND(1)		NS	NS	NS
Styrene	ND(1)		NS	NS	NS
1,1,1,2-Tetrachloroethane	ND(1)		NS	NS	NS
1,1,2,2-Tetrachloroethane	ND(1)		NS	NS	NS
Tetrachloroethene	ND(1)		NS	NS	NS
Toluene	ND(1)		NS	NS	NS
1,2,3-Trichlorobenzene	ND(1)		NS	NS	NS
1,2,4-Trichlorobenzene	ND(1)		NS	NS	NS
1,1,1-Trichloroethane	ND(1)		NS	NS	NS
1,1,2-Trichloroethane	ND(1)		NS	NS	NS
Trichloroethene	ND(1)		NS	NS	NS
Trichlorofluoromethane	ND(1)		NS	NS	NS
1,2,3-Trichloropropane	ND(1)		NS	NS	NS
1,2,4-Trimethylbenzene	ND(1)		NS	NS	NS
1,3,5-Trimethylbenzene	ND(1)		NS	NS	NS
Vinyl Chloride	ND(1)		NS	NS	NS
Xylenes (total)	ND(1)		NS	NS	NS

Notes:

1. NS = Not sampled
2. ND = Not detected above detection limit listed in parentheses.
3. J = Estimated concentration
4. R = Rejected as a result of data validation
5. Results reported in micrograms per liter.

TABLE 2-46
RETENTION POND SURFACE WATER ANALYTICAL RESULTS
SEMI-VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SW-PW1		DSI-SW-PW2		DSI-SW-PW4	
DATE SAMPLED:	21-Oct-92	Aug-93	21-Oct-92	Aug-93	Oct-92	Aug-93
TCL SEMI-VOLATILE ORGANICS						
METHOD: 8270						
Phenol	ND(10)	NS	ND(10)	NS	NS	NA
bis(2-Chloroethyl) Ether	ND(10)	NS	ND(10)	NS	NS	NA
2-Chlorophenol	ND(10)	NS	ND(10)	NS	NS	NA
1,3-Dichlorobenzene	ND(10)	NS	ND(10)	NS	NS	NA
1,4-Dichlorobenzene	ND(10)	NS	ND(10)	NS	NS	NA
1,2-Dichlorobenzene	ND(10)	NS	ND(10)	NS	NS	NA
2-Methylphenol	ND(10)	NS	ND(10)	NS	NS	NA
2,2'-oxybis(1-Chloropropane)	ND(10)	NS	ND(10)	NS	NS	NA
4-Methylphenol	ND(10)	NS	ND(10)	NS	NS	NA
N-Nitroso-Di-n-propylamine	ND(10)	NS	ND(10)	NS	NS	NA
Hexachloroethane	ND(10)	NS	ND(10)	NS	NS	NA
Nitrobenzene	ND(10)	NS	ND(10)	NS	NS	NA
Isophorone	ND(10)	NS	ND(10)	NS	NS	NA
2-Nitrophenol	ND(10)	NS	ND(10)	NS	NS	NA
2,4-Dimethylphenol	ND(10)	NS	ND(10)	NS	NS	NA
bis(2-Chloroethoxy)Methane	ND(10)	NS	ND(10)	NS	NS	NA
2,4,-Dichlorophenol	ND(10)	NS	ND(10)	NS	NS	NA
1,2,4-Trichlorobenzene	ND(10)	NS	ND(10)	NS	NS	NA
Naphthalene	ND(10)	NS	ND(10)	NS	NS	NA
4-Chloroaniline	ND(10)	NS	ND(10)	NS	NS	NA
Hexachlorobutadiene	ND(10)	NS	ND(10)	NS	NS	NA
4-Chloro-3-Methylphenol	ND(10)	NS	ND(10)	NS	NS	NA
2- Methylnaphthalene	ND(10)	NS	ND(10)	NS	NS	NA
Hexachlorocyclopentadiene	ND(10)	NS	ND(10)	NS	NS	NA
2,4,6-Trichlorophenol	ND(10)	NS	ND(10)	NS	NS	NA
2,4,5-Trichlorophenol	ND(25)	NS	ND(25)	NS	NS	NA
2-Chloronaphthalene	ND(10)	NS	ND(10)	NS	NS	NA
2-Nitroaniline	ND(25)	NS	ND(25)	NS	NS	NA
Dimethyl Phthalate	ND(10)	NS	ND(10)	NS	NS	NA
Acenaphthylene	ND(10)	NS	ND(10)	NS	NS	NA
2,6-Dinitrotoluene	ND(10)	NS	ND(10)	NS	NS	NA
3-Nitroaniline	ND(25)	NS	ND(25)	NS	NS	NA
Acenaphthene	ND(10)	NS	ND(10)	NS	NS	NA
2,4-Dinitrophenol	ND(25)	NS	ND(25)	NS	NS	NA
4-Nitrophenol	3 J	NS	ND(25)	NS	NS	NA
Dibenzofuran	ND(10)	NS	ND(10)	NS	NS	NA
2,4-Dinitrotoluene	ND(10)	NS	ND(10)	NS	NS	NA
Diethylphthalate	ND(10)	NS	ND(10)	NS	NS	NA
4-Chlorophenyl-phenylether	ND(10)	NS	ND(10)	NS	NS	NA
Fluorene	ND(10)	NS	ND(10)	NS	NS	NA
4-Nitroaniline	ND(25)	NS	ND(25)	NS	NS	NA
4,6-Dinitro-2-Methylphenol	ND(25)	NS	ND(25)	NS	NS	NA
n-Nitrosodiphenylamine (1)	ND(10)	NS	ND(10)	NS	NS	NA
4-Bromophenyl-phenylether	ND(10)	NS	ND(10)	NS	NS	NA
Hexachlorobenzene	ND(10)	NS	ND(10)	NS	NS	NA
Pentachlorophenol	ND(25)	NS	ND(25)	NS	NS	NA
Phenanthrene	ND(10)	NS	ND(10)	NS	NS	NA
Anthracene	ND(10)	NS	ND(10)	NS	NS	NA
Carbazole	ND(10)	NS	ND(10)	NS	NS	NA
Di-n-butylphthalate	ND(10)	NS	ND(10)	NS	NS	NA
Fluoranthene	ND(10)	NS	ND(10)	NS	NS	NA
Pyrene	ND(10)	NS	ND(10)	NS	NS	NA
Butylbenzylphthalate	ND(10)	NS	ND(10)	NS	NS	NA
3,3'-Dichlorobenzidine	ND(10)	NS	ND(10)	NS	NS	NA
Benzo(a)anthracene	ND(10)	NS	ND(10)	NS	NS	NA
Chrysene	ND(10)	NS	ND(10)	NS	NS	NA
Bis(2-ethylhexyl)phthalate	ND(5)	NS	ND(5)	NS	NS	NA
Di-n-octyl Phthalate	ND(10)	NS	ND(10)	NS	NS	NA
Benzo(b)fluoranthene	ND(10)	NS	ND(10)	NS	NS	NA
Benzo(k)fluoranthene	ND(10)	NS	ND(10)	NS	NS	NA
Benzo(a)pyrene	ND(10)	NS	ND(10)	NS	NS	NA
Indeno(1,2,3-cd)pyrene	ND(10)	NS	ND(10)	NS	NS	NA
Dibenzo(a,h)anthracene	ND(10)	NS	ND(10)	NS	NS	NA
Benzo(g,h,i)perylene	ND(10)	NS	ND(10)	NS	NS	NA

Notes:

1. NA = Not analyzed
2. ND = Not detected above detection limit listed in parentheses.
3. NS = Not sampled
4. J = Estimated concentration
5. Results reported in micrograms per liter.
6. (1) = Cannot be separated from Diphenylamine.

TABLE 2-47
RETENTION POND SURFACE WATER ANALYTICAL RESULTS
TARGET ANALYTE LIST INORGANICS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SW-PW1			DSI-SW-PW3			DSI-SW-PW4	
DATE SAMPLED:	22-Oct-92		Aug-93	22-Oct-92		Aug-93	Oct-92	Aug-93
TOTAL METALS								
METHOD: CLP TAL								
Aluminum	3060		NS	ND(179.0)		NS	NS	NS
Antimony	ND(2.0)	J	NS	ND(2.0)	J	NS	NS	NS
Arsenic	3.2	J	NS	ND(2.0)		NS	NS	NS
Barium	35		NS	21.3		NS	NS	NS
Beryllium	ND(1.0)		NS	ND(1.0)		NS	NS	NS
Cadmium	0.56		NS	ND(0.10)		NS	NS	NS
Calcium	38500		NS	24200		NS	NS	NS
Chromium	6.4	J	NS	ND(4.0)		NS	NS	NS
Cobalt	4.3		NS	ND(4.0)		NS	NS	NS
Copper	24.8		NS	ND(4.0)		NS	NS	NS
Iron	5640		NS	805		NS	NS	NS
Lead	22.2	J	NS	ND(1.0)	J	NS	NS	NS
Magnesium	7560		NS	2970		NS	NS	NS
Manganese	304		NS	465		NS	NS	NS
Mercury	ND(0.10)		NS	ND(0.10)		NS	NS	NS
Nickel	10.8	J	NS	ND(8.0)		NS	NS	NS
Potassium	9150		NS	4650		NS	NS	NS
Selenium	ND(2.0)		NS	ND(2.0)		NS	NS	NS
Silver	ND(4.0)		NS	ND(4.0)		NS	NS	NS
Sodium	22100		NS	5570		NS	NS	NS
Thallium	ND(3.0)	J	NS	ND(3.0)	J	NS	NS	NS
Vanadium	24.2		NS	ND(4.0)		NS	NS	NS
Zinc	69.5		NS	ND(6.0)		NS	NS	NS
Cyanide	ND(10.0)		NS	ND(10.0)		NS	NS	NS

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. J = Estimated concentration
4. ND = Not detected above detection limit
5. Results reported in micrograms per liter.
6. TAL = Target Analyte List
7. Surface water samples were not collected from the retention ponds during August 1993.

TABLE 2-48
SURFACE WATER ANALYTICAL RESULTS
TOTAL ORGANIC CARBON
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE LOCATION	TOTAL ORGANIC CARBON Oct-92	Aug-93
DSI-SW-SW2	1,200 J	NS
DSI-SW-SW6	1,200 J	NA
DSI-SW-SW7 *	1,100 J	NS
DSI-SW-RW2	ND(1,000) J	NA
DSI-SW-RW3	ND(1,000) J	NA

* DSI-SW-SW7 is a duplicate sample of DSI-SW-SW6.

Notes:

1. Results reported as milligrams of carbon per kilogram of sample.
2. Samples were analyzed using the Loyd Kahn Method.
3. ND = Not detected above detection limit listed in parentheses.
4. J = Estimated due to holding time exceedance.
5. Laboratory reports for analyses are presented in Appendix C.
6. NS = Not sampled
7. NA = Not analyzed
8. Surface water samples were not analyzed for TOC during August 1993.

TABLE 2-53
SEDIMENT QA/QC SAMPLING SUMMARY
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

QA/QC SAMPLE DESIGNATION	DATE	LOCATION OF MATRIX SPIKE/ MATRIX SPIKE DUPLICATE	LOCATION OF DUPLICATE	LOCATION OF FIELD BLANK	TCL VOCs Method 524.2	TCL VOCs CLP	TCL SVOCs CLP	TAL METALS	CYANIDE	TOC	HARDNESS
DSI-SD-SS7	Oct-92	-	DSI-SD-SS6	-	NA	X	X	X	X	X	NA
DSI-SD-QS1	Aug-93	-	DSI-SD-SS3/4	-	NA	X	NA	X	X	NA	NA
FB-1	Oct-92	-	-	DSI-SD-SS6	X	NA	X	X	X	NA	NA
FB-2	Oct-92	-	-	DSI-SD-RS3C	X	NA	X	X	X	NA	NA
FB-3	Oct-92	-	-	DSI-SD-SS9	X	NA	X	X	X	NA	NA
FB-5	Oct-92	-	-	DSI-SD-SS8	X	NA	X	X	X	NA	NA
FB-9	Oct-92	-	-	DSI-SD-PS2	X	NA	X	X	X	NA	X
DSI-QA-EQ1	Aug-93	-	-	DSI-SD-SS2	X	NA	NA	X	X	NA	NA
DSI-QA-EQ2	Aug-93	-	-	DSI-SD-SS8	NA	X	NA	X	X	NA	NA
DSI-QA-EQ5	Aug-93	-	-	DSI-SD-RS3	NA	NA	NA	X	X	NA	NA
DSI-SD-PS3A(MS/MSD)	Oct-92	DSI-SD-PS3A	-	-	NA	X	X	X	X	X	NA
DSI-SD-SS9(MS/MSD)	Aug-93	DSI-SD-SS9	-	-	NA	NA	NA	X	X	NA	NA

NOTES:

1. QA/QC = Quality Assurance/Quality Control
2. X = QA/QC sample collected
3. - = QA/QC sample not collected
4. NA = Not analyzed
5. TCL VOCs = Target Compound List Volatile Organic Compounds
6. TCL SVOCs = Target Compound List Semi-volatile Organic Compounds
7. TAL metals = Target Analyte List
8. One trip blank sample was submitted with each shipment for VOC analysis
9. TOC = Total Organic Carbon
10. CLP = Contract Laboratory Program

TABLE 2-54
SEEP SEDIMENT ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-SS1		DSI-SD-SS2		DSI-SD-SS3/4		DSI-SD-QS1 *	
DATE SAMPLED:	16-Oct-92	Aug-93	13-Oct-92	23-Aug-93	13-Oct-92	23-Aug-93	Oct-92	23-Aug-93
VOLATILE ORGANICS METHOD: 8240								
Chloromethane	ND(12)	NS	ND(13) R	ND(12)	ND(16) R	ND(12)	NS	ND(14)
Bromomethane	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
Vinyl Chloride	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
Chloroethane	ND(12)	NS	ND(13)	ND(12)	12 J	ND(12)	NS	ND(14)
Methylene Chloride	ND (12)	NS	ND(13) R	ND(12)	ND(16) R	ND(12)	NS	ND(14)
Acetone	5 J	NS	ND(13) R	ND(12)	210 J	ND(12)	NS	ND(14)
Carbon Disulfide	ND(12)	NS	ND(13) R	ND(12)	ND(16) R	ND(12)	NS	ND(14)
1,1-Dichloroethene	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
1,1-Dichloroethane	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
1,2-Dichloroethene (total)	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
Chloroform	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
1,2-Dichloroethane	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
2-Butanone	ND(12)	NS	ND(13) R	ND(12)	46 J	ND(12)	NS	ND(14)
1,1,1-Trichloroethane	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
Carbon Tetrachloride	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
Bromodichloromethane	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
1,2-Dichloropropane	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
cis-1,3-Dichloropropene	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
Trichloroethene	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
Dibromochloromethane	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
1,1,2-Trichloroethane	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
Benzene	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
trans-1,3-Dichloropropene	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
Bromoform	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
4-Methyl-2-Pentanone	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
2-Hexanone	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
Tetrachloroethene	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
1,1,2,2-Tetrachloroethane	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
Toluene	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
Chlorobenzene	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
Ethylbenzene	ND(12)	NS	ND(13)	ND(12)	9 J	ND(12)	NS	ND(14)
Styrene	ND(12)	NS	ND(13)	ND(12)	ND(16)	ND(12)	NS	ND(14)
Xylene (total)	ND(12)	NS	ND(13)	ND(12)	90	ND(12)	NS	ND(14)

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. * DSI-SD-QS1 is a duplicate of DSI-SD-SS3/4.
   DSI-SD-SS7 is a duplicate of DSI-SD-SS6.
4. ND = Not detected above detection limit
   listed in parentheses.
5. J = Estimated concentration
6. R = Rejected as a result of data validation.
7. Results reported in micrograms per kilogram.

TABLE 2-54
SEEP SEDIMENT ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-SS5		DSI-SD-SS6		DSI-SD-SS7 *		DSI-SD-SS8	
DATE SAMPLED:	16-Oct-92	Aug-93	14-Oct-92	23-Aug-93	14-Oct-92	Aug-93	16-Oct-92	Aug-93
VOLATILE ORGANICS								
METHOD: 8240								
Chloromethane	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
Bromomethane	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
Vinyl Chloride	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
Chloroethane	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
Methylene Chloride	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
Acetone	4 J	NS	ND(38) J	ND(14)	160 J	NS	ND(13)	NA
Carbon Disulfide	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
1,1-Dichloroethene	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
1,1-Dichloroethane	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
1,2-Dichloroethene (total)	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
Chloroform	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
1,2-Dichloroethane	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
2-Butanone	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
1,1,1-Trichloroethane	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
Carbon Tetrachloride	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
Bromodichloromethane	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
1,2-Dichloropropane	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
cis-1,3-Dichloropropene	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
Trichloroethene	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
Dibromochloromethane	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
1,1,2-Trichloroethane	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
Benzene	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
trans-1,3-Dichloropropene	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
Bromoform	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
4-Methyl-2-Pentanone	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
2-Hexanone	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
Tetrachloroethene	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
1,1,2,2-Tetrachloroethane	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
Toluene	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
Chlorobenzene	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
Ethylbenzene	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
Styrene	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA
Xylene (total)	ND(14)	NS	ND(18)	ND(14)	ND(21)	NS	ND(13)	NA

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. * DSI-SD-QS1 is a duplicate of DSI-SD-SS3/4.
   DSI-SD-SS7 is a duplicate of DSI-SD-SS6.
4. ND = Not detected above detection limit
   listed in parentheses.
5. J = Estimated concentration
6. R = Rejected as a result of data validation.
7. Results reported in micrograms per kilogram.

TABLE 2-54
SEEP SEDIMENT ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-SS9		DSI-SD-SS30		DSI-SD-SS31	
DATE SAMPLED:	15-Oct-92	Aug-93	14-Oct-92	Aug-93	15-Oct-92	Aug-93
VOLATILE ORGANICS METHOD: 8240						
Chloromethane	ND(13)	NA	ND(12)	NS	ND(13)	NS
Bromomethane	ND(13)	NA	ND(12)	NS	ND(13)	NS
Vinyl Chloride	ND(13)	NA	ND(12)	NS	ND(13)	NS
Chloroethane	ND(13)	NA	ND(12)	NS	ND(13)	NS
Methylene Chloride	ND(13)	NA	ND(12)	NS	ND(13)	NS
Acetone	ND(13)	NA	ND(12)	NS	ND(13)	NS
Carbon Disulfide	ND(13)	NA	ND(12)	NS	ND(13)	NS
1,1-Dichloroethene	ND(13)	NA	ND(12)	NS	ND(13)	NS
1,1-Dichloroethane	ND(13)	NA	ND(12)	NS	ND(13)	NS
1,2-Dichloroethene (total)	ND(13)	NA	ND(12)	NS	ND(13)	NS
Chloroform	ND(13)	NA	ND(12)	NS	ND(13)	NS
1,2-Dichloroethane	ND(13)	NA	ND(12)	NS	ND(13)	NS
2-Butanone	ND(13)	NA	ND(12)	NS	ND(13)	NS
1,1,1-Trichloroethane	ND(13)	NA	ND(12)	NS	ND(13)	NS
Carbon Tetrachloride	ND(13)	NA	ND(12)	NS	ND(13)	NS
Bromodichloromethane	ND(13)	NA	ND(12)	NS	ND(13)	NS
1,2-Dichloropropane	ND(13)	NA	ND(12)	NS	ND(13)	NS
cis-1,3-Dichloropropene	ND(13)	NA	ND(12)	NS	ND(13)	NS
Trichloroethene	ND(13)	NA	ND(12)	NS	ND(13)	NS
Dibromochloromethane	ND(13)	NA	ND(12)	NS	ND(13)	NS
1,1,2-Trichloroethane	ND(13)	NA	ND(12)	NS	ND(13)	NS
Benzene	ND(13)	NA	ND(12)	NS	ND(13)	NS
trans-1,3-Dichloropropene	ND(13)	NA	ND(12)	NS	ND(13)	NS
Bromoform	ND(13)	NA	ND(12)	NS	ND(13)	NS
4-Methyl-2-Pentanone	ND(13)	NA	ND(12)	NS	ND(13)	NS
2-Hexanone	ND(13)	NA	ND(12)	NS	ND(13)	NS
Tetrachloroethene	ND(13)	NA	ND(12)	NS	ND(13)	NS
1,1,2,2-Tetrachloroethane	ND(13)	NA	ND(12)	NS	ND(13)	NS
Toluene	ND(13)	NA	ND(12)	NS	ND(13)	NS
Chlorobenzene	ND(13)	NA	ND(12)	NS	ND(13)	NS
Ethylbenzene	ND(13)	NA	ND(12)	NS	ND(13)	NS
Styrene	ND(13)	NA	ND(12)	NS	ND(13)	NS
Xylene (total)	ND(13)	NA	ND(12)	NS	ND(13)	NS

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. * DSI-SD-QS1 is a duplicate of DSI-SD-SS3/4.
   DSI-SD-SS7 is a duplicate of DSI-SD-SS6.
4. ND = Not detected above detection limit
   listed in parentheses.
5. J = Estimated concentration
6. R = Rejected as a result of data validation.
7. Results reported in micrograms per kilogram.

TABLE 2-54
SEEP SEDIMENT ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-SS32		DSI-SD-SS33		DSI-SD-SS34			
DATE SAMPLED:	15-Oct-92	Aug-93	15-Oct-92	Aug-93	15-Oct-92		Aug-93	
VOLATILE ORGANICS METHOD: 8240								
Chloromethane	ND(13)	NS	ND(13)	NS	ND(14)		NS	
Bromomethane	ND(13)	NS	ND(13)	NS	ND(14)		NS	
Vinyl Chloride	ND(13)	NS	ND(13)	NS	ND(14)		NS	
Chloroethane	ND(13)	NS	ND(13)	NS	ND(14)		NS	
Methylene Chloride	ND(13)	NS	ND(13)	NS	ND(14)		NS	
Acetone	ND(13)	NS	ND(13)	NS	9	J	NS	
Carbon Disulfide	ND(13)	NS	ND(13)	NS	ND(14)		NS	
1,1-Dichloroethene	ND(13)	NS	ND(13)	NS	ND(14)		NS	
1,1-Dichloroethane	ND(13)	NS	ND(13)	NS	ND(14)		NS	
1,2-Dichloroethene (total)	ND(13)	NS	ND(13)	NS	ND(14)		NS	
Chloroform	ND(13)	NS	ND(13)	NS	ND(14)		NS	
1,2-Dichloroethane	ND(13)	NS	ND(13)	NS	ND(14)		NS	
2-Butanone	ND(13)	NS	ND(13)	NS	ND(14)		NS	
1,1,1-Trichloroethane	ND(13)	NS	ND(13)	NS	ND(14)		NS	
Carbon Tetrachloride	ND(13)	NS	ND(13)	NS	ND(14)		NS	
Bromodichloromethane	ND(13)	NS	ND(13)	NS	ND(14)		NS	
1,2-Dichloropropane	ND(13)	NS	ND(13)	NS	ND(14)		NS	
cis-1,3-Dichloropropene	ND(13)	NS	ND(13)	NS	ND(14)		NS	
Trichloroethene	ND(13)	NS	ND(13)	NS	ND(14)		NS	
Dibromochloromethane	ND(13)	NS	ND(13)	NS	ND(14)		NS	
1,1,2-Trichloroethane	ND(13)	NS	ND(13)	NS	ND(14)		NS	
Benzene	ND(13)	NS	ND(13)	NS	ND(14)		NS	
trans-1,3-Dichloropropene	ND(13)	NS	ND(13)	NS	ND(14)		NS	
Bromoform	ND(13)	NS	ND(13)	NS	ND(14)		NS	
4-Methyl-2-Pentanone	ND(13)	NS	ND(13)	NS	ND(14)		NS	
2-Hexanone	ND(13)	NS	ND(13)	NS	ND(14)		NS	
Tetrachloroethene	ND(13)	NS	ND(13)	NS	ND(14)		NS	
1,1,2,2-Tetrachloroethane	ND(13)	NS	ND(13)	NS	ND(14)		NS	
Toluene	ND(13)	NS	ND(13)	NS	ND(14)		NS	
Chlorobenzene	ND(13)	NS	ND(13)	NS	ND(14)		NS	
Ethylbenzene	ND(13)	NS	ND(13)	NS	ND(14)		NS	
Styrene	ND(13)	NS	ND(13)	NS	ND(14)		NS	
Xylene (total)	ND(13)	NS	ND(13)	NS	ND(14)		NS	

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. * DSI-SD-QS1 is a duplicate of DSI-SD-SS3/4.
   DSI-SD-SS7 is a duplicate of DSI-SD-SS6.
4. ND = Not detected above detection limit
   listed in parentheses.
5. J = Estimated concentration
6. R = Rejected as a result of data validation.
7. Results reported in micrograms per kilogram.

TABLE 2-55
SEEP SEDIMENT ANALYTICAL RESULTS
SEMI-VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-SS1		DSI-SD-SS3		DSI-SD-SS2/4		DSI-SD-SS5		DSI-SD-SS6	
DATE SAMPLED:	18-Oct-92	Aug-93	13-Oct-92	Aug-93	13-Oct-92	Aug-93	16-Oct-92	Aug-93	14-Oct-92	Aug-93
SEMI-VOLATILE ORGANICS METHOD: 8270										
Phenol	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
bis(2-Chloroethyl) Ether	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
2-Chlorophenol	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
1,3-Dichlorobenzene	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
1,4-Dichlorobenzene	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
1,2-Dichlorobenzene	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
2-Methylphenol	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
2,2'-oxybis(1-Chloropropane)	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
4-Methylphenol	ND(400) J	NS	ND(420)	NA	59 J	NA	ND(440) J	NS	ND(450) J	NA
N-Nitroso-Di-n-propylamine	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
Hexachloroethane	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
Nitrobenzene	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
Isophorone	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
2-Nitrophenol	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
2,4-Dimethylphenol	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
bis(2-Chloroethoxy)Methane	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
2,4,-Dichlorophenol	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
1,2,4-Trichlorobenzene	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
Naphthalene	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
4-Chloroaniline	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
Hexachlorobutadiene	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
4-Chloro-3-Methylphenol	ND(400) J	NS	ND(420)	NA	58 J	NA	ND(440) J	NS	ND(450) J	NA
2- Methylnaphthalene	ND(400) J	NS	ND(420)	NA	460 J	NA	ND(440) J	NS	ND(450) J	NA
Hexachlorocyclopentadiene	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
2,4,6-Trichlorophenol	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
2,4,5-Trichlorophenol	ND(970) J	NS	ND(1000)	NA	ND(1100)	NA	ND(1067) J	NS	ND(1200) J	NA
2-Chloronaphthalene	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
2-Nitroaniline	ND(980) J	NS	ND(1000)	NA	ND(1100)	NA	ND(1067) J	NS	ND(1200) J	NA
Dimethyl Phthalate	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
Acenaphthylene	ND(400) J	NS	83 J	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
2,6-Dinitrotoluene	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
3-Nitroaniline	ND(970) J	NS	ND(1000) J	NA	ND(1100) J	NA	ND(1067) J	NS	ND(1200) J	NA
Acenaphthene	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
2,4-Dinitrophenol	ND(970) J	NS	ND(1000)	NA	ND(1100)	NA	ND(1067) J	NS	ND(1200) J	NA
4-Nitrophenol	ND(970) J	NS	ND(1000)	NA	ND(1100)	NA	ND(1067) J	NS	ND(1200) J	NA
Dibenzofuran	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
2,4-Dinitrotoluene	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
Diethylphthalate	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
4-Chlorophenyl-phenylether	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
Fluorene	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
4-Nitroaniline	ND(970) J	NS	ND(1000) J	NA	ND(1100) J	NA	ND(1067) J	NS	ND(1200) J	NA
4,6-Dinitro-2-Methylphenol	ND(970) J	NS	ND(1000)	NA	ND(1100)	NA	ND(1067) J	NS	ND(1200) J	NA
n-Nitrosodiphenylamine (1)	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
4-Bromophenyl-phenylether	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
Hexachlorobenzene	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
Pentachlorophenol	ND(970) J	NS	ND(1000)	NA	ND(1100)	NA	ND(1067) J	NS	ND(1200) J	NA
Phenanthrene	ND(400) J	NS	280 J	NA	130 J	NA	ND(440) J	NS	ND(450) J	NA
Anthracene	ND(400) J	NS	75 J	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
Carbazole	ND(400) J	NS	ND(420) J	NA	ND(460) J	NA	ND(440) J	NS	ND(450) J	NA
Di-n-butylphthalate	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
Fluoranthene	ND(400) J	NS	710	NA	220 J	NA	ND(440) J	NS	ND(450) J	NA
Pyrene	ND(400) J	NS	650	NA	220 J	NA	ND(440) J	NS	ND(450) J	NA
Butylbenzylphthalate	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
3,3'-Dichlorobenzidine	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
Benzo(a)anthracene	ND(400) J	NS	320 J	NA	74 J	NA	ND(440) J	NS	ND(450) J	NA
Chrysene	ND(400) J	NS	350 J	NA	110 J	NA	ND(440) J	NS	ND(450) J	NA
Bis(2-ethylhexyl)phthalate	ND(210) J	NS	ND(220)	NA	ND(240)	NA	ND(230) J	NS	410 J	NA
Di-n-octyl Phthalate	ND(400) J	NS	ND(420)	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
Benzo(b)fluoranthene	ND(400) J	NS	440	NA	140 J	NA	ND(440) J	NS	ND(450) J	NA
Benzo(k)fluoranthene	ND(400) J	NS	140 J	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
Benzo(a)pyrene	ND(400) J	NS	270 J	NA	74 J	NA	ND(440) J	NS	ND(450) J	NA
Indeno(1,2,3-cd)pyrene	ND(400) J	NS	120 J	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
Dibenz(a,h)anthracene	ND(400) J	NS	43 J	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA
Benzo(g,h,i)perylene	ND(400) J	NS	76 J	NA	ND(460)	NA	ND(440) J	NS	ND(450) J	NA

Notes:

1. ND = Not Detected above detection limit listed in parentheses.
2. NS = Not sampled
3. NA = Not analyzed
4. * DSI-SD-SS7 is a duplicate of DSI-SD-SS6.
5. J = Estimated concentration.
6. Results reported in micrograms per kilogram.
7. (1) = Cannot be separated from Diphenylamine.

TABLE 2-55
SEEP SEDIMENT ANALYTICAL RESULTS
SEMI-VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-SS7		DSI-SD-SS6		DSI-SD-SS9		DSI-SD-SS10		DSI-SD-SS11	
DATE SAMPLED:	14-Oct-92	Aug-93	16-Oct-92	Aug-93	15-Oct-92	Aug-93	14-Oct-92	Aug-93	15-Oct-92	Aug-93
SEMI-VOLATILE ORGANICS METHOD: 8270										
Phenol	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
bis(2-Chloroethyl) Ether	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
2-Chlorophenol	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
1,3-Dichlorobenzene	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
1,4-Dichlorobenzene	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
1,2-Dichlorobenzene	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
2-Methylphenol	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
2,2'-oxybis(1-Chloropropane)	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
4-Methylphenol	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
N-Nitroso-Di-n-propylamine	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
Hexachloroethane	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
Nitrobenzene	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
Isophorone	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
2-Nitrophenol	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
2,4-Dimethylphenol	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
bis(2-Chloroethoxy)Methane	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
2,4-Dichlorophenol	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
1,2,4-Trichlorobenzene	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
Naphthalene	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
4-Chloroaniline	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
Hexachlorobutadiene	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
4-Chloro-3-Methylphenol	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
2- Methylnaphthalene	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
Hexachlorocyclopentadiene	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
2,4,6-Trichlorophenol	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
2,4,5-Trichlorophenol	ND(1200)	NS	ND(920) J	NA	ND(950) J	NA	ND(1100)	NS	ND(920) J	NS
2-Chloronaphthalene	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
2-Nitroaniline	ND(1200)	NS	ND(920) J	NA	ND(950) J	NA	ND(1100)	NS	ND(920) J	NS
Dimethyl Phthalate	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
Acenaphthylene	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
2,6-Dinitrotoluene	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
3-Nitroaniline	ND(1200)	NS	ND(920) J	NA	ND(950) J	NA	ND(1100)	NS	ND(920) J	NS
Acenaphthene	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
2,4-Dinitrophenol	ND(1200)	NS	ND(920) J	NA	ND(950) J	NA	ND(1100)	NS	ND(920) J	NS
4-Nitrophenol	ND(1200)	NS	ND(920) J	NA	ND(950) J	NA	ND(1100)	NS	ND(920) J	NS
Dibenzofuran	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
2,4-Dinitrotoluene	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
Diethylphthalate	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
4-Chlorophenyl-phenylether	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
Fluorene	59 J	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
4-Nitroaniline	ND(1200)	NS	ND(920) J	NA	ND(950) J	NA	ND(1100)	NS	ND(920) J	NS
4,6-Dinitro-2-Methylphenol	ND(1200)	NS	ND(920) J	NA	ND(950) J	NA	ND(1100)	NS	ND(920) J	NS
n-Nitrosodiphenylamine (1)	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
4-Bromophenyl-phenylether	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
Hexachlorobenzene	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
Pentachlorophenol	ND(1200)	NS	ND(920) J	NA	ND(950) J	NA	ND(1100)	NS	ND(920) J	NS
Phenanthrene	800 J	NS	ND(380) J	NA	ND(390) J	NA	300 J	NS	ND(380) J	NS
Anthracene	160 J	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
Carbazole	99 J	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
Di-n-butylphthalate	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
Fluoranthene	750 J	NS	ND(380) J	NA	ND(390) J	NA	370 J	NS	ND(380) J	NS
Pyrene	660 J	NS	ND(380) J	NA	ND(390) J	NA	410 J	NS	ND(380) J	NS
Butylbenzylphthalate	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
3,3'-Dichlorobenzidine	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
Benzo(a)anthracene	230 J	NS	ND(380) J	NA	ND(390) J	NA	160 J	NS	ND(380) J	NS
Chrysene	240 J	NS	ND(380) J	NA	ND(390) J	NA	220 J	NS	ND(380) J	NS
Bis(2-ethylhexyl)phthalate	68 J	NS	ND(200) J	NA	ND(200) J	NA	120 J	NS	ND(200) J	NS
Di-n-octyl Phthalate	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
Benzo(b)fluoranthene	200 J	NS	ND(380) J	NA	ND(390) J	NA	270 J	NS	ND(380) J	NS
Benzo(k)fluoranthene	87 J	NS	ND(380) J	NA	ND(390) J	NA	100 J	NS	ND(380) J	NS
Benzo(a)pyrene	130 J	NS	ND(380) J	NA	ND(390) J	NA	170 J	NS	ND(380) J	NS
Indeno(1,2,3-cd)pyrene	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	93 J	NS	ND(380) J	NS
Dibenz(a,h)anthracene	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	ND(440)	NS	ND(380) J	NS
Benzo(g,h,i)perylene	ND(510)	NS	ND(380) J	NA	ND(390) J	NA	85 J	NS	ND(380) J	NS

Notes:

1. ND = Not Detected above detection limit listed in parentheses.
2. NS = Not sampled
3. NA = Not analyzed
4. * DSI-SD-SS7 is a duplicate of DSI-SD-SS6.
5. J = Estimated concentration.
6. Results reported in micrograms per kilogram.
7. (1) = Cannot be separated from Diphenylamine.

TABLE 2-55
SEEP SEDIMENT ANALYTICAL RESULTS
SEMI-VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-SS32			DSI-SD-SS33			DSI-SD-SS34		
DATE SAMPLED:	15-Oct-92		Aug-93	15-Oct-92		Aug-93	15-Oct-92		Aug-93
SEMI-VOLATILE ORGANICS METHOD: 8270									
Phenol	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
bis(2-Chloroethyl) Ether	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
2-Chlorophenol	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
1,3-Dichlorobenzene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
1,4-Dichlorobenzene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
1,2-Dichlorobenzene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
2-Methylphenol	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
2,2'-oxybis(1-Chloropropane)	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
4-Methylphenol	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
N-Nitroso-Di-n-propylamine	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Hexachloroethane	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Nitrobenzene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Isophorone	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
2-Nitrophenol	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
2,4-Dimethylphenol	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
bis(2-Chloroethoxy)Methane	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
2,4,-Dichlorophenol	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
1,2,4-Trichlorobenzene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Naphthalene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
4-Chloroaniline	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Hexachlorobutadiene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
4-Chloro-3-Methylphenol	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
2- Methylnaphthalene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Hexachlorocyclopentadiene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
2,4,6-Trichlorophenol	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
2,4,5-Trichlorophenol	ND(920)	J	NS	ND(1000)	J	NS	ND(920)	J	NS
2-Chloronaphthalene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
2-Nitroaniline	ND(920)	J	NS	ND(1000)	J	NS	ND(920)	J	NS
Dimethyl Phthalate	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Acenaphthylene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
2,6-Dinitrotoluene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
3-Nitroaniline	ND(920)	J	NS	ND(1000)	J	NS	ND(920)	J	NS
Acenaphthene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
2,4-Dinitrophenol	ND(920)	J	NS	ND(1000)	J	NS	ND(920)	J	NS
4-Nitrophenol	ND(920)	J	NS	ND(1030)	J	NS	ND(920)	J	NS
Dibenzofuran	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
2,4-Dinitrotoluene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Diethylphthalate	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
4-Chlorophenyl-phenylether	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Fluorene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
4-Nitroaniline	ND(920)	J	NS	ND(1000)	J	NS	ND(920)	J	NS
4,6-Dinitro-2-Methylphenol	ND(920)	J	NS	ND(1000)	J	NS	ND(920)	J	NS
n-Nitrosodiphenylamine (1)	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
4-Bromophenyl-phenylether	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Hexachlorobenzene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Pentachlorophenol	ND(920)	J	NS	ND(1000)	J	NS	ND(920)	J	NS
Phenanthrene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Anthracene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Carbazole	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Di-n-butylphthalate	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Fluoranthene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Pyrene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Butylbenzylphthalate	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
3,3'-Dichlorobenzidine	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Benzo(a)anthracene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Chrysene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Bis(2-ethylhexyl)phthalate	ND(200)	J	NS	ND(220)	J	NS	ND(200)	J	NS
Di-n-octyl Phthalate	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Benzo(b)fluoranthene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Benzo(k)fluoranthene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Benzo(a)pyrene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Indeno(1,2,3-cd)pyrene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Dibenz(a,h)anthracene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS
Benzo(g,h,i)perylene	ND(380)	J	NS	ND(420)	J	NS	ND(390)	J	NS

Notes:

1. ND = Not Detected above detection limit listed in parentheses.
2. NS = Not sampled
3. NA = Not analysed
4. * DSI-SD-SS7 is a duplicate of DSI-SD-SS6.
5. J = Estimated concentration.
6. Results reported in micrograms per kilogram.
7. (1) = Cannot be separated from Diphenylamine.

TABLE 2-56
SEEP SEDIMENT ANALYTICAL RESULTS
TARGET ANALYTE LIST INORGANICS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-SS1		DSI-SD-SS2		DSI-SD-SS3/4		DSI-SD-QS1	
DATE SAMPLED:	16-Oct-92	Aug-93	13-Oct-92	23-Aug-93	13-Oct-92	23-Aug-93	Oct-92	23-Aug-93
TOTAL METALS								
METHOD: CLP Target Analyte List								
Aluminum	ND(6670)	NS	2860	8560	3140	31900	NS	33500
Antimony	ND(5.2)	NS	ND(4.90) R	1.2 R	ND(5.70) R	1.3 R	NS	1.4 R
Arsenic	2.2 J	NS	2.2	9.8 J	3.3	8.2 J	NS	15.0 J
Barium	15.6	NS	161	576 J	331	551 J	NS	548 J
Beryllium	ND(0.26)	NS	ND(0.25)	ND(0.73)	0.43	ND(0.77)	NS	ND(0.84)
Cadmium	ND(0.79)	NS	ND(0.74)	0.85 J	ND(0.85)	0.37 J	NS	0.75 J
Calcium	2460	NS	2340	15200 J	44200	53900 J	NS	49600 J
Chromium	11.1	NS	4.7	ND(2.4)	4.2	52.9	NS	55.2
Cobalt	8.4	NS	4.4	8.6 J	10.0	39.5 J	NS	42.3 J
Copper	16.7	NS	10.1	ND(1.2) J	11.6	ND(1.3) J	NS	ND(1.4) J
Iron	17600	NS	88400	389000	92200	149000	NS	158000
Lead	3.8	NS	10.2	41.6	10.8	100	NS	102
Magnesium	3370	NS	1800	6850	2250	18400	NS	19200
Manganese	227	NS	194	1040 J	2450	3100 J	NS	3200 J
Mercury	ND(0.07)	NS	ND(0.06)	ND(0.12)	ND(0.07)	ND(0.12)	NS	ND(0.14)
Nickel	14.7	NS	6.8	ND(7.3)	10	63.0 J	NS	69.3 J
Potassium	676	NS	443	1390	645	5450	NS	5710
Selenium	ND(0.52)	NS	ND(0.49)	ND(0.73) J	ND(0.57)	ND(0.75) J	NS	ND(0.84) J
Silver	ND(1.0)	NS	ND(0.98)	ND(0.05)	ND(1.10)	ND(0.05)	NS	ND(0.06)
Sodium	ND(102.0)	NS	ND(40.20)	374	ND(422.00)	765	NS	679
Thallium	ND(0.79)	NS	ND(0.74)	ND(0.73)	ND(0.85)	ND(0.75)	NS	ND(0.84)
Vanadium	15.4	NS	7.3	ND(4.9)	7.4	69.2	NS	59.0
Zinc	ND(35.7)	NS	216	799 J	120	443 J	NS	421 J
Cyanide	ND(0.65)	NS	ND(0.61)	ND(1.1)	ND(0.71)	ND(1.2)	NS	ND(1.3)

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. DSI-SD-QS1 is a duplicate of DSI-SD-SS3/4. DSI-SD-SS7 is a duplicate of DSI-SD-SS6.
4. J = Estimated concentration
5. R = Rejected as a result of data validation.
6. ND = Not detected above detection limit listed in parentheses.
7. Results are reported in milligrams per kilogram.

TABLE 2-56
SEEP SEDIMENT ANALYTICAL RESULTS
TARGET ANALYTE LIST INORGANICS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-SS5		DSI-SD-SS6			DSI-SD-SS6A			DSI-SD-SS7	
DATE SAMPLED:	16-Oct-92	Aug-93	14-Oct-92	24-Aug-93		Oct-92	24-Aug-93		14-Oct-92	Aug-93
TOTAL METALS										
METHOD: CLP Target Analyte List										
Aluminum	6550	NS	14600	51000		NS	45200		12900	NS
Antimony	ND(5.2)	NS	ND(0.63)	1.4	R	NS	1.4	R	ND(6.6)	NS
Arsenic	3.2	NS	5.6	38.2	J	NS	14.2	J	5	NS
Barium	30.9	NS	96.5	494	J	NS	193	J	86.2	NS
Beryllium	ND(0.26)	NS	0.77	ND(0.8)		NS	ND(0.88)		0.66	NS
Cadmium	ND(0.77)	NS	ND(0.95)	2.6		NS	0.94	J	ND(1.0)	NS
Calcium	1350	NS	16300	124000	J	NS	24300	J	13200	NS
Chromium	10.5	NS	25.2	72.8		NS	75.5		20.4	NS
Cobalt	7.5	NS	16.7	66.5	J	NS	46.1	J	15.5	NS
Copper	15.1	NS	25.8	ND(1.3)	J	NS	ND(1.5)	J	23.8	NS
Iron	15600	NS	42000	192000		NS	93100		34700	NS
Lead	5.6	NS	9.1	62.8		NS	78.8		8.3	NS
Magnesium	3560	NS	8510	28300		NS	24100		7730	NS
Manganese	346	NS	1470	10500	J	NS	2470	J	1190	NS
Mercury	ND(0.06)	NS	ND(0.08)	ND(0.12)		NS	ND(0.13)		ND(0.08)	NS
Nickel	14	NS	28.5	162	J	NS	102	J	24.7	NS
Potassium	1010	NS	2130	7150		NS	5850		1860	NS
Selenium	ND(0.52)	NS	ND(0.63)	ND(0.82)		NS	ND(0.84)	J	ND(0.66)	NS
Silver	ND(1.0)	NS	ND(1.3)	ND(0.05)		NS	ND(0.06)		ND(1.3)	NS
Sodium	ND(27.6)	NS	460	1600		NS	649		494	NS
Thallium	ND(0.77)	NS	ND(0.95)	ND(0.82)		NS	ND(0.84)		ND(1.0)	NS
Vanadium	13.5	NS	30.2	96.4		NS	79.1		25.6	NS
Zinc	ND(40.7)	NS	289	1860	J	NS	278	J	260	NS
Cyanide	ND(0.66)	NS	ND(0.79)	ND(1.3)		NS	ND(1.4)		ND(0.83)	NS

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. DSI-SD-QS1 is a duplicate of DSI-SD-SS3/4. DSI-SD-SS7 is a duplicate of DSI-SD-SS6.
4. J = Estimated concentration
5. R = Rejected as a result of data validation.
6. ND = Not detected above detection limit listed in parentheses.
7. Results are reported in milligrams per kilogram.

TABLE 2-56
SEEP SEDIMENT ANALYTICAL RESULTS
TARGET ANALYTE LIST INORGANICS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-SS6		DSI-SD-SS9		DSI-SD-SS30		DSI-SD-SS31	
DATE SAMPLED:	16-Oct-92	24-Aug-93	15-Oct-92	24-Aug-93	14-Oct-92	Aug-93	15-Oct-92	Aug-93
TOTAL METALS								
METHOD: CLP Target Analyte List								
Aluminum	2850	20200	6150	30100	6170	NS	6280	NS
Antimony	ND(4.7)	1.4 R	ND(5.2)	1.2 R	ND(4.9)	NS	ND(4.9)	NS
Arsenic	1.3	12.1 J	1.8	14.0 J	2	NS	2.1	NS
Barium	8.8	173 J	20.2	177 J	44.1	NS	27.6	NS
Beryllium	ND(0.23)	ND(0.87)	ND(0.26)	ND(0.75)	0.44	NS	ND(0.25)	NS
Cadmium	ND(0.70)	1.1 J	ND(0.77)	0.27 J	ND(0.74)	NS	ND(0.74)	NS
Calcium	1090	9500 J	2080	20100 J	2270	NS	2120	NS
Chromium	4.6	34.7	10.4	47.6	14.8	NS	10.5	NS
Cobalt	6	38.5 J	7.4	36.2 J	7.9	NS	6.9	NS
Copper	7.5	ND(1.5) J	14.9	ND(1.3) J	17.6	NS	12.9	NS
Iron	10100	58500	14300	70000	16200	NS	13400	NS
Lead	3.2	41.4	4.9	34.7	23.8	NS	5.2	NS
Magnesium	1510	10700	3440	15500	4230	NS	3370	NS
Manganese	158	8270 J	274	2550 J	804	NS	346	NS
Mercury	ND(0.06)	ND(0.13)	ND(0.06)	ND(0.11)	ND(0.06)	NS	0.11	NS
Nickel	6.9	130 J	13.9	80.8 J	17.5	NS	12.2	NS
Potassium	ND(285.0)	2590	845	3970	951	NS	871	NS
Selenium	ND(0.47)	ND(0.83) J	ND(0.52)	ND(0.74) J	ND(0.49) J	NS	ND(0.49)	NS
Silver	ND(0.93)	ND(0.06)	ND(1.0)	ND(0.05)	ND(0.99)	NS	ND(0.98)	NS
Sodium	ND(30.7)	768	ND(98.7)	503	ND(64.6)	NS	ND(74.0)	NS
Thallium	ND(0.70)	ND(0.83)	ND(0.77)	ND(0.74)	ND(0.74)	NS	ND(0.74)	NS
Vanadium	7.3	43.7	13.2	63.8	16.8	NS	13.2	NS
Zinc	ND(17.1)	366 J	53.2	151 J	247	NS	ND(33.8)	NS
Cyanide	ND(0.58)	ND(1.3)	ND(0.65)	ND(1.2)	ND(0.62)	NS	ND(0.61)	NS

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. DSI-SD-QS1 is a duplicate of DSI-SD-SS3/4.
   DSI-SD-SS7 is a duplicate of DSI-SD-SS6.
4. J = Estimated concentration
5. R = Rejected as a result of data validation.
6. ND = Not detected above detection limit
   listed in parentheses.
7. Results are reported in milligrams per
   kilogram.

TABLE 2-56
SEEP SEDIMENT ANALYTICAL RESULTS
TARGET ANALYTE LIST INORGANICS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-SS32		DSI-SD-SS33		DSI-SD-SS34	
DATE SAMPLED:	15-Oct-92	Aug-93	15-Oct-92	Aug-93	15-Oct-92	Aug-93
TOTAL METALS						
METHOD: CLP Target Analyte List						
Aluminum	3270	NS	6330	NS	3750	NS
Antimony	ND(4.7)	NS	ND(5.0)	NS	ND(5.0)	NS
Arsenic	1.5	NS	1.7	NS	3.4	NS
Barium	13.9	NS	32.7	NS	17.4	NS
Beryllium	ND(0.24)	NS	ND(0.25)	NS	ND(0.25)	NS
Cadmium	ND(0.71)	NS	ND(0.75)	NS	ND(0.75)	NS
Calcium	1610	NS	3510	NS	2030	NS
Chromium	5.6	NS	10.7	NS	6.2	NS
Cobalt	3.9	NS	6.2	NS	4.8	NS
Copper	11.9	NS	12.2	NS	12.6	NS
Iron	8310	NS	14200	NS	11500	NS
Lead	3.2	NS	4.7	NS	3.3	NS
Magnesium	1770	NS	3440	NS	2040	NS
Manganese	247	NS	357	NS	148	NS
Mercury	ND(0.06)	NS	ND(0.06)	NS	ND(0.06)	NS
Nickel	8	NS	12.3	NS	9.3	NS
Potassium	ND(475.0)	NS	825	NS	ND(577.0)	NS
Selenium	ND(0.47)	NS	ND(0.50)	NS	ND(0.50) J	NS
Silver	ND(0.94)	NS	ND(1.0)	NS	ND(1.00)	NS
Sodium	ND(60.9)	NS	ND(58.9)	NS	ND(68.3)	NS
Thallium	ND(0.71)	NS	ND(0.75)	NS	ND(0.75)	NS
Vanadium	7.8	NS	13.3	NS	9.3	NS
Zinc	ND(29.3)	NS	ND(33.6)	NS	ND(37.9)	NS
Cyanide	ND(0.71)	NS	ND(0.63)	NS	ND(0.62)	NS

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. DSI-SD-QS1 is a duplicate of DSI-SD-SS3/4. DSI-SD-SS7 is a duplicate of DSI-SD-SS6.
4. J = Estimated concentration
5. R = Rejected as a result of data validation.
6. ND = Not detected above detection limit listed in parentheses.
7. Results are reported in milligrams per kilogram.

TABLE 2-57
CONNECTICUT RIVER SEDIMENT ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-RS1A		DSI-SD-RS1B		DSI-SD-RS1C		DSI-SD-RS2		DSI-SD-RS2A		DSI-SD-RS2B	
DATE SAMPLED:	14-Oct-92	Aug-93	14-Oct-92	Aug-93	14-Oct-92	Aug-93	Oct-92	Aug-93	14-Oct-92	Aug-93	14-Oct-92	Aug-93
VOLATILE ORGANICS METHOD: 8240												
Chloromethane	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
Bromomethane	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
Vinyl Chloride	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
Chloroethane	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
Methylene Chloride	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
Acetone	ND(41)	NS	66	NA	63	NS	NS	NA	ND(13)	NS	130	NS
Carbon Disulfide	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
1,1-Dichloroethene	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
1,1-Dichloroethane	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
1,2-Dichloroethene (total)	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
Chloroform	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
1,2-Dichloroethane	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
2-Butanone	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	29	NS
1,1,1-Trichloroethane	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
Carbon Tetrachloride	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
Bromodichloromethane	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
1,2-Dichloropropane	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
cis-1,3-Dichloropropene	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
Trichloroethene	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
Dibromochloromethane	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
1,1,2-Trichloroethane	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
Benzene	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
trans-1,3-Dichloropropene	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
Bromoform	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
4-Methyl-2-Pentanone	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
2-Hexanone	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
Tetrachloroethene	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
1,1,2,2-Tetrachloroethane	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
Toluene	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
Chlorobenzene	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
Ethylbenzene	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
Styrene	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS
Xylene (total)	ND(16)	NS	ND(15)	NA	ND(15)	NS	NS	NA	ND(13)	NS	ND(18)	NS

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. NA = Not analyzed
4. ND = Not detected above detection limit listed in parentheses.
5. J = Estimated concentration
6. Date reported in micrograms per kilogram.

TABLE 2-57
CONNECTICUT RIVER SEDIMENT ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-RS2C		DSI-SD-RS3A		DSI-SD-RS3B		DSI-SD-RS3C		DSI-SD-RS4	
DATE SAMPLED:	14-Oct-92	Aug-93	15-Oct-92	Aug-93	15-Oct-92	Aug-93	15-Oct-92	Aug-93	Oct-92	Aug-93
VOLATILE ORGANICS METHOD: 8240										
Chloromethane	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
Bromomethane	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
Vinyl Chloride	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
Chloroethane	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
Methylene Chloride	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
Acetone	75	NS	180	NS	47 J	NA	89 J	NS	NS	NA
Carbon Disulfide	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
1,1-Dichloroethene	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
1,1-Dichloroethane	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
1,2-Dichloroethene (total)	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
Chloroform	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
1,2-Dichloroethane	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
2-Butanone	19	NS	50	NS	12 J	NA	21 J	NS	NS	NA
1,1,1-Trichloroethane	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
Carbon Tetrachloride	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
Bromodichloromethane	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
1,2-Dichloropropane	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
cis-1,3-Dichloropropene	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
Trichloroethene	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
Dibromochloromethane	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
1,1,2-Trichloroethane	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
Benzene	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
trans-1,3-Dichloropropene	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
Bromoform	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
4-Methyl-2-Pentanone	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
2-Hexanone	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
Tetrachloroethene	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
1,1,2,2-Tetrachloroethane	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
Toluene	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
Chlorobenzene	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
Ethylbenzene	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
Styrene	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA
Xylene (total)	ND(15)	NS	ND(19)	NS	ND(17)	NA	ND(17)	NS	NS	NA

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. NA = Not analyzed
4. ND = Not detected above detection limit listed in parentheses.
5. J = Estimated concentration
6. Date reported in micrograms per kilogram.

TABLE 2-58
CONNECTICUT RIVER SEDIMENT ANALYTICAL RESULTS
SEMI-VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-RS1A		DSI-SD-RS1B		DSI-SD-RS1C		DSI-SD-RS2	
DATE SAMPLED:	14-Oct-92	Aug-93	14-Oct-92	Aug-93	14-Oct-92	Aug-93	Oct-92	Aug-93
TCL SEMI-VOLATILE ORGANICS METHOD: 8270								
Phenol	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
bis(2-Chloroethyl) Ether	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
2-Chlorophenol	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
1,3-Dichlorobenzene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
1,4-Dichlorobenzene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
1,2-Dichlorobenzene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
2-Methylphenol	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
2,2'-oxybis(1-Chloropropane)	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
4-Methylphenol	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
N-Nitroso-Di-n-propylamine	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Hexachloroethane	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Nitrobenzene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Isophorone	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
2-Nitrophenol	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
2,4-Dimethylphenol	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
bis(2-Chloroethoxy)Methane	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
2,4,-Dichlorophenol	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
1,2,4-Trichlorobenzene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Naphthalene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
4-Chloroaniline	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Hexachlorobutadiene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
4-Chloro-3-Methylphenol	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
2- Methylnaphthalene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Hexachlorocyclopentadiene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
2,4,6-Trichlorophenol	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
2,4,5-Trichlorophenol	ND(840)	NS	ND(840)	NA	ND(1100)	NS	NS	NA
2-Chloronaphthalene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
2-Nitroaniline	ND(840)	NS	ND(840)	NA	ND(1100)	NS	NS	NA
Dimethyl Phthalate	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Acenaphthylene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
2,6-Dinitrotoluene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
3-Nitroaniline	ND(840)	NS	ND(840)	NA	ND(1100)	NS	NS	NA
Acenaphthene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
2,4-Dinitrophenol	ND(840)	NS	ND(840) J	NA	ND(1100) J	NS	NS	NA
4-Nitrophenol	ND(840)	NS	ND(840)	NA	ND(1100)	NS	NS	NA
Dibenzofuran	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
2,4-Dinitrotoluene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Diethylphthalate	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
4-Chlorophenyl-phenylether	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Fluorene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
4-Nitroaniline	ND(840)	NS	ND(840)	NA	ND(1100)	NS	NS	NA
4,6-Dinitro-2-Methylphenol	ND(840)	NS	ND(840)	NA	ND(1100)	NS	NS	NA
n-Nitrosodiphenylamine (1)	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
4-Bromophenyl-phenylether	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Hexachlorobenzene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Pentachlorophenol	ND(840)	NS	ND(840)	NA	ND(1100)	NS	NS	NA
Phenanthrene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Anthracene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Carbazole	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Di-n-butylphthalate	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Fluoranthene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Pyrene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Butylbenzylphthalate	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
3,3'-Dichlorobenzidine	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Benzo(a)anthracene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Chrysene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Bis(2-ethylhexyl)phthalate	ND(350)	NS	36 J	NA	150 J	NS	NS	NA
Di-n-octyl Phthalate	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Benzo(b)fluoranthene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Benzo(k)fluoranthene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Benzo(a)pyrene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Indeno(1,2,3-cd)pyrene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Dibenz(a,h)anthracene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA
Benzo(g,h,i)perylene	ND(350)	NS	ND(350)	NA	ND(440)	NS	NS	NA

Notes:

1. NS = Not sampled
2. NA = Not analyzed
3. ND = Not detected above detection limit listed in parentheses.
4. J = Estimated concentration
5. Results reported in micrograms per kilogram.
6. (1) = Cannot be separated from Diphenylamine.

TABLE 2-58
CONNECTICUT RIVER SEDIMENT ANALYTICAL RESULTS
SEMI-VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-RS2A		DSI-SD-RS2B		DSI-SD-RS2C		DSI-SD-RS3A	
DATE SAMPLED:	14-Oct-92	Aug-93	14-Oct-92	Aug-93	14-Oct-92	Aug-93	15-Oct-92	Aug-93
TCL SEMI-VOLATILE ORGANICS METHOD: 8270								
Phenol	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
bis(2-Chloroethyl) Ether	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
2-Chlorophenol	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
1,3-Dichlorobenzene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
1,4-Dichlorobenzene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
1,2-Dichlorobenzene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
2-Methylphenol	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
2,2'-oxybis(1-Chloropropane)	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
4-Methylphenol	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
N-Nitroso-Di-n-propylamine	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Hexachloroethane	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Nitrobenzene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Isophorone	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
2-Nitrophenol	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
2,4-Dimethylphenol	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
bis(2-Chloroethoxy)Methane	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
2,4,-Dichlorophenol	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
1,2,4-Trichlorobenzene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Naphthalene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
4-Chloroaniline	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Hexachlorobutadiene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
4-Chloro-3-Methylphenol	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
2- Methylnaphthalene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Hexachlorocyclopentadiene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
2,4,6-Trichlorophenol	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
2,4,5-Trichlorophenol	ND(990)	NS	ND(1000)	NS	ND(1100) J	NS	ND(1300) J	NS
2-Chloronaphthalene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
2-Nitroaniline	ND(990)	NS	ND(1000)	NS	ND(1100) J	NS	ND(1300) J	NS
Dimethyl Phthalate	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Acenaphthylene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
2,6-Dinitrotoluene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
3-Nitroaniline	ND(990)	NS	ND(1000)	NS	ND(1100) J	NS	ND(1300) J	NS
Acenaphthene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
2,4-Dinitrophenol	ND(990)	NS	ND(1000)	NS	ND(1100) J	NS	ND(1300) J	NS
4-Nitrophenol	ND(990)	NS	ND(1000)	NS	ND(1100) J	NS	ND(1300) J	NS
Dibenzofuran	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
2,4-Dinitrotoluene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Diethylphthalate	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
4-Chlorophenyl-phenylether	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Fluorene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
4-Nitroaniline	ND(990)	NS	ND(1000)	NS	ND(1100) J	NS	ND(1300) J	NS
4,6-Dinitro-2-Methylphenol	ND(990)	NS	ND(1000)	NS	ND(1100) J	NS	ND(1300) J	NS
n-Nitrosodiphenylamine (1)	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
4-Bromophenyl-phenylether	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Hexachlorobenzene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Pentachlorophenol	ND(990)	NS	ND(1000)	NS	ND(1100) J	NS	ND(1300) J	NS
Phenanthrene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Anthracene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Carbazole	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Di-n-butylphthalate	ND(410)	NS	ND(430)	NS	150 J	NS	ND(560) J	NS
Fluoranthene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	71 J	NS
Pyrene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	57 J	NS
Butylbenzylphthalate	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
3,3'-Dichlorobenzidine	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Benzo(a)anthracene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Chrysene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Bis(2-ethylhexyl)phthalate	64 J	NS	66 J	NS	260 J	NS	ND(290) J	NS
Di-n-octyl Phthalate	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Benzo(b)fluoranthene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Benzo(k)fluoranthene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Benzo(a)pyrene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Indeno(1,2,3-cd)pyrene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Dibenz(a,h)anthracene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS
Benzo(g,h,i)perylene	ND(410)	NS	ND(430)	NS	ND(440) J	NS	ND(560) J	NS

Notes:

1. NS = Not sampled
2. NA = Not analyzed
3. ND = Not detected above detection limit listed in parentheses.
4. J = Estimated concentration
5. Results reported in micrograms per kilogram.
6. (1) = Cannot be separated from Diphenylamine.

TABLE 2-58
CONNECTICUT RIVER SEDIMENT ANALYTICAL RESULTS
SEMI-VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-RSSB		DSI-SD-RSSC		DSI-SD-RS4	
DATE SAMPLED:	15-Oct-92	Aug-93	15-Oct-92	Aug-93	Oct-92	Aug-93
TCL SEMI-VOLATILE ORGANICS						
METHOD: 8270						
Phenol	ND(500) J	NA	ND(510) J	NS	NS	NA
bis(2-Chloroethyl) Ether	ND(500) J	NA	ND(510) J	NS	NS	NA
2-Chlorophenol	ND(500) J	NA	ND(510) J	NS	NS	NA
1,3-Dichlorobenzene	ND(500) J	NA	ND(510) J	NS	NS	NA
1,4-Dichlorobenzene	ND(500) J	NA	ND(510) J	NS	NS	NA
1,2-Dichlorobenzene	ND(500) J	NA	ND(510) J	NS	NS	NA
2-Methylphenol	ND(500) J	NA	ND(510) J	NS	NS	NA
2,2'-oxybis(1-Chloropropane)	ND(500) J	NA	ND(510) J	NS	NS	NA
4-Methylphenol	ND(500) J	NA	ND(510) J	NS	NS	NA
N-Nitroso-Di-n-propylamine	ND(500) J	NA	ND(510) J	NS	NS	NA
Hexachloroethane	ND(500) J	NA	ND(510) J	NS	NS	NA
Nitrobenzene	ND(500) J	NA	ND(510) J	NS	NS	NA
Isophorone	ND(500) J	NA	ND(510) J	NS	NS	NA
2-Nitrophenol	ND(500) J	NA	ND(510) J	NS	NS	NA
2,4-Dimethylphenol	ND(500) J	NA	ND(510) J	NS	NS	NA
bis(2-Chloroethoxy)Methane	ND(500) J	NA	ND(510) J	NS	NS	NA
2,4,-Dichlorophenol	ND(500) J	NA	ND(510) J	NS	NS	NA
1,2,4-Trichlorobenzene	ND(500) J	NA	ND(510) J	NS	NS	NA
Naphthalene	ND(500) J	NA	ND(510) J	NS	NS	NA
4-Chloroaniline	ND(500) J	NA	ND(510) J	NS	NS	NA
Hexachlorobutadiene	ND(500) J	NA	ND(510) J	NS	NS	NA
4-Chloro-3-Methylphenol	ND(500) J	NA	ND(510) J	NS	NS	NA
2- Methylnaphthalene	ND(500) J	NA	ND(510) J	NS	NS	NA
Hexachlorocyclopentadiene	ND(500) J	NA	ND(510) J	NS	NS	NA
2,4,6-Trichlorophenol	ND(500) J	NA	ND(510) J	NS	NS	NA
2,4,5-Trichlorophenol	ND(1200) J	NA	ND(1200) J	NS	NS	NA
2-Chloronaphthalene	ND(500) J	NA	ND(510) J	NS	NS	NA
2-Nitroaniline	ND(1200) J	NA	ND(1200) J	NS	NS	NA
Dimethyl Phthalate	ND(500) J	NA	ND(510) J	NS	NS	NA
Acenaphthylene	ND(500) J	NA	ND(510) J	NS	NS	NA
2,6-Dinitrotoluene	ND(500) J	NA	ND(510) J	NS	NS	NA
3-Nitroaniline	ND(1200) J	NA	ND(1200) J	NS	NS	NA
Acenaphthene	ND(500) J	NA	ND(510) J	NS	NS	NA
2,4-Dinitrophenol	ND(1200) J	NA	ND(1200) J	NS	NS	NA
4-Nitrophenol	ND(1200) J	NA	ND(1200) J	NS	NS	NA
Dibenzofuran	ND(500) J	NA	ND(510) J	NS	NS	NA
2,4-Dinitrotoluene	ND(500) J	NA	ND(510) J	NS	NS	NA
Diethylphthalate	ND(500) J	NA	ND(510) J	NS	NS	NA
4-Chlorophenyl-phenylether	ND(500) J	NA	ND(510) J	NS	NS	NA
Fluorene	ND(500) J	NA	ND(510) J	NS	NS	NA
4-Nitroaniline	ND(1200) J	NA	ND(1200) J	NS	NS	NA
4,6-Dinitro-2-Methylphenol	ND(1200) J	NA	ND(1200) J	NS	NS	NA
n-Nitrosodiphenylamine (1)	ND(500) J	NA	ND(510) J	NS	NS	NA
4-Bromophenyl-phenylether	ND(500) J	NA	ND(510) J	NS	NS	NA
Hexachlorobenzene	ND(500) J	NA	ND(510) J	NS	NS	NA
Pentachlorophenol	ND(1200) J	NA	ND(1200) J	NS	NS	NA
Phenanthrene	ND(500) J	NA	ND(510) J	NS	NS	NA
Anthracene	ND(500) J	NA	ND(510) J	NS	NS	NA
Carbazole	ND(500) J	NA	ND(510) J	NS	NS	NA
Di-n-butylphthalate	ND(500) J	NA	ND(510) J	NS	NS	NA
Fluoranthene	ND(500) J	NA	ND(510) J	NS	NS	NA
Pyrene	ND(500) J	NA	ND(510) J	NS	NS	NA
Butylbenzylphthalate	ND(500) J	NA	ND(510) J	NS	NS	NA
3,3'-Dichlorobenzidine	ND(500) J	NA	ND(510) J	NS	NS	NA
Benzo(a)anthracene	ND(500) J	NA	ND(510) J	NS	NS	NA
Chrysene	ND(500) J	NA	ND(510) J	NS	NS	NA
Bis(2-ethylhexyl)phthalate	ND(260) J	NA	ND(260) J	NS	NS	NA
Di-n-octyl Phthalate	ND(500) J	NA	ND(510) J	NS	NS	NA
Benzo(b)fluoranthene	ND(500) J	NA	ND(510) J	NS	NS	NA
Benzo(k)fluoranthene	ND(500) J	NA	ND(510) J	NS	NS	NA
Benzo(a)pyrene	ND(500) J	NA	ND(510) J	NS	NS	NA
Indeno(1,2,3-cd)pyrene	ND(500) J	NA	ND(510) J	NS	NS	NA
Dibenz(a,h)anthracene	ND(500) J	NA	ND(510) J	NS	NS	NA
Benzo(g,h,i)perylene	ND(500) J	NA	ND(510) J	NS	NS	NA

Notes:

1. NS = Not sampled
2. NA = Not analyzed
3. ND = Not detected above detection limit listed in parentheses.
4. J = Estimated concentration
5. Results reported in micrograms per kilogram.
6. (1) = Cannot be separated from Diphenylamine.

TABLE 2-59
CONNECTICUT RIVER SEDIMENT ANALYTICAL RESULTS
TARGET ANALYTE LIST INORGANICS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-RS1		DSI-SD-RS1A		DSI-SD-RS1B		DSI-SD-RS1C	
DATE SAMPLED:	Oct-92	25-Aug-93	14-Oct-92	Aug-93	14-Oct-92	Aug-93	14-Oct-92	Aug-93
TOTAL METALS								
METHOD: CLP Target Analyte List								
Aluminum	NA	8380	7180	NS	8960	NS	6330	NS
Antimony	NA	ND(1.6)	ND(5.6)	NS	ND(05.7)	NS	ND(5.6)	NS
Arsenic	NA	2.2	1.5	NS	2.1	NS	1.5	NS
Barium	NA	30.9	26	NS	34.3	NS	26.1	NS
Beryllium	NA	ND(0.92)	0.44	NS	0.5	NS	0.5	NS
Cadmium	NA	ND(0.06)	ND(0.84)	NS	ND(0.86)	NS	ND(0.84)	NS
Calcium	NA	3490	4210	NS	5390	NS	1730	NS
Chromium	NA	63.7	10.9	NS	14.2	NS	13.9	NS
Cobalt	NA	7.9	7.5	NS	9.7	NS	5.9	NS
Copper	NA	ND(1.5)	16.7	NS	21.1	NS	13.2	NS
Iron	NA	24400	15400	NS	18400	NS	11500	NS
Lead	NA	ND(5.7)	5.5	NS	6.6	NS	6.9	NS
Magnesium	NA	5310	4920	NS	6290	NS	3350	NS
Manganese	NA	399	406	NS	498	NS	179	NS
Mercury	NA	ND(0.14)	ND(0.07)	NS	ND(0.07)	NS	ND(0.07)	NS
Nickel	NA	29.2	14.5	NS	19.2	NS	13.1	NS
Potassium	NA	1180	941	NS	1430	NS	713	NS
Selenium	NA	ND(0.95)	ND(0.56)	NS	ND(0.57)	NS	ND(0.56)	NS
Silver	NA	ND(0.06)	ND(1.1)	NS	ND(1.1)	NS	ND(1.1)	NS
Sodium	NA	336	ND(55.3)	NS	ND(70.8)	NS	ND(60.1)	NS
Thallium	NA	ND(0.95)	ND(0.84)	NS	ND(0.86)	NS	ND(0.84)	NS
Vanadium	NA	14.6	13.5	NS	17.1	NS	13.6	NS
Zinc	NA	48.9	43.2	NS	52.9	NS	46.1	NS
Cyanide	NA	ND(1.4)	ND(0.7)	NS	ND(0.72)	NS	ND(0.7)	NS

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. NA = Not analyzed
4. J = Estimated concentration
5. ND = Not detected above detection limit listed in parentheses.
6. Results reported in milligrams per kilogram.
7. Samples collected during October 1992 were obtained from three locations at each station and were analyzed separately. These samples are designated as a, b, and c above.

TABLE 2-59
CONNECTICUT RIVER SEDIMENT ANALYTICAL RESULTS
TARGET ANALYTE LIST INORGANICS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-RS2		DSI-SD-RS2A		DSI-SD-RS2B		DSI-SD-RS2C	
DATE SAMPLED:	Oct-92	25-Aug-93	14-Oct-92	Aug-93	14-Oct-92	Aug-93	14-Oct-92	Aug-93
TOTAL METALS								
METHOD: CLP Target Analyte List								
Aluminum	NA	21800	6360	NS	11000	NS	7320	NS
Antimony	NA	ND(2.6)	ND(5.1)	NS	ND(5.6)	NS	ND(6.1)	NS
Arsenic	NA	3.7	2.1	NS	2.8	NS	1.5	NS
Barium	NA	87.5	25.9	NS	44.6	NS	30	NS
Beryllium	NA	ND(1.6)	0.4	NS	0.59	NS	0.56	NS
Cadmium	NA	ND(0.11)	ND(0.77)	NS	ND(0.84)	NS	ND(0.91)	NS
Calcium	NA	4630	2040	NS	2130	NS	1630	NS
Chromium	NA	40.9	10.4	NS	18.9	NS	14.3	NS
Cobalt	NA	17.7	7.6	NS	11.5	NS	6.9	NS
Copper	NA	ND(2.7)	17.2	NS	25.2	NS	15.7	NS
Iron	NA	35000	14800	NS	21900	NS	13400	NS
Lead	NA	ND(9.5)	5.5	NS	9.7	NS	6.4	NS
Magnesium	NA	11800	3570	NS	6060	NS	3830	NS
Manganese	NA	1300	398	NS	625	NS	213	NS
Mercury	NA	ND(0.25)	ND(0.06)	NS	ND(0.07)	NS	ND(0.08)	NS
Nickel	NA	45.6	16.3	NS	22.1	NS	15.1	NS
Potassium	NA	2820	967	NS	1380	NS	811	NS
Selenium	NA	ND(1.6)	ND(0.51)	NS	ND(0.56)	NS	ND(0.61) J	NS
Silver	NA	ND(0.11)	ND(1.0)	NS	ND(1.1)	NS	ND(1.2)	NS
Sodium	NA	657	ND(74.9)	NS	ND(83.5)	NS	ND(64.6)	NS
Thallium	NA	ND(1.6)	ND(0.77)	NS	ND(0.84)	NS	ND(0.91)	NS
Vanadium	NA	42.7	13.6	NS	21.9	NS	15.4	NS
Zinc	NA	163	51.8	NS	80.2	NS	52.8	NS
Cyanide	NA	ND(2.7)	ND(0.64)	NS	ND(0.7)	NS	ND(0.76)	NS

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. NA = Not analyzed
4. J = Estimated concentration
5. ND = Not detected above detection limit listed in parentheses.
6. Results reported in milligrams per kilogram.
7. Samples collected during October 1992 were obtained from three locations at each station and were analyzed separately. These samples are designated as a, b, and c above.

TABLE 2-59
CONNECTICUT RIVER SEDIMENT ANALYTICAL RESULTS
TARGET ANALYTE LIST INORGANICS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-RS3		DSI-SD-RS3A		DSI-SD-RS3B		DSI-SD-RS3C		DSI-SD-RS4	
DATE SAMPLED:	Oct-92	25-Aug-93	15-Oct-92	Aug-93	15-Oct-92	Aug-93	15-Oct-92	Aug-93	Oct-93	26-Aug-93
TOTAL METALS										
METHOD: CLP Target Analyte List										
Aluminum	NA	9660	9240	NS	8000	NS	5690	NS	NS	9850
Antimony	NA	ND(1.9)	ND(6.7)	NS	ND(5.9)	NS	ND(5.8)	NS	NS	ND(2.0)
Arsenic	NA	3.0	2.1	NS	1.8 J	NS	1.4	NS	NS	2.8
Barium	NA	45.4	39	NS	34.7	NS	23.5	NS	NS	46.4
Beryllium	NA	ND(1.1)	ND(3.3)	NS	ND(0.30)	NS	ND(0.29)	NS	NS	ND(1.2)
Cadmium	NA	ND(0.08)	1.3 J	NS	ND(0.89)	NS	ND(0.87)	NS	NS	ND(0.16)
Calcium	NA	2100	2150	NS	1930	NS	1590	NS	NS	2800
Chromium	NA	21.3	19.3	NS	16.2	NS	13	NS	NS	22.1
Cobalt	NA	8.3	8.8	NS	7.5	NS	5.3	NS	NS	8.9
Copper	NA	ND(1.9)	19	NS	15.8	NS	11.3	NS	NS	ND(2.0)
Iron	NA	24500	16500	NS	14300	NS	10600	NS	NS	18800
Lead	NA	ND(12.5)	9.8	NS	8.1	NS	6	NS	NS	11.7
Magnesium	NA	4670	4660	NS	4040	NS	2910	NS	NS	4840
Manganese	NA	329	314	NS	241	NS	159	NS	NS	350
Mercury	NA	ND(0.19)	ND(0.08)	NS	ND(0.07)	NS	ND(0.07)	NS	NS	ND(0.19)
Nickel	NA	14.9	16.2	NS	17.4	NS	11.7	NS	NS	22.7
Potassium	NA	1090	1060	NS	928	NS	ND(594.0)	NS	NS	1110 J
Selenium	NA	ND(1.1)	0.67	NS	ND(0.59)	NS	ND(0.58)	NS	NS	ND(1.2) J
Silver	NA	ND(0.08)	ND(1.3)	NS	ND(1.2)	NS	ND(1.2)	NS	NS	ND(0.08)
Sodium	NA	446	ND(61.0)	NS	ND(72.9)	NS	ND(57.2)	NS	NS	823
Thallium	NA	ND(1.1)	ND(1.0)	NS	ND(0.89)	NS	ND(0.87)	NS	NS	ND(1.6)
Vanadium	NA	19.5	18.9	NS	17	NS	12.4	NS	NS	19.4
Zinc	NA	82.0	64	NS	54.7	NS	ND(40.5)	NS	NS	64.6
Cyanide	NA	ND(1.6)	ND(0.84)	NS	ND(0.74)	NS	ND(0.72)	NS	NS	ND(1.9)

Notes:

1. CLP = Contract Laboratory Program
2. NS = Not sampled
3. NA = Not analyzed
4. J = Estimated concentration
5. ND = Not detected above detection limit listed in parentheses.
6. Results reported in milligrams per kilogram.
7. Samples collected during October 1992 were obtained from three locations at each station and were analyzed separately. These samples are designated as a, b, and c above.

TABLE 2-60
RETENTION POND SEDIMENT ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-PS-1A		DSI-SD-PS-1B		DSI-SD-PS-1C		DSI-SD-PS-1D		
DATE SAMPLED:	23-Oct-92	Aug-93	23-Oct-92	Aug-93	23-Oct-92	Aug-93	23-Oct-92		Aug-93
VOLATILE ORGANICS METHOD: 8240									
Chloromethane	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
Bromomethane	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
Vinyl Chloride	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
Chloroethane	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
Methylene Chloride	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
Acetone	ND(15)	NS	ND(15)	NS	ND(14)	NS	10	J	NS
Carbon Disulfide	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
1,1-Dichloroethene	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
1,1-Dichloroethane	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
1,2-Dichloroethene (total)	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
Chloroform	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
1,2-Dichloroethane	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
2-Butanone	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
1,1,1-Trichloroethane	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
Carbon Tetrachloride	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
Bromodichloromethane	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
1,2-Dichloropropane	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
cis-1,3-Dichloropropene	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
Trichloroethene	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
Dibromochloromethane	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
1,1,2-Trichloroethane	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
Benzene	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
trans-1,3-Dichloropropene	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
Bromoform	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
4-Methyl-2-Pentanone	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
2-Hexanone	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
Tetrachloroethene	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
1,1,2,2-Tetrachloroethane	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
Toluene	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
Chlorobenzene	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
Ethylbenzene	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
Styrene	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS
Xylene (total)	ND(15)	NS	ND(15)	NS	ND(14)	NS	ND(12)		NS

Notes:

1. NS = Not sampled
2. NA = Not analyzed
3. ND = Not detected above detection limit listed in parentheses.
4. J = Estimated concentration
5. Results reported in micrograms per kilogram.

TABLE 2-60
RETENTION POND SEDIMENT ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-PS-2A		DSI-SD-PS-2B		DSI-SD-PS-2C		DSI-SD-PS-2D	
DATE SAMPLED:	23-Oct-92	Aug-93	23-Oct-92	Aug-93	23-Oct-92	Aug-93	23-Oct-92	Aug-93
VOLATILE ORGANICS METHOD: 8240								
Chloromethane	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
Bromomethane	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
Vinyl Chloride	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
Chloroethane	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
Methylene Chloride	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
Acetone	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
Carbon Disulfide	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
1,1-Dichloroethene	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
1,1-Dichloroethane	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
1,2-Dichloroethene (total)	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
Chloroform	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
1,2-Dichloroethane	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
2-Butanone	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
1,1,1-Trichloroethane	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
Carbon Tetrachloride	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
Bromodichloromethane	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
1,2-Dichloropropane	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
cis-1,3-Dichloropropene	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
Trichloroethene	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
Dibromochloromethane	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
1,1,2-Trichloroethane	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
Benzene	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
trans-1,3-Dichloropropene	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
Bromoform	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
4-Methyl-2-Pentanone	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
2-Hexanone	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
Tetrachloroethene	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
1,1,2,2-Tetrachloroethane	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
Toluene	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
Chlorobenzene	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
Ethylbenzene	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
Styrene	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS
Xylene (total)	ND(14)	NS	ND(12)	NS	ND(14)	NS	ND(12)	NS

Notes:

1. NS = Not sampled
2. NA = Not analyzed
3. ND = Not detected above detection limit listed in parentheses.
4. J = Estimated concentration
5. Results reported in micrograms per kilogram.

TABLE 2-60
RETENTION POND SEDIMENT ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-PS-3A		DSI-SD-PS-4	
DATE SAMPLED:	23-Oct-92	Aug-93	Oct-92	26-Aug-93
VOLATILE ORGANICS				
METHOD: 8240				
Chloromethane	ND(86)	NS	NS	NA
Bromomethane	ND(86)	NS	NS	NA
Vinyl Chloride	ND(86)	NS	NS	NA
Chloroethane	590	NS	NS	NA
Methylene Chloride	ND(86)	NS	NS	NA
Acetone	8 J	NS	NS	NA
Carbon Disulfide	ND(86)	NS	NS	NA
1,1-Dichloroethene	ND(86)	NS	NS	NA
1,1-Dichloroethane	ND(86)	NS	NS	NA
1,2-Dichloroethene (total)	ND(86)	NS	NS	NA
Chloroform	ND(86)	NS	NS	NA
1,2-Dichloroethane	ND(86)	NS	NS	NA
2-Butanone	100	NS	NS	NA
1,1,1-Trichloroethane	ND(86)	NS	NS	NA
Carbon Tetrachloride	ND(86)	NS	NS	NA
Bromodichloromethane	ND(86)	NS	NS	NA
1,2-Dichloropropane	ND(86)	NS	NS	NA
cis-1,3-Dichloropropene	ND(86)	NS	NS	NA
Trichloroethene	ND(86)	NS	NS	NA
Dibromochloromethane	ND(86)	NS	NS	NA
1,1,2-Trichloroethane	ND(86)	NS	NS	NA
Benzene	ND(86)	NS	NS	NA
trans-1,3-Dichloropropene	ND(86)	NS	NS	NA
Bromoform	ND(86)	NS	NS	NA
4-Methyl-2-Pentanone	ND(86)	NS	NS	NA
2-Hexanone	ND(86)	NS	NS	NA
Tetrachloroethene	ND(86)	NS	NS	NA
1,1,2,2-Tetrachloroethane	ND(86)	NS	NS	NA
Toluene	ND(86)	NS	NS	NA
Chlorobenzene	ND(86)	NS	NS	NA
Ethylbenzene	ND(86)	NS	NS	NA
Styrene	ND(86)	NS	NS	NA
Xylene (total)	ND(86)	NS	NS	NA

Notes:

1. NS = Not sampled
2. NA = Not analyzed
3. ND = Not detected above detection limit listed in parentheses.
4. J = Estimated concentration
5. Results reported in micrograms per kilogram.

TABLE 2-61
RETENTION POND SEDIMENT ANALYTICAL RESULTS
SEMI-VOLATILE ORGANIC COMPOUNDS
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE NUMBER:	DSI-SD-PS-1		DSI-SD-PS-2		DSI-SD-PS-3A		DSI-SD-PS-3B		DSI-SD-PS-4	
DATE SAMPLED:	23-Oct-92	Aug-93	23-Oct-92	Aug-93	23-Oct-92	Aug-93	23-Oct-92	Aug-93	Oct-92	Aug-93
TCL SEMI-VOLATILE ORGANICS METHOD: 8270										
Phenol	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
bis(2-Chloroethyl) Ether	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
2-Chlorophenol	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
1,3-Dichlorobenzene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
1,4-Dichlorobenzene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
1,2-Dichlorobenzene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
2-Methylphenol	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
2,2'-oxybis(1-Chloropropane)	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
4-Methylphenol	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
N-Nitroso-Di-n-propylamine	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Hexachloroethane	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Nitrobenzene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Isophorone	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
2-Nitrophenol	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
2,4-Dimethylphenol	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
bis(2-Chloroethoxy)Methane	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
2,4-Dichlorophenol	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
1,2,4-Trichlorobenzene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Naphthalene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
4-Chloroaniline	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Hexachlorobutadiene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
4-Chloro-3-Methylphenol	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
2- Methylnaphthalene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Hexachlorocyclopentadiene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
2,4,6-Trichlorophenol	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
2,4,5-Trichlorophenol	ND(1000)	NS	ND(940)	NS	ND(1000) J	NS	ND(930)	NS	NS	NA
2-Chloronaphthalene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
2-Nitroaniline	ND(1000)	NS	ND(940)	NS	ND(1000) J	NS	ND(930)	NS	NS	NA
Dimethyl Phthalate	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Acenaphthylene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
2,6-Dinitrotoluene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
3-Nitroaniline	ND(1000)	NS	ND(940)	NS	ND(1000) J	NS	ND(930)	NS	NS	NA
Acenaphthene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
2,4-Dinitrophenol	ND(1000)	NS	ND(940)	NS	ND(1000) J	NS	ND(930)	NS	NS	NA
4-Nitrophenol	ND(1000)	NS	ND(940)	NS	ND(1000) J	NS	ND(930)	NS	NS	NA
Dibenzofuran	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
2,4-Dinitrotoluene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Diethylphthalate	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
4-Chlorophenyl-phenylether	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Fluorene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
4-Nitroaniline	ND(1000)	NS	ND(940)	NS	ND(1000) J	NS	ND(930)	NS	NS	NA
4,6-Dinitro-2-Methylphenol	ND(1000)	NS	ND(940)	NS	ND(1000) J	NS	ND(930)	NS	NS	NA
n-Nitrosodiphenylamine (1)	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
4-Bromophenyl-phenylether	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Hexachlorobenzene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Pentachlorophenol	ND(1000)	NS	ND(940)	NS	ND(1000) J	NS	ND(930)	NS	NS	NA
Phenanthrene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Anthracene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Carbazole	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Di-n-butylphthalate	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Fluoranthene	ND(410)	NS	ND(390)	NS	57 J	NS	ND(380)	NS	NS	NA
Pyrene	ND(410)	NS	ND(390)	NS	54 J	NS	ND(380)	NS	NS	NA
Butylbenzylphthalate	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
3,3'-Dichlorobenzidine	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Benzo(a)anthracene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Chrysene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Bis(2-ethylhexyl)phthalate	ND(210)	NS	ND(200)	NS	140 J	NS	180 J	NS	NS	NA
Di-n-octyl Phthalate	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Benzo(b)fluoranthene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Benzo(k)fluoranthene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Benzo(a)pyrene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Indeno(1,2,3-cd)pyrene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Dibenz(a,h)anthracene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA
Benzo(g,h,i)perylene	ND(410)	NS	ND(390)	NS	ND(410) J	NS	ND(380)	NS	NS	NA

Notes:

1. NA = Not analyzed
2. NS = Not sampled
3. ND = Not detected above detection limit listed in parentheses.
4. J = Estimated concentration
5. Results reported in micrograms per kilogram.
6. (1) = Cannot be separated from Diphenylamine

TABLE 2-63
SEDIMENT ANALYTICAL RESULTS
TOTAL ORGANIC CARBON
DISPOSAL SPECIALISTS, INC. LANDFILL
ROCKINGHAM, VERMONT

SAMPLE LOCATION	TOTAL ORGANIC CARBON Oct-92	Aug-93
DSI-SD-SS1	2,600 J	NS
DSI-SD-SS2	6,900 J	NA
DSI-SD-SS(3)/4	4,300 J	NA
DSI-SD-SS5	11,200 J	NS
DSI-SD-SS6	5,700 J	NA
DSI-SD-SS6A	NS	32,000
DSI-SD-SS7	9,600 J	NS
DSI-SD-SS8	1,300 J	NA
DSI-SD-SS9	2,300 J	NA
DSI-SD-SS30	13,000 J	NS
DSI-SD-SS31	3,500 J	NS
DSI-SD-SS32	ND(1,000) J	NS
DSI-SD-SS33	3,600 J	NS
DSI-SD-SS34	1,300 J	NS
DSI-SD-RS1A	1,700 J	NA
DSI-SD-RS1B	1,900 J	NA
DSI-SD-RS2A	1,500 J	NA
DSI-SD-RS2B	2,500 J	NA
DSI-SD-RS2C	3,200 J	NA
DSI-SD-RS3A	4,100 J	NA
DSI-SD-RS3B	5,100 J	NA
DSI-SD-RS3C	3,500 J	NA
DSI-SD-RS4	NS	30,000
DSI-SD-PS1	1,500 J	NS
DSI-SD-PS2	1,100 J	NS
DSI-SD-PS3A	8,300 J	NS
DSI-SD-PS3B	1,700 J	NS
DSI-SD-PS4	NS	71,000

Notes:

1. Results reported as milligrams of carbon per kilogram of sample.
2. Samples were analyzed using the Loyd Kahn Method.
3. ND = Not detected above detection limit listed in parentheses.
4. NA = Not analyzed
5. NS = Not sampled
6. J = Estimated concentration due to holding time exceedance.
7. Laboratory reports for analyses are presented in Appendix C.

- **ARTHUR D. LITTLE'S UNVALIDATED AUGUST/SEPTEMBER, 1993 SURFACE WATER AND SEDIMENT ANALYTICAL DATA**

BFI - Rockingham Landfill
Volatile Organic Analytes in Water*
August, 1993

Site: BFI Rockingham Landfill
SDG Number: SA7965
Case Number: 20674
Laboratory: EAS Laboratories

Sample Number	SA7965	SA7967	SA7968	SA7973	SA7974	SA7985	SA7978	SA8466	SA8057	SA8058	SA8059
Sample Location	MWJ-38	TRP-BLK	RW-1	TRP-BLK	RW-1(D)	PE	RW-2	TRP-BLK	MWJ-37(D)	EQP-BLK	MWJ-37
Lab Number	9304243	9304244	9304242	9304245	9304241	9304246	9304240	9304238	9304236	9304237	9304239
Matrix	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Data Unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dichlorodifluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	0.7 J	1 U	1 U	1 U	0.8 J	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	3.2	1 U	1 U	1 U	1 U	1 U
2-Butanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	5 U	5 U	5 U	5 U	5 U	12	5 U	5 U	5 U	5 U	5 U
Acetone	2.5 J	5 U	4.8 J	2.6 J	4 J	5 U	4 J	5 U	5 U	5 U	5 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	27 B	3.4	1 U	3.2 B	1 U	1 U	1 U	2.6 B	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1.5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	6	1 U	1 U	1 U	1 U	4.3	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	15	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.9 J	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	8.2	1 U	1 U	1 U	1 U	1 U
Dibromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	1.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	10	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	11	1 U	1 U	1 U	1 U	1 U
Xylenes (Total)	0.7 J	1 U	1 U	1 U	1 U	1.6 J	1 U	1 U	1 U	1 U	1 U
Styrene	1 U	1 U	1 U	1 U	1 U	16	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	16	1 U	1 U	1 U	1 U	1 U
Bromobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
n-Propylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Chlorotoluene	1 U	1 U	1 U	1 U	1 U	16	1 U	1 U	1 U	1 U	1 U
4-Chlorotoluene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trimethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
sec-Butylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
p-Isopropyltoluene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
tert-Butylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
n-Butylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-Chloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Hexachlorobutadiene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Naphthalene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Analysis Date	09/07/93	09/08/93	09/07/93	09/07/93	09/07/93	09/08/93	09/07/93	09/02/93	09/02/93	09/02/93	09/03/93
Sample Date	08/25/93	08/25/93	08/25/93	08/25/93	08/25/93	08/25/93	08/25/93	08/24/93	08/24/93	08/24/93	08/24/93

Notes:
*Data have not been validated
(D)Field Duplicate Sample

BFI - Rockingham Landfill

Volatile Organic Analytes in Water*

August, 1993

Site: BFI Rockingham
SDG Number: AAC31
Case Number: 20671
Laboratory: Recra Environmental Inc.

Sample Number	AAC44		AAC73	
Sample Location	EQP BLK		PE	
Lab Number	AS043523		AS043404	
Matrix	Water		Water	
Data Unit	ug/L		ug/L	
Chloromethane	10	U	38	
Bromomethane	10	U	10	U
Vinyl Chloride	10	U	10	U
Methylene Chloride	10	U	10	U
Acetone	10	U	10	U
Carbon Disulfide	10	U	10	U
1,1-Dichloroethene	10	U	80	
1,1-Dichloroethane	10	U	10	U
1,2-Dichloroethene (total)	10	U	10	U
Chloroform	10	U	10	U
1,2-Dichloroethane	10	U	10	U
2-Butanone	10	U	10	U
1,1,1-Trichloroethane	10	U	10	U
Carbon Tetrachloride	10	U	10	U
Bromodichloromethane	10	U	10	U
1,2-Dichloropropane	10	U	10	U
cis-1,3-Dichloropropene	10	U	10	U
Trichloroethene	10	U	1	J
Dibromochloromethane	10	U	89	
1,1,2-Trichloroethane	10	U	10	U
Benzene	10	U	61	
trans-1,3-Dichloropropene	10	U	10	U
Bromoform	10	U	9	J
4-Methyl-2-Pentanone	10	U	66	
2-Hexanone	10	U	580	D
Tetrachloroethene	10	U	10	U
1,1,1,2-Tetrachloroethane	10	U	71	
Toluene	10	U	10	U
Chlorobenzene	10	U	32	
Ethylbenzene	10	U	10	U
Styrene	10	U	190	D
Total Xylenes	10	U	170	
TENTATIVELY IDENTIFIED COMPOUNDS				
Isopropyl alcohol (RT 9.13 min)			270	JN
Hexane, 2,4-Dimethyl(RT 17.87 min)			44	JN
Dilution Factor	1		1	
Sampling Date	8/25/93		8/25/93	

Notes:
*Data have not been validated

BFI - Rockingham Landfill
Semivolatile Organic Analytes in Water*
August, 1993

Site: BFI Rockingham
SDG Number:SA4469 Case Number:20673
Laboratory: Recra Environmental Inc.

Sample Number	SA4469		SA4470		SA7964		SA7965		SA7969		SA7974		SA7981		SA7982	
Sample Location	MW-37(D)		MW-37		EQP BLK		MW-38		RW-1		RW-1(D)		RW-2		PE	
Laboratory Number	AS043190		AS043189		AS043241		AS043191		AS043242		AS043245		AS043243		AS043244	
Matrix	Water		Water		Water		Water		Water		Water		Water		Water	
Data Unit	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Phenol	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Bis (2-Chloroethyl) Ether	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Chlorophenol	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Methylphenol	5	U	5	U	5	U	5	U	5	U	5	U	5	U	13	
2,2'Oxybis(1-Chloropropane)	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methylphenol	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
n-Nitroso Di-n-Propylamine	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Hexachloroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Nitrobenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Isophorone	5	U	5	U	5	U	5	U	5	U	5	U	5	U	17	
2-Nitrophenol	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2,4-Dimethylphenol	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Bis (2-Chloroethoxy) Methane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2,4-Dichlorophenol	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,2,4-Trichlorobenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Naphthalene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	14	
4-Chloroaniline	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Hexachlorobutadiene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
3-Methyl-4-Chlorophenol	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Methylnaphthalene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Hexachlorocyclopentadiene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2,4,6-Trichlorophenol	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2,4,5-Trichlorophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2-Chloronaphthalene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Nitroaniline	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Dimethyl phthalate	5	U	5	U	2	J	5	U	5	U	5	U	5	U	5	U
Acenaphthylene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2,6-Dinitrotoluene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
3-Nitroaniline	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Acenaphthene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2,4-Dinitrophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Nitrophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Dibenzofuran	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2,4-Dinitrotoluene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	18	
Diethyl phthalate	5	U	5	U	2	J	5	U	5	U	5	U	5	U	5	U
4-Chlorophenylphenyl Ether	5	U	5	U	5	U	5	U	5	U	5	U	5	U	8	
Fluorene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Nitroaniline	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4,6-Dinitro-2-Methylphenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
n-Nitroso Diphenylamine	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Bromophenylphenyl Ether	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Hexachlorobenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Pentachlorophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Phenanthrene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Anthracene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Di-n-butyl phthalate	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Fluoranthene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Pyrene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	32	
Butylbenzyl phthalate	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
3,3'-Dichlorobenzidine	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Benzo [a] anthracene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Chrysene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Bis (2-Ethylhexyl) phthalate	0.6	J	3	J	5	U	0.4	J	5	U	5	U	5	U	5	U
Di-n-octyl phthalate	5	U	5	U	5	U	5	U	5	U	5	U	5	U	17	
Benzo [b] fluoranthene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Benzo [k] fluoranthene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Benzo [a] pyrene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	3	J
Indeno [1,2,3-c,d] pyrene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Dibenz [a,h] anthracene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Benzo [g,h,i] perylene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Cyclohexenol Isomer (RT 5.8 min)					10	J	14	J	43	J	33	J	31	J	24	J
2-Cyclohexen-1-one (RT 6.75 min)											14	JN	13	JN	10	JN
Chlorocyclohexanol (RT 9.04 min)											17	J				
2,6-Dimethyl-6-nitro-2-hepten-4-one(RT11.5 min)											27	JN	48	JN		
Trichloropropene isomer (RT 7.12 min)													23	J		
Unknown Hydrocarbon (RT 9.04 min)													14	J		
Unknown C6H6CL6 (RT 21.67 min)															16	J
Dilution Factor	1		1		1		1		1		1		1		1	
Sampling Date	8/24/93		8/24/93		8/24/93		8/25/93		8/25/93		8/25/93		8/25/93		8/25/93	

Notes:
*Data have not been validated
(D)Field Duplicate Sample

BFI - Rockingham Landfill

Semivolatile Organic Analytes in Water*

August, 1993

Site: BFI Rockingham
SDG Number: AAC31 Case Number: 20671
Laboratory: Recra Environmental Inc.

Sample Number	AAC45		AAC74	
Sample Location	EQP BLK		PE	
Laboratory Number	AS043411		AS043407	
Matrix	Water		Water	
Data Unit	ug/L		ug/L	
Phenol	10	U	18	
Bis (2-Chloroethyl) Ether	10	U	10	U
2-Chlorophenol	10	U	10	U
1,3-Dichlorobenzene	10	U	10	U
1,4-Dichlorobenzene	10	U	10	U
1,2-Dichlorobenzene	10	U	10	U
2-Methylphenol	10	U	39	
2,2'Oxybis(1-Chloropropane)	10	U	10	U
4-Methylphenol	10	U	10	U
n-Nitroso Di-n-Propylamine	10	U	10	U
Hexachloroethane	10	U	10	
Nitrobenzene	10	U	10	U
Isophorone	10	U	31	
2-Nitrophenol	10	U	10	U
2,4-Dimethylphenol	10	U	5	J
Bis (2-Chloroethoxy) Methane	10	U	13	
2,4-Dichlorophenol	10	U	10	U
1,2,4-Trichlorobenzene	10	U	11	
Naphthalene	10	U	27	
4-Chloroaniline	10	U	10	U
Hexachlorobutadiene	10	U	10	U
3-Methyl-4-Chlorophenol	10	U	10	U
2-Methylnaphthalene	10	U	10	U
Hexachlorocyclopentadiene	10	U	10	U
2,4,6-Trichlorophenol	10	U	14	
2,4,5-Trichlorophenol	25	U	25	U
2-Chloronaphthalene	10	U	10	U
2-Nitroaniline	25	U	25	U
Dimethyl phthalate	10	U	10	U
Acenaphthylene	10	U	10	U
2,6-Dinitrotoluene	10	U	10	U
3-Nitroaniline	25	U	25	U
Acenaphthene	10	U	10	U
2,4-Dinitrophenol	25	U	25	U
4-Nitrophenol	25	U	25	U
Dibenzofuran	10	U	10	U
2,4-Dinitrotoluene	10	U	40	
Diethyl phthalate	10	U	10	U
4-Chlorophenylphenyl Ether	10	U	16	
Fluorene	10	U	10	U
4-Nitroaniline	25	U	25	U
4,6-Dinitro-2-Methylphenol	25	U	25	U
n-Nitroso Diphenylamine	10	U	10	U
4-Bromophenylphenyl Ether	10	U	10	U
Hexachlorobenzene	10	U	10	U
Pentachlorophenol	25	U	25	U
Phenanthrene	10	U	10	U
Anthracene	10	U	2	J
Carbazole	10	U	10	U
Di-n-butyl phthalate	10	U	10	U
Fluoranthene	10	U	10	U
Pyrene	10	U	150	D
Butylbenzyl phthalate	10	U	10	U
3,3'-Dichlorobenzidine	10	U	10	U
Benzo [a] anthracene	10	U	10	U
Chrysene	10	U	10	U
Bis (2-Ethylhexyl) phthalate	10	U	10	U
Di-n-octyl phthalate	10	U	38	
Benzo [b] fluoranthene	10	U	10	U
Benzo [k] fluoranthene	10	U	10	U
Benzo [a] pyrene	10	U	8	J
Indeno [1,2,3-c,d] pyrene	10	U	10	U
Dibenz [a,h] anthracene	10	U	10	U
Benzo [g,h,i] perylene	10	U	10	U
UNKNOWN (RT 6.67 min.)			11	BJ
2-CYCLOHEXEN-1-ONE (RT 7.70 min.)			5	JN
UNKNOWN C6H8CL6 ISOMER (RT 22.85 min.)			32	J
Dilution Factor	1		1	
Sampling Date	8/25/93		8/25/93	

Notes:
*Data have not been validated

BFI - Rockingham Landfill
Pesticides and PCBs in Water*
August, 1993

Site: BFI Landfill
SDG Number: AAC31 Case Number: 20671
Laboratory: Recra Environmental Inc.

Sample number	AAC31		AAC33		AAC36		AAC37		AAC38		AAC39		AAC40		AAC46		AAC75	
Sample Location	MWJ37		EQP BLK		MWJ37(D)		MWJ38		RW-1		RW-1		RW-2		EQP BLK		PE	
Lab Number	AS043407		AS043402		AS043408		AS043403		AS043414		AS043413		AS043410		AS043412		AS043406	
Matrix	Water		Water		Water		Water		Water		Water		Water		Water		Water	
Data Unit	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Alpha-BHC	0.059	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.1	
Beta-BHC	0.059	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Delta-BHC	0.059	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Gamma-BHC (Lindane)	0.059	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Heptachlor	0.059	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.12	P
Aldrin	0.059	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Heptachlor Epoxide	0.059	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Endosulfan I	0.059	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Dieldrin	0.12	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
4,4'DDE	0.12	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Endrin	0.12	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Endosulfan II	0.12	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.59	
4,4'DDD	0.12	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Endosulfan Sulfate	0.12	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.26	
4,4'DDT	0.12	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Methoxychlor	0.59	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Endrin Ketone	0.12	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.17	
Endrin Aldehyde	0.12	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Alpha Chlordane	0.059	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Gamma Chlordane	0.059	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Toxaphene	5.9	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Aroclor 1016	1.2	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Aroclor 1221	2.4	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Aroclor 1232	1.2	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Aroclor 1242	1.2	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Aroclor 1248	1.2	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1.1	
Aroclor 1254	1.2	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Aroclor 1260	1.2	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Dilution Factor	1		1		1		1		1		1		1		1		1	
Sampling Date	8/24/93		8/24/93		8/24/93		8/25/93		8/25/93		8/25/93		8/25/93		8/25/93		8/25/93	

Notes:
*Data have not been validated
(D)Field Duplicate Sample

BFI - Rockingham Landfill
Inorganic Analytes in Ground Water*
August, 1993

Site: BFI Rockingham
SDG Number: MAW132 Case Number: 20671
Laboratory: ChemTech Consulting Group

Sample Number			MAW-132		MAW-133		MAW-134		MAW-135		MAW-136		MAW-137		MAW-138		MAW-139		MAW-145		MAW-146		MAW-163		MAW-164
Sample Location			MWJ-37		MWJ-37		EQP-BLK		EQP-BLK		MWJ-37(D)		MWJ-37(D)		MWJ-38		MWJ-38		EQP-BLK		EQP-BLK		PE		PE
Lab Number			18612S		18613S		18616S		18617S		18614S		18615S		18618S		18621S		18624S		18625S		19517S		19518S
Matrix			Water		Water		Water		Water		Water		Water		Water		Water		Water		Water		Water		Water
Data Unit	CRDL	IDL	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L
Aluminum	200	56	395				56	U			586				658				56	U			100000		
Antimony	60	36	36	U			36	U			36	U			36	U			36	U			36	U	
Arsenic	10	4	5.6	B			4	U			6.6	B			4	U			4	U			4	U	
Barium	200	15	188	B			15	U			238				166	B			15	U			15	U	
Beryllium	5	2	2	U			2	U			2	U			2	U			2	U			2	U	
Cadmium	5	3	3	U			3	U			3	U			3	U			3	U			3	U	
Calcium	5000	357	44700				357	U			47100				48400				357	U			357	U	
Chromium	10	6	6	U			6	U			9.8	B			6	U			6	U			6	U	
Cobalt	50	8	13.9	B			8	U			18	B			8	U			8	U			768		
Copper	25	11	11	U			11	U			11	U			11	U			11	U			11	U	
Iron	100	18	8760				18	U			15100				1860				18	U			846		
Lead	3	3	3	U			3	U			5.6				3	U			3	U			3	U	
Magnesium	5000	185	21500				185	U			22500				16600				185	U			185	U	
Manganese	15	7	5140				7	U			5960				1010				7	U			7	U	
Mercury	0.2	0.2	0.2	U			0.2	U			0.2	U			0.2	U			12	U			0.2	U	
Nickel	40	12	12	U			12	U			12	U			12	U			380	U			78.2		
Potassium	5000	380	3590	B			380	U			3510	B			2500	B			2	U			380	U	
Selenium	5	2	20	U			2	U			2	U			2	U			6	U			2.7	B	
Silver	10	6	6	U			6	U			6	U			6	U			204	U			6	U	
Sodium	5000	204	20600				204	U			20000				61800				3	U			204	U	
Thallium	10	3	3	U			3	U			3	U			3	U			12	U			3	U	
Vanadium	50	12	12	U			12	U			12	U			12	U			5.7	B			12	U	
Zinc	20	4	32.1				4	U			59.3				7	U							872		
Cyanide					10	U			10	U			10	U			10	U			10	U			29
Sample Date			08/24/93		08/24/93		08/24/93		08/24/93		08/25/93		08/25/93		08/25/93		08/25/93		08/25/93		08/25/93		08/25/93		08/25/93

Notes:
*Data have not been validated
(D)Field Duplicate Sample

BFI - Rockingham Landfill
Inorganic Analytes In Surface Water*
August, 1993

Site: BFI Rockingham
SDG Number: SA7970 Case Number: 8056-A-01
Laboratory: American Analytical & Technical

Sample Number			SA7970		SA7971		SA7976		SA7977		SA7979		SA7980		SA7983		SA7984	
Sample Location			RW-1		RW-1		RW-1(D)		RW-1(D)		RW-2		RW-2		PE		PE	
Lab Number			1518101		1518102		1518103		1518104		1518105		1518106		1518107		1518108	
Matrix			Water		Water		Water		Water		Water		Water		Water		Water	
Data Unit	CRDL	IDL	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Aluminum	100	31	135				161				164				160000			
Antimony	5	2	2	U			2	U			2	U			2	U		
Arsenic	2	1	1.2	B			1	U			1	U			1	U		
Barium	200	6.8	9.9	B			9.6	B			9.4	B			6	U		
Beryllium	1	1	1	U			1	U			1	U			2.3			
Cadmium	1	0.5	0.5	U			0.5	U			0.5	U			5.9			
Calcium	500	200	20100				20000				19800				200	U		
Chromium	10	4	4	U			4	U			4	U			71.1			
Cobalt	10	5	5	U			5	U			5	U			5	U		
Copper	10	3	3	U			3	U			3.6	B			3	U		
Iron	100	8	235				215				351				44.5	B		
Lead	2	2	2	U			2	U			2	U			2	U		
Magnesium	500	114	2230				2220				2130				114	U		
Manganese	10	2	44.2				38.8				42.6				2	U		
Mercury	0.2	0.2	0.2	U			0.2	U			0.2	U			0.2	U		
Nickel	20	21	21	U			21	U			21	U			21	U		
Potassium	750	796	1150				1270				1080				796	U		
Selenium	3	2	2	U			2	U			2	U			19.3			
Silver	10	3	3	U			3	U			3	U			75.9			
Sodium	500	183	10100				9930				10300				571			
Thallium	10	2	2	U			2	U			2	U			49.8			
Vanadium	10	6	6	U			6	U			6	U			6	U		
Zinc	20	7	7	U			7	U			7	U			7	U		
Cyanide					10	U			10	U			10	U			10	U
Sample Date			08/25/93		08/25/93		08/25/93		08/25/93		08/25/93		08/25/93		08/25/93		08/25/93	

Notes:
*Data has not been validated
(D)Field Duplicate Sample

BFI - Rockingham Landfill
Semivolatile Organic Analytes in Sediment*
August, 1993

Site: BFI Rockingham
SDG Number: AAC59 Case Number: 20671
Laboratory: Recra Environmental Inc.

Sample Number	AAC42		AAC48		AAC51		AAC54		AAC57		AAC60		AAC69		AAC63		AAC66	
Sample Location	RS-1		RS-2		RS-2(D)		RS-3A		RS-4		SS-6		SS-6A		SS-8		SS-9	
Laboratory Number	ASO43441		ASO43438		AS043434		AS043428		AS043431		AS043416		AS043419		AS043422		AS043425	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Data Unit	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Phenol	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
Bis (2-Chloroethyl) Ether	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
2-Chlorophenol	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
1,3-Dichlorobenzene	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
1,4-Dichlorobenzene	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
1,2-Dichlorobenzene	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
2-Methylphenol	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
2,2'Oxybis(1-Chloropropane)	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
4-Methylphenol	74	J	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
n-Nitroso Di-n-Propylamine	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
Hexachloroethane	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
Nitrobenzene	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
Isophorone	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
2-Nitrophenol	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
2,4-Dimethylphenol	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
Bis (2-Chloroethoxy) Methane	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
2,4-Dichlorophenol	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
1,2,4-Trichlorobenzene	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
Naphthalene	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
4-Chloroaniline	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
Hexachlorobutadiene	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
3-Methyl-4-Chlorophenol	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
2-Methylnaphthalene	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
Hexachlorocyclopentadiene	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
2,4,6-Trichlorophenol	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
2,4,5-Trichlorophenol	1100	U	1000	U	1000	U	1200	U	1100	U	1100	U	930	U	930	U	910	U
2-Chloronaphthalene	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
2-Nitroaniline	1100	U	1000	U	1000	U	1200	U	1100	U	1100	U	930	U	930	U	910	U
Dimethyl phthalate	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
Acenaphthylene	450	U	430	U	420	U	490	U	460	U	20	J	380	U	380	U	370	U
2,6-Dinitrotoluene	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
3-Nitroaniline	1100	U	1000	U	1000	U	1200	U	1100	U	1100	U	930	U	930	U	910	U
Acenaphthene	450	U	430	U	420	U	490	U	460	U	58	J	930	U	380	U	370	U
2,4-Dinitrophenol	1100	U	1000	U	1000	U	1200	U	1100	U	1100	U	930	U	930	U	910	U
4-Nitrophenol	1100	U	1000	U	1000	U	1200	U	1100	U	1100	U	380	U	930	U	910	U
Dibenzofuran	450	U	430	U	420	U	490	U	460	U	21	J	380	U	380	U	370	U
2,4-Dinitrotoluene	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
Diethyl phthalate	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
4-Chlorophenylphenyl Ether	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
Fluorene	450	U	430	U	420	U	490	U	460	U	59	J	380	U	380	U	370	U
4-Nitroaniline	1100	U	1000	U	1000	U	1200	U	1100	U	1100	U	930	U	930	U	910	U
4,6-Dinitro-2-Methylphenol	1100	U	1000	U	1000	U	1200	U	1100	U	1100	U	930	U	930	U	910	U
n-Nitroso Diphenylamine	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
4-Bromophenylphenyl Ether	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
Hexachlorobenzene	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
Pentachlorophenol	1100	U	1000	U	1000	U	1200	U	1100	U	1100	U	930	U	930	U	910	U
Phenanthrene	450	U	430	U	18	J	15	J	28	J	820		84	J	14	J	18	J
Anthracene	450	U	430	U	420	U	490	U	460	U	200	J	380	U	380	U	370	U
Carbazole	450	U	430	U	420	U	490	U	460	U	93	J	380	U	380	U	370	U
Di-n-butyl phthalate	450	U	430	U	16	J	490	U	460	U	440	U	380	U	380	U	370	U
Fluoranthene	450	U	430	U	23	J	27	J	57	J	1700		150	J	14	J	29	J
Pyrene	450	U	430	U	420	U	29	J	67	J	1500		150	J	380	U	26	J
Butylbenzyl phthalate	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
3,3'-Dichlorobenzidine	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
Benzo [a] anthracene	450	U	430	U	420	U	15	J	35	J	800		77	J	380	U	13	J
Chrysene	450	U	430	U	13	J	20	J	44	J	770		92	J	380	U	17	J
Bis (2-Ethylhexyl) phthalate	24	J	430	U	220	J	490	U	33	J	68	J	380	U	110	J	29	J
Di-n-octyl phthalate	450	U	430	U	420	U	490	U	460	U	440	U	380	U	380	U	370	U
Benzo [b] fluoranthene	450	U	430	U	420	U	23	J	59	J	810		77	J	380	U	19	J
Benzo [k] fluoranthene	450	U	430	U	420	U	490	U	460	U	390	J	31	J	380	U	370	U
Benzo [a] pyrene	450	U	430	U	420	U	13	J	30	J	540		52	J	380	U	8	J

BFI - Rockingham Landfill
Semivolatile Organic Analytes in Sediment*
August, 1993

Site: BFI Rockingham
SDG Number: AAC59 Case Number: 20671
Laboratory: Recra Environmental Inc.

Sample Number	AAC42	AAC48	AAC51	AAC54	AAC57	AAC60	AAC69	AAC63	AAC66
Sample Location	RS-1	RS-2	RS-2(D)	RS-3A	RS-4	SS-6	SS-6A	SS-8	SS-9
Laboratory Number	ASO43441	ASO43438	AS043434	AS043428	AS043431	AS043416	AS043419	AS043422	AS043425
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Data Unit	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Indeno [1,2,3-c,d] pyrene	450 U	430 U	420 U	490 U	16 J	240 J	28 J	380 U	370 U
Dibenz [a,h] anthracene	450 U	430 U	420 U	490 U	460 U	49 J	7 J	380 U	370 U
Benzo [g,h,i] perylene	450 U	430 U	420 U	490 U	460 U	72 J	380 U	380 U	370 U

BFI - Rockingham Landfill
Semivolatile Organic Analytes in Sediment*
August, 1993

Site: BFI Rockingham
SDG Number: AAC59 Case Number: 20671
Laboratory: Recra Environmental Inc.

Sample Number	AAC42		AAC48		AAC51		AAC54		AAC57		AAC60		AAC69		AAC63		AAC66	
Sample Location	RS-1		RS-2		RS-2(D)		RS-3A		RS-4		SS-6		SS-6A		SS-8		SS-9	
Laboratory Number	ASO43441		ASO43438		AS043434		AS043428		AS043431		AS043416		AS043419		AS043422		AS043425	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Data Unit	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Unknown Hydrocarbon (RT 7.1 min)	450	J	480	J	1100	J			1300	J	940	J	1000	J	1000	J	990	J
Substituted Tetrahydrofuran (RT 7.4 min)	760	J													370	J	380	J
Unknown Hydrocarbon (RT 7.42 min)	260	J			330	J			210	J			310	J				
Unknown Hydrocarbon (RT 33.35 min)	120	J	220	J	89	J					760	J						
Unknown (RT 7.8 min)			780	J	840	J			1200	J	900	J	750	J	630	J	640	J
Unknown Ketone (RT 8.08 min)			550	J					270	J								
Unknown Dione (RT 8.8 min)			280	J	580	J	290	J			420	J	530	J	370	J	350	J
Substituted Biphenyl C15H16 (RT min)			200	J														
Substituted Biphenyl C15H16 (RT min)																		
Unknown (RT 26.57 min)					160	J	190	J	230	J								
Unknown (RT 30.72 min)					110	J												
Unknown Hydrocarbon (RT 7.03 min)							670	J										
Unknown Hydrocarbon (RT 7.77 min)							690	J										
Unknown Hydrocarbon (RT 37.08 min)							100	J	130	J								
Unknown Hydrocarbon (RT 34.63 min)									95	J	350	J					200	J
Benzofluorene Isomer (RT 28.45 min)											170	J						
Unknown (RT 34.43 min)											660	J						
Benzofluoranthene Isomer (RT 34.53 min)											130	J						
Unknown PAH C20H12 (RT 35.0 min)											380	J						
Unknown Hydrocarbon (RT 35.23 min)											2100	J					360	J
Unknown Hydrocarbon (RT 35.57 min)											210	J						
Unknown Hydrocarbon (RT 36.53 min)											570	J	94	J			390	J
Unknown Hydrocarbon (RT 37.17 min)											1800	J					350	J
Unknown Hydrocarbon (RT 38.28 min)											610	J						
Unknown Hydrocarbon (RT 38.9 min)											550	J	77	J			170	J
Unknown Hydrocarbon (RT 39.68 min)											870	J					130	J
Unknown (RT 39.05 min)											540	J						
Unknown Sterol (RT 40.25 min)											1500	J						
Unknown Hydrocarbon (RT 41.02 min)											490	J						
Unknown (RT 25.2 min)													98	J	150	J	110	J
Unknown Hydrocarbon (RT 29.63 min)															120	J		
Unknown Hydrocarbon (RT 31.32 min)															170	J	91	J
Unknown Hydrocarbon (RT 32.72 min)															130	J		
Unknown Hydrocarbon (RT 32.9 min)															230	J		
Unknown Hydrocarbon (RT 33.68 min)															180	J		
Unknown (RT 33.38 min)															97	J		
Unknown (RT 36.93 min)															140	J		
Unknown Hydrocarbon C18H18 (RT 28.4 min)																	200	J
Unknown Hydrocarbon (RT 33.35 min)													110	J			290	J
Unknown (RT 40.95 min)													260	J			300	J
Unknown (RT 41.55 min)																	92	J
Unknown (RT 31.77 min)													180	J				
Propanoic Acid, 3,3'-Thiobis - didodecyl ester (RT 35.9 min)													180	J				
Unknown Hydrocarbon (RT 37.08 min)													84	J				
Dilution Factor	1		1		1		1		1		1		1		1		1	
Sampling Date	8/25/93		8/25/93		8/25/93		8/26/93		8/26/93		8/24/93		8/24/93		8/24/93		8/24/93	

Notes:
*Data have not been validated
(D)Field Duplicate Sample

BFI - Rockingham Landfill
Pesticides and PCBs in Sediment*
August, 1993

Site: BFI Landfill
SDG Number: AAC59 Case Number: 20671
Laboratory: Recra Environmental Inc.

Sample number	AAC43		AAC49		AAC52		AAC55		AAC58		AAC61		AAC70		AAC64		AAC67	
Sample Location	RS-1		RS-2		RS-2(D)		RS-3A		RS-4		SS-6		SS-6A		SS-8		SS-9	
Lab Number	AS043442		AS043439		AS043435		AS043429		AS043432		AS043417		AS043420		AS043423		AS043443	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Data Unit	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Alpha-BHC	2.3	U	2.2	U	2.2	U	2.6	U	2.3	U	2.4	U	2	U	2.1	U	1.9	U
Beta-BHC	2.3	U	2.2	U	2.2	U	2.6	U	2.3	U	2.4	U	2	U	2.1	U	1.9	U
Delta-BHC	2.3	U	2.2	U	2.2	U	2.6	U	2.3	U	2.4	U	2	U	2.1	U	1.9	U
Gamma-BHC (Lindane)	2.3	U	2.2	U	2.2	U	2.6	U	2.3	U	2.4	U	2	U	2.1	U	1.9	U
Heptachlor	2.3	U	2.2	U	2.2	U	2.6	U	2.3	U	2.4	U	2	U	2.1	U	1.9	U
Aldrin	2.3	U	2.2	U	2.2	U	2.6	U	2.3	U	2.4	U	2	U	2.1	U	1.9	U
Heptachlor Epoxide	2.3	U	2.2	U	2.2	U	2.6	U	2.3	U	2.4	U	2	U	2.1	U	1.9	U
Endosulfan I	2.3	U	2.2	U	2.2	U	2.6	U	2.3	U	2.4	U	2	U	2.1	U	1.9	U
Dieldrin	4.5	U	4.2	U	4.2	U	0.79	J	4.5	U	4.6	U	3.8	U	4.2	U	3.8	U
4,4'DDE	4.5	U	4.2	U	4.2	U	5	U	4.5	U	1	JP	3.8	U	4.2	U	0.48	JP
Endrin	4.5	U	4.2	U	4.2	U	5	U	4.5	U	6	J	3.8	U	4.2	U	3.8	U
Endosulfan II	4.5	U	4.2	U	4.2	U	5	U	4.5	U	0.79	JP	3.8	U	4.2	U	3.8	U
4,4'DDD	4.5	U	4.2	U	4.2	U	5	U	4.5	U	1.1	JP	0.68	J	4.2	U	3.8	U
Endosulfan Sulfate	4.5	U	4.2	U	4.2	U	5	U	4.5	U	4.6	U	3.8	U	4.2	U	3.8	U
4,4'DDT	4.5	U	4.2	U	4.2	U	4.1	J	4.5	U	4.6	U	0.6	JP	4.2	U	3.8	U
Methoxychlor	23	U	22	U	22	U	26	U	23	U	24	U	20	U	21	U	19	U
Endrin Ketone	4.5	U	4.2	U	4.2	U	5	U	4.5	U	4.6	U	3.8	U	4.2	U	3.8	U
Endrin Aldehyde	4.5	U	4.2	U	4.2	U	5	U	4.5	U	4.6	U	3.8	U	4.2	U	3.8	U
Alpha Chlordane	2.3	U	2.2	U	2.2	U	2.6	U	2.3	U	0.91	JP	2	U	2.1	U	1.9	U
Gamma Chlordane	2.3	U	2.2	U	2.2	U	2.6	U	2.3	U	2.4	U	2	U	2.1	U	1.9	U
Toxaphene	230	U	220	U	220	U	260	U	230	U	240	U	200	U	210	U	190	U
Aroclor 1016	45	U	42	U	42	U	50	U	45	U	46	U	38	U	42	U	38	U
Aroclor 1221	91	U	86	U	86	U	100	U	92	U	93	U	78	U	85	U	76	U
Aroclor 1232	45	U	42	U	42	U	50	U	45	U	46	U	38	U	42	U	38	U
Aroclor 1242	45	U	42	U	42	U	50	U	45	U	46	U	38	U	42	U	34	J
Aroclor 1248	45	U	42	U	42	U	50	U	45	U	46	U	38	U	42	U	38	U
Aroclor 1254	45	U	42	U	42	U	50	U	45	U	46	U	38	U	42	U	38	U
Aroclor 1260	45	U	42	U	42	U	50	U	45	U	46	U	38	U	42	U	38	U
Dilution Factor	1		1		1		1		1		1		1		1		1	
Sampling Date	8/25/93		8/25/93		8/25/93		8/26/93		8/26/93		8/24/93		8/24/93		8/24/93		8/25/93	

Notes:
*Data have not been validated
(D)Field Duplicate Sample

BFI - Rockingham Landfill
Volatile Organic Analytes in Sediment*
August, 1993

Site: BFI Rockingham
SDG Number: AAC59
Case Number: 20671
Laboratory: Recra Environmental Inc.

Sample Number	AAC41	AAC47	AAC50	AAC53	AAC56	AAC59	AAC68	AAC82	AAC85
Sample Location	RS-1	RS-2	RS-2(D)	RS-3A	RS-4	SS-6	SS-6A	SS-8	SS-9
Lab Number	AS043440	AS043437	AS043433	AS043427	AS043430	AS043415	AS043418	AS043421	AS043424
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Data Unit	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Chloromethane	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
Bromomethane	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
Vinyl Chloride	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
Methylene Chloride	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
Acetone	15	12 U	14 U	25	36	13 U	11 U	14 U	11 U
Carbon Disulfide	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
1,1-Dichloroethene	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
1,1-Dichloroethane	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
1,2-Dichloroethene (total)	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
Chloroform	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
1,2-Dichloroethane	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
2-Butanone	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
1,1,1-Trichloroethane	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
Carbon Tetrachloride	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
Bromodichloromethane	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
1,2-Dichloropropane	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
cis-1,3-Dichloropropene	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
Trichloroethene	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
Dibromochloromethane	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
1,1,2-Trichloroethane	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
Benzene	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
trans-1,3-Dichloropropene	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
Bromoform	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
4-Methyl-2-Pentanone	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
2-Hexanone	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
Tetrachloroethene	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
1,1,1,2-Tetrachloroethane	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
Toluene	14 U	1 BJ	14 U	15 U	13 U	13 U	11 U	14 U	11 U
Chlorobenzene	14 U	1 BJ	14 U	15 U	13 U	13 U	11 U	14 U	11 U
Ethylbenzene	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
Styrene	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
Total Xylenes	14 U	12 U	14 U	15 U	13 U	13 U	11 U	14 U	11 U
Dilution Factor	1	1	1	1	1	1	1	1	1
Sampling Date	8/25/93	8/25/93	8/25/93	8/26/93	8/26/93	8/24/93	8/24/93	8/24/93	8/24/93
Tentatively Identified Compounds									
Unknown Siloxane (RT 21.33 min)						69 J	290 J		
Unknown Siloxane (RT 21.40 min)									110 J
Unknown Siloxane (RT 24.23 min)									13 J
Unknown (RT 24.17 min)							32 J		

Notes:
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(D)= Field Duplicate Sample

BFI - Rockingham Landfill
Inorganic Analytes in Sediment*
August, 1993

Site: BFI Rockingham
SDG Number: MAW143 Case Number: 2 0671
Laboratory: ChemTech Consulting Group

Sample Number			MAW-143		MAW-144		MAW-147		MAW-148		MAW-149		MAW-150		MAW-151		MAW-152		MAW-153		MAW-154		MAW-155		MAW-156	
Sample Location			RS-1		RS-1		RS-2		RS-2		RS-2(D)		RS-2(D)		RS-3A		RS-3A		RS-4		RS-4		SS-6		SS-6	
Lab Number			18632S		18644S		18633S		18645S		18631S		18643S		18635S		18647S		18636S		18648S		18627S		18639S	
Matrix			Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Data Unit	CRDL	IDL	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Aluminum	200	56	14400				12700				11200				13000				7960				12000			
Antimony	60	36	9.8	U			9.8	U			9.2	U			11.2	U			9.9	U			10.5	U		
Arsenic	10	4	2.8				2.7				2.8				2.7	B			1.5	B			7.6			
Barium	200	15	49.4	B			53.2	B			44.7	B			56.4	B			35.1	B			137			
Beryllium	5	2	0.55	U			0.54	U			0.51	U			0.62	U			0.55	U			0.59	U		
Cadmium	5	3	0.82	U			0.82	U			0.77	U			0.93	U			0.83	U			0.88	U		
Calcium	5000	357	5380				3060				2780				2780				2260				41900			
Chromium	10	6	22.3				19.9				17.6				25.7				16.8				20			
Cobalt	50	8	15.5				13.9				13.7				12.1	B			8.9	B			17.9			
Copper	25	11	37.8				36.7				33.3				30.1				23.3				66.6			
Iron	100	18	26700				25500				23100				21900				14700				49800			
Lead	3	19	10.6	N			11.4				9.6				14.2				10.4				12.2			
Magnesium	5000	185	8780				6480				5890				6140				3740				6770			
Manganese	15	7	636				703				675				420				272				3550			
Mercury	0.2	0.2	0.14	U			0.14	U			0.13	U			0.16	U			0.14	U			0.15	U		
Nickel	40	12	29.3				27.7				25.1				25.5				16.2				20.3			
Potassium	5000	380	2010				1840				1600				1570				856	B			1670			
Selenium	5	2	0.55	U			0.54	U			0.51	U			0.62	U			0.55	U			5.9	U		
Silver	10	6	1.6	U			1.6	U			1.5	U			1.9	U			1.7	U			1.8	U		
Sodium	5000	204	181	B			200	B			201	B			254	B			182	B			499	B		
Thallium	10	2	0.55	U			0.54	U			0.51	U			0.62	U			0.55	U			0.59	U		
Vanadium	50	12	22				24.2				20.3				25.3				14.5				18.7			
Zinc	20	4	84.8				97.2				90.7				98.4				61.4				728			
Cyanide					1.4	U			1.4	U			1.4	U			1.6	U			1.4	U			1.5	U
Sample Date			08/24/93		08/24/93		08/24/93		08/24/93		08/25/93		08/25/93		08/26/93		08/26/93		08/26/93		08/26/93		08/24/93		08/24/93	

Notes:
*Data have not been validated
(D)Field Duplicate Sample

BFI - Rockingham Landfill
Inorganic Analytes in Sediment*
August, 1993

Site: BFI Rockingham
SDG Number: MAW143 Case Number: 2
Laboratory: ChemTech Consulting Group

Sample Number			MAW-157		MAW-158		MAW-159		MAW-160		MAW-161		MAW-162	
Sample Location			SS-8		SS-8		SS-9		SS-9		SS-6A		SS-6A	
Lab Number			18629S		18641S		18630S		18642S		18628S		18640S	
Matrix			Soil		Soil		Soil		Soil		Soil		Soil	
Data Unit	CRDL	IDL	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Aluminum	200	56	3860				7740				8630			
Antimony	60	36	8.9	U			8.3	U			8.5	U		
Arsenic	10	4	2.1	B			2	B			3.1			
Barium	200	15	20	B			42.8	B			33	B		
Beryllium	5	2	0.49	U			0.46	U			0.47	U		
Cadmium	5	3	0.74	U			0.69	U			0.71	U		
Calcium	5000	357	1530				5030				4710			
Chromium	10	6	73.7				14.5				15.6			
Cobalt	50	8	7.2	B			9.4	B			10.6	B		
Copper	25	11	67.8				33.2				32.2			
Iron	100	18	25700				19700				18500			
Lead	3	19	13.5				6.2				10.6			
Magnesium	5000	185	2150				4020				4400			
Manganese	15	7	1130				550				491			
Mercury	0.2	0.2	0.12	U			0.12	U			0.12	U		
Nickel	40	12	57				18.4				17			
Potassium	5000	380	466	B			1210				1190			
Selenium	5	2	0.49	U			4.6	U			0.47	U		
Silver	10	6	1.5	U			1.4	U			1.4	U		
Sodium	5000	204	155	B			166	B			175	U		
Thallium	10	2	0.49	U			0.76	B			0.76	B		
Vanadium	50	12	9.7	B			16.6				19.3			
Zinc	20	4	62.5				57.1				65.9			
Cyanide					1.2	U			1.2	U			1.2	U
Sample Date			08/24/93		08/24/93		08/24/93		08/24/93		08/24/93		08/24/93	

Notes:
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(D)Field Duplicate Sample