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SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM
EPA CONTRACT 68-W5-0009

22 December 1999
20098-041-001-7168-70
DC No. A-4409

Mr. Charles Schwer
State of Vermont
Agency of Natural Resources
Vermont Department of Environmental Conservation
Hazardous Materials Management Division
103 South Main Street
Waterbury, VT 05671-0404

Subject: Final Site Inspection Report
River Street Dump
Richford, Vermont
CERCLIS No. VTD988366605
TDD No. 99-05-0142

Dear Mr. Schwer:

Enclosed is one copy of the Final Site Inspection (SI) Report for the River Street Dump property in Richford, Vermont. The U.S. Environmental Protection Agency Region I, Office of Site Remediation and Restoration and the Vermont Department of Environmental Conservation comments regarding the contents of the Draft SI Report have been incorporated.

Please contact the undersigned at (781) 229-6430 if you have any questions regarding this report.

Very truly yours,

ROY F. WESTON, INC.
Region I START

Christopher Skluney
Site Leader

Daniel Keefe
Project Leader

CLS:cls
Enclosures
cc: C. Marchant (EPA Task Monitor)

FINAL SITE INSPECTION REPORT
FOR
RIVER STREET DUMP
RICHFORD, VERMONT

Prepared For:
U.S. Environmental Protection Agency
Region I
1 Congress Street
Suite 1100 (HBS)
Boston, MA 02114-2023

CONTRACT NO. 68-W5-0009

CERCLIS NO. VTD988366605
TDD NO. 99-05-0142
PCS NO. 7168
DC NO. A-4409

Submitted By:
Roy F. Weston, Inc. (WESTON®)
Superfund Technical Assessment and Response Team (START)
217 Middlesex Turnpike
Burlington, MA 01803

22 December 1999

Region I START
Reviewed and Approved:

Christopher Sklarey — Date: 12/22/99
Site Leader

Daniel Keefe — Date: 12/22/99
Project Leader

QA Review — Date: 12/22/99

Work Order No. 20098-041-001-7168-70

DISCLAIMER

This report was prepared solely for the use and benefit of the U.S. Environmental Protection Agency Region I (EPA Region I), Office of Site Remediation and Restoration, for the specific purposes set forth in the contract between the EPA Region I and the Roy F. Weston, Inc. (WESTON®), Superfund Technical Assessment and Response Team (START). Professional services performed and reports generated by START have been prepared for EPA Region I purposes as described in the START contract. The information, statements, and conclusions contained in the report were prepared in accordance with the statement of work, and contract terms and conditions. The report may be subject to differing interpretations or misinterpretation by third parties who did not participate in the planning, research or consultation processes. Any use of this document or the information contained herein by persons or entities other than the EPA Region I shall be at the sole risk and liability of said person or entity. START, therefore, expressly disclaims any liability to persons other than the EPA Region I who may use or rely upon this report in any way or for any purpose.

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Richford, Vermont

CERCLIS No. VTD988366605
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INTRODUCTION

The Roy F. Weston, Inc. (WESTON®) Superfund Technical Assessment and Response Team (START) was requested by the U.S. Environmental Protection Agency Region I (EPA Region I), Office of Site Remediation and Restoration, to perform a Site Inspection (SI) of the River Street Dump (RSD) property on River Street in Richford, Vermont. Tasks were conducted in accordance with the SI scope of work and technical specifications provided by EPA Region I. A Preliminary Assessment (PA) report for the RSD property was prepared by the Vermont Agency of Natural Resources (VT ANR) [currently Vermont Department of Environmental Conservation (VT DEC)] for EPA Region I on 6 June 1990. VT DEC determined that based upon historical information and property conditions, an SI of medium priority was required. On the basis of the information provided in the PA, the RSD SI was initiated.

Background information used in the generation of this report was obtained through file searches conducted at EPA Region I, VT DEC, telephone interviews with town officials, conversations with persons knowledgeable of the RSD property, and conversations with other Federal, State, and local agencies.

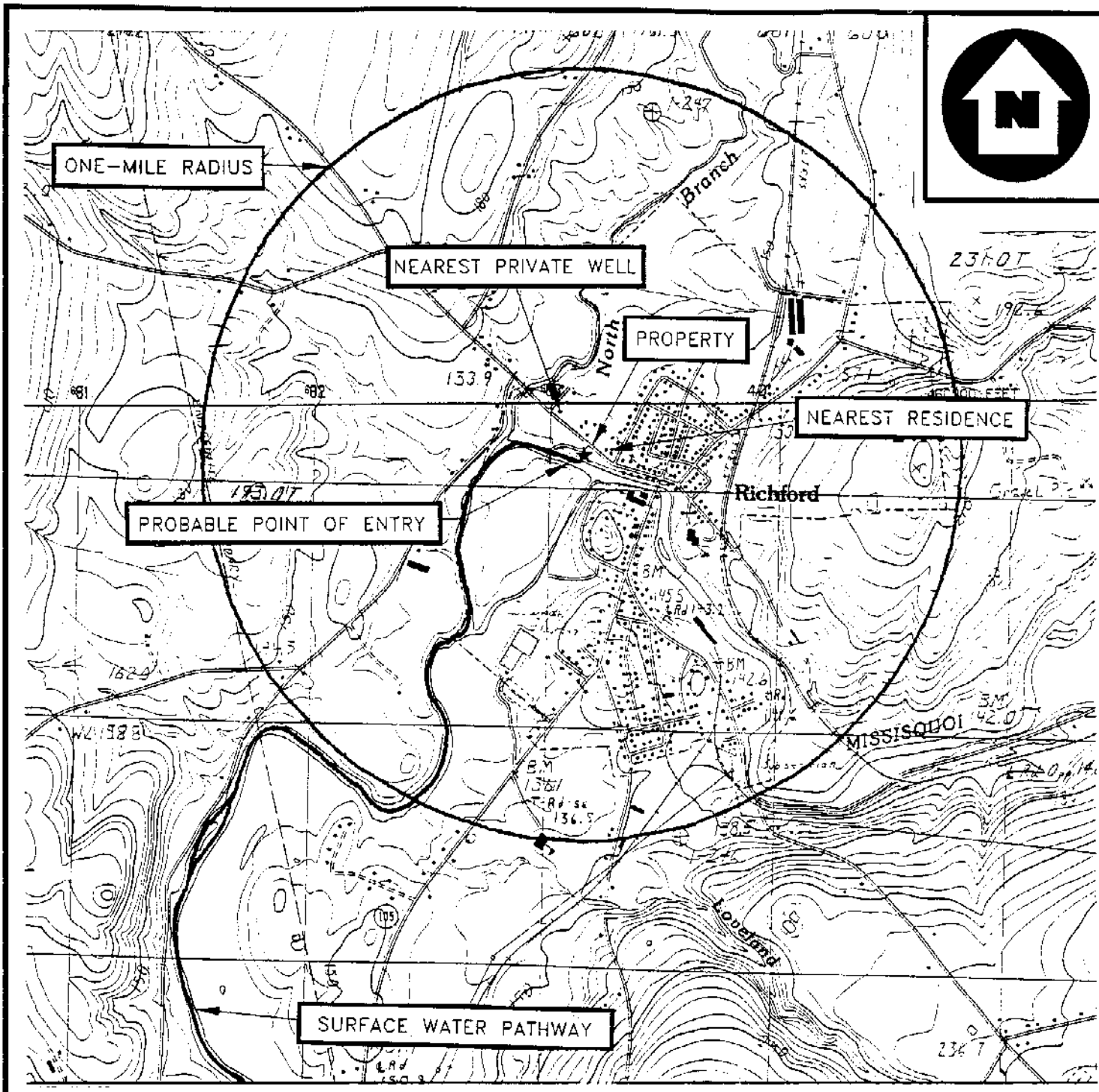
This package follows the guidelines developed under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, commonly referred to as Superfund. However, these documents do not necessarily fulfill the requirements of other EPA Region I regulations such as those under the Resource Conservation and Recovery Act (RCRA) or other Federal, State, or local regulations. SIs are intended to provide a preliminary screening of sites to facilitate EPA Region I's assignment of site priorities. They are limited efforts and are not intended to supersede more detailed investigations.

SITE DESCRIPTION

The RSD property is a 4-acre public recreational area located on River Street in Richford, Franklin County, Vermont at 44° 59′ 52.9″ north latitude and 72° 40′ 34.0″ west longitude (Figure 1) [7; 30]. Richford is located in northern Vermont, approximately 1 mile south of the United States-Canada border, 25 miles east of Lake Champlain, and 50 miles north of Montpelier, Vermont [2; 30]. The property is owned by the Village of Richford, but is not listed on town tax assessor maps [8; 19].

Land use in the vicinity of the property is residential and agricultural. The principal residential area of Richford is located to the east and southeast of the property. Land to the west and southwest of the property, in the flood plains of the Missisquoi River and North Branch, is used for agriculture. Uplands to the east of Richford and west of the Missisquoi River are forested [19; 30].

The property is situated approximately 1,000 feet upstream and east of the Missisquoi River and North Branch confluence (Figure 2). The property is bounded by private residences and River Street on the north and east, the Missisquoi River on the south, and Brown's Farm Supply on the west. Big Island, an agriculturally developed island surrounded entirely by the Missisquoi River, is located to the south of the property [19; 22, Plate 1; 30].



BASE MAP FROM A PORTION OF THE RICHFORD, VERMONT 7.5' USGS QUADRANGLE (PROVISIONAL EDITION, 1986).

QUADRANGLE LOCATION

SITE LOCATION MAP

RIVER STREET DUMP
RIVER STREET
RICHFORD, VERMONT

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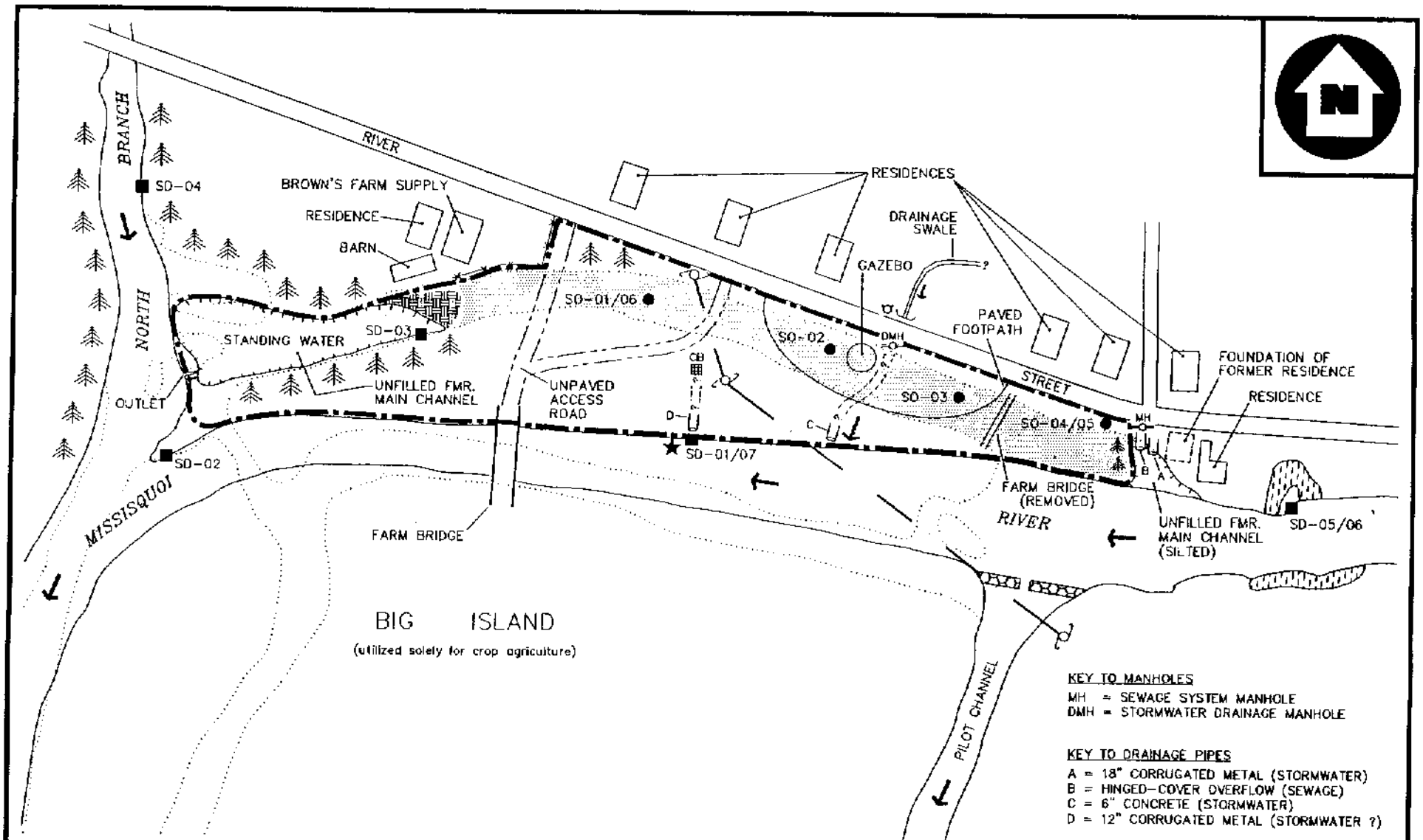
FIGURE 1



Base map from US Army Corps of Engineers (US COE) Missisquoi River Flood Control Project Plan (1961).
References: WESTON/START Field Book No. 00170-S (1997), US COE Missisquoi River Local Flood Protection Works Operation and Maintenance Manual (1964).

NOT TO SCALE

LEGEND

- SOURCE SAMPLE LOCATION
- SEDIMENT SAMPLING LOCATION
- PROBABLE POINT OF ENTRY
- SURFACE WATER FLOW DIRECTION
- GROUNDWATER DISCHARGE TO SURFACE WATER
- UNDERGROUND DRAINAGE PIPE (QUERIED WHERE UNCERTAIN)
- FENCE
- PROPERTY BOUNDARY
- DRAINAGE CULVERT
- CB CATCHBASIN
- MH MANHOLE
- HYDRANT
- UTILITY POLE
- TREE
- DRAINAGE PIPE
- UNFILLED PORTION OF FORMER MAIN CHANNEL
- FILLED PORTION OF FORMER MAIN CHANNEL
- RIPRAP WEIR
- BEDROCK OUTCROP
- CLEAN FILL (NO WASTE)
- HIGH-TENSION UTILITY LINE
- CHANNEL OF MISSISQUOI RIVER PRIOR TO 1961

SITE SKETCH

RIVER STREET DUMP
RIVER STREET
RICHFORD, VERMONT

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FILE NAME: S:\97020041\FIG2.DWG

FIGURE 2

OPERATIONAL AND REGULATORY HISTORY AND WASTE CHARACTERISTICS

According to historical information, the RSD property was occupied by the main channel of the Missisquoi River prior to 1961. Ice-jam floods associated with seasonal snow melt, recorded in March 1950, 1955, and 1960, influenced the initiation of a channel realignment project conducted by the U.S. Army Corps of Engineers (COE). The project proposed the construction of a new main channel, both straighter and narrower in design than the existing main channel, in order to maintain a flow velocity great enough to prevent ice accumulation. E. J. Persons Construction Company of Newport, Vermont was awarded the subcontract to complete the channel improvement project, and began work on 22 November 1961. The project was completed on 27 May 1964 [22, p. 5].

A new main channel, riprap weir, pilot channel, dike, and steel farm bridge were created during the project. The new main channel was developed approximately 60 feet to the south. The former main channel, which was lined with grass and remained open in order to convey stormwater drainage and sewage overflow, was abandoned. The riprap weir was constructed at the head of the pilot channel as a cross-stream structure, in order to maintain adequate flow velocity through the new main channel and subsequently prevent ice jams from occurring. The pilot channel, a former diverging channel of the Missisquoi River around Big Island, was developed to receive new main channel overflow during flood events. The dike, comprised of 18-inch riprap over a bed of 6-inch gravel, was constructed at the head of the former main channel. A notch was inserted into both the riprap weir and the dike to convey overflow from the new main channel into the pilot channel and the former main channel, respectively. A bridge spanning the former main channel was removed, and a steel farm bridge was constructed across the new main channel [22, pp. 13-14].

Alluvial deposits were removed, and the new main channel was deepened and tapered inward downstream to increase the flow velocity of the Missisquoi River around Big Island. The new main channel was constructed with a design capacity equivalent to the return period of a one-year flood event on the Missisquoi River [4,000 cubic-feet per second (cfs)]. Additionally, a 300-foot island on the west side of Big Island and three shoals near the mouth of the North Branch were removed. Excavation spoils were used to fill a point bar channel on the west side of Big Island, downstream of the Missisquoi River and North Branch confluence [22, pp. 13-14].

On 5 October 1971, an inspection of the channel improvement noted that the former main channel was receiving flow from the new main channel on a continual basis, and was heavily vegetated and silted. The diverted flow into the former main channel subsequently reduced the flow velocity in the new main channel, and resulted in continued ice jams. A sewage treatment system, installed by the Village of Richford at an unknown time between 1964 and 1971, made obsolete the function of the former main channel as a pathway for stormwater and sewage overflow. Selectmen from Richford reportedly requested closing the notch in the dike or dredging the new main channel. However, no action was taken by COE [32].

On 9 September 1975, a Vermont Agency of Environmental Conservation (VT AEC) memorandum discussed development of the former main channel into a park. The proposal suggested filling and grading the former main channel and purchasing any adjacent land necessary to construct the park. At the time of the memorandum, the former main channel was heavily vegetated and silted [33].

In 1975, the Village of Richford opened the former main channel to any party disposing of (landfilling) acceptable fill material (trees stumps and limbs, dirt, stone, concrete, and limited amounts of lumber). However, unauthorized fill material, consisting of construction debris, tires, automobile parts, and municipal wastes, was reported to be present during VT AEC inspections conducted periodically between 1978 and 1982 [34; 35; 37]. The former main channel was backfilled with topsoil from an unknown off-site source and seeded with grass by Richford in 1982. The area was subsequently developed into a park [36].

A 30 January 1989 memorandum from a State of Vermont Public Facilities Division Water Supply Engineer to the State of Vermont Director of Hazardous Materials Division noted a complaint filed by a Richford citizen. The complainant stated that he had in his possession "one gallon of capacitor oil identical to the oil in the capacitors." Using a General Electric (GE) Chloronol polychlorinated biphenyl (PCB) test kit, the citizen allegedly recorded a chloride concentration of 50 parts per million (ppm) from a sample he found in the dump. The complainant also alleged that three PCB-containing capacitors and an unknown quantity of mercury vapor lamps were disposed of in the dump abutting River Street at some time between the beginning of the channel improvement project in 1961 and the closing of the dump in 1982. The complainant accused Citizens Utilities (CU) of disposing of the capacitors in the former main channel [38]. PCB-containing capacitors or mercury vapor lamps were not reported during VT AEC inspections.

According to CU, all PCB-containing capacitors were stored in a ware house in Richford pending PCB-disposal regulations which were promulgated in 1979 [3]. No other file information was available to START regarding the disposal of these capacitors or the years of accumulation. Moreover, START obtained manifests (dated from 1982 to 1987) which document the disposal of PCB-containing capacitors stored at CU's warehouse in Pine Hill, Vermont. It is unknown if these shipments contained the capacitors which were stored in CU's Richford warehouse [21].

A PA was conducted by the Hazardous Material Management Division of VT ANR for EPA Region I and submitted on 6 June 1990. The report recommended a medium priority assessment for an SI [39, p. 6].

START personnel conducted an on-site reconnaissance on 17 June 1997 and conducted environmental sampling on 7 April 1998. During on-site activities, START personnel observed that the RSD property was utilized as a public recreational area, and contained a maintained lawn and trees. Additionally, an arc-shaped paved walkway and five benches were observed. The only improved structure present on the property was one covered, open-sided gazebo. A set of overhead utility lines extended along the northern portion of the property parallel to River Street. Another set of utility lines extended from the northwestern portion of the property to a utility pole across the Missisquoi River and immediately upstream of the riprap weir. One catchbasin and one manhole were located on the southwestern and the eastern portions of the property, respectively [19].

START personnel observed three stormwater drainage pipes, one sewage overflow pipe, and one catchbasin on the RSD property. The outflow for all the pipes enters the Missisquoi River. The most downstream stormwater drainage pipe is constructed of 12-inch diameter corrugated metal and is in poor condition. Based upon observations made by START personnel, the most downstream stormwater drainage pipe is connected to flow entering the on-site catchbasin. Additionally, a

sewage odor was detected emanating from the catchbasin. A second drainage pipe constructed of 6-inch diameter concrete is located approximately 100 feet upstream of the corrugated metal pipe. START personnel observed surface water drainage entering an identical pipe in a drainage culvert on the opposite side of River Street. START personnel observed stormwater discharge from the corrugated metal pipe and the concrete pipe during the sampling event. A sewage overflow pipe and a third drainage pipe were observed approximately 15 feet apart in the upper portion of the unfilled former main channel. Sewage waste was observed at the outlet of the sewage overflow pipe, although the flip-up pipe cover was closed. The third drainage pipe, constructed of 18-inch diameter corrugated metal, was observed approximately 15 feet upstream of the sewage overflow pipe. START personnel did not observe discharge from the sewage overflow pipe or the corrugated metal pipe during on-site activities [19].

START personnel collected seven sediment samples from the Missisquoi River and North Branch, and six soil samples from the filled former main channel (Figure 2). The sediment samples were sent to a procured Delivery of Analytical Services (DAS) laboratory for volatile organic compound (VOC), semivolatile organic compound (SVOC), pesticide/PCB, and inorganic (total metals and cyanide) analyses. The soil samples were sent to EPA Contract Laboratory Program (CLP) laboratories for the same analyses. Analytical results are discussed in the appropriate sections of this report.

Table 1 presents the identified area on the RSD property that is a potential source of contamination, the associated source containment factor, and the relative location of the potential source.

Table 1

Source Evaluation for River Street Dump

Source Area	Containment Factors	Spatial Location
Filled Former Main Channel	None	Located in the filled portion of the former main channel.

[19; 38]

The potentially hazardous substances that allegedly have been disposed of on the RSD property are presented in Table 2.

Table 2

Hazardous Waste Quantity for River Street Dump

Substances	Quantity	Years of Use/Storage	Years of Disposal	Source Area
PCB-containing Capacitors	Unknown	Not applicable	1975-1982	Filled former main channel
Mercury Vapor Lamps	Unknown	Not applicable	1975-1982	Filled former main channel

PCB = Polychlorinated biphenyl.

[19; 34; 38]

Kaytec, Inc. (VT5000000653) and Sweat Comings, Inc. (VTD002077709) are the only known RCRA facilities in Richford, and no known CERCLA or National Priorities List (NPL) properties are present in Richford or within 1-radial mile [24; 25].

WASTE/SOURCE SAMPLING

Potential sources may be present in the filled portion of the former main channel, which is presently covered by a maintained lawn and public recreational area. The former main channel was intended to serve as a disposal area for tree stumps, tree branches, grass clippings, and other non-hazardous refuse only, but was additionally utilized as a disposal area for construction debris, tires, automobile parts, and other assorted municipal wastes. PCB-containing capacitors and mercury vapor lamps were allegedly disposed of in the former main channel. Based upon historical information and START on-site observations, refuse and potential sources (if present) are located approximately 5 to 15 feet below the present ground surface.

START did not collect waste/source samples as part of the RSD SI. Soil samples were collected from the park (filled former main channel) at a depth of 0 to 2 feet below the ground surface to determine the potential threat to the nearby population. Additionally, soil sample analytical results were utilized to determine whether potential sources were present within 2 feet of the ground surface. Soil sample analytical results are discussed in the Soil Exposure Pathway section of this report.

GROUNDWATER PATHWAY

The two principal aquifers underlying the RSD property are an unconfined unconsolidated deposit (water table) aquifer and a crystalline bedrock aquifer. The unconsolidated deposits are comprised of well-sorted sands and gravels of Quaternary-aged stratified drift and alluvial deposits [42, pp. 15-17, Plate I]. The unconsolidated deposit aquifer has excellent groundwater potential for municipal and industrial purposes [6]. Reportedly, wells drilled into the aquifer are generally less

than 70 feet deep and produce yields from 30 to 400 gallons per minute (gpm) [28, p. 422]. Due to the proximity of the RSD property to the Missisquoi River, the groundwater elevation is expected to be approximately 5 feet less than the ground surface [19].

The bedrock underlying the property is comprised of green quartz-chlorite-sericite phyllites of the Cambrian Underhill Formation. The rocks strike generally north-northeast and dip steeply (approximately 55° to 85°) to the west-northwest [4, pp. 19-23, Plate 3]. The crystalline bedrock aquifer is generally confined and has low to moderate potential for municipal and industrial purposes due to the lack of primary porosity and the available groundwater in the unconfined aquifer. However, yields should be suitable for domestic purposes. Wells drilled into the aquifer range between 100 and 600 feet deep, and commonly yield up to 10 gpm [28, p. 422]. Highly fractured zones should be expected to produce greater yields due to increased secondary porosity.

The property is located within the Missisquoi River Valley, which was scoured by Pleistocene glacial activity and filled with stratified drift deposits. The U.S. Geological Survey (USGS) maintains an observation water table (overburden) well in the Missisquoi River valley, approximately 3 miles southwest of the property, and reports fine sand and gravel deposits greater than 50 feet thick [11, p. 178]. Morainal tills and lacustrine clays and silts, which often serve as confining layers between aquifers, are not believed to be present locally. In such a case, the unconsolidated deposit and crystalline bedrock aquifers may be interconnected, resulting in the presence of a single, unconfined aquifer beneath the property [28, p. 421]. However, no known hydrogeologic investigation has been conducted to date.

Groundwater monitoring wells are not present on the property, and most of the local residences are served by the Richford Public Water Supply (surface water source), resulting in a lack of specific data regarding groundwater movement. Due to the high permeability of fill deposits, groundwater may flow parallel to the downstream direction of flow for the length of the filled former main channel, although exact flow direction is unknown. Groundwater was not monitored during the PA [39, p. 1]. During START on-site activities, groundwater was observed discharging from the property to the Missisquoi River [19]. Based upon available information and START observations, groundwater at the property is assumed to flow in a southerly direction toward the Missisquoi River.

The Village of Richford (population 1,414) and the Town of Berkshire (population 1,190) are the only Vermont municipalities either wholly or partially located within 4-radial miles of the RSD property. No public groundwater sources are known to be located within 4-radial miles of the property [11; 12; 47, pp. 25-27].

No private drinking water supply wells are located on the RSD property. The nearest private drinking water well is located in Richford, approximately 1,000 feet west and topographically upgradient of the property [11; 12; 19; 47, pp. 25-27]. Private groundwater supplies within 4-radial miles of the property were estimated using equal distribution calculations of U.S. Census CENTRACTS data identifying population, households, and private drinking water wells for "Block Groups" that lie within or partially within individual radial distance rings of the RSD property. The estimated number of residents utilizing private drinking water wells within 4-radial miles of the property is 303 persons [5, pp. 5-8; 19]. Table 3 summarizes private and public well populations utilizing groundwater sources within 4-radial miles of the RSD property.

Table 3

Estimated Drinking Water Populations Served by Groundwater Sources Within 4-Radial Miles of River Street Dump

Radial Distance From River Street Dump (miles)	Estimated Population Served by Private Wells	Estimated Population Served by Public Wells	Total Estimated Population Served by Groundwater Sources Within the Ring
≥ 0.00 to 0.25	2	0	2
> 0.25 to 0.50	5	0	5
> 0.50 to 1.00	22	0	22
> 1.00 to 2.00	87	0	87
> 2.00 to 3.00	72	0	72
> 3.00 to 4.00	115	0	115
TOTAL	303	0	303

[5, pp. 5-8]

START did not collect groundwater samples as part of the RSD SI. According to historical information, no groundwater samples have been collected from the RSD property or from local wells to date. Based on the location and proximity of the surrounding residential wells, no nearby drinking water sources are known or suspected to have been impacted by a release from on-site sources.

SURFACE WATER PATHWAY

The RSD property is located within the St. Lawrence River Drainage Basin at an approximate elevation of 425 feet above mean sea level [22, Plate 2; 30]. The Missisquoi River, the only surface water body along the 15-mile downstream surface water pathway (downstream pathway), drains 867 square miles (mi^2) in northern Vermont and southern Quebec, Canada [22, p. 1; 11, p. 119]. From its source in the Green Mountains in northern Vermont, the Missisquoi River flows north into Canada before turning to the southwest and eventually emptying into Lake Champlain [11, p. 2]. The water body located along the 15-mile downstream surface water pathway is described in Table 4.

Table 4

Surface Water Bodies Along the 15-Mile Downstream Pathway from River Street Dump

Surface Water Body	Descriptor [a]	Length of Reach (miles)	Flow Characteristics (cfs)	Length of Wetlands (miles)
Missisquoi River	Moderate to large stream	5.5	>100 to 1,000	1.3
	Large stream to river	9.5	>1,000 to 10,000	2.2

[a] Minimal stream <10 cfs. Small to moderate stream 10-100 cfs. Moderate to large stream >100-1,000 cfs. Large stream to river >1,000-10,000 cfs. Large river >10,000-100,000 cfs. Very large river >100,000 cfs. Coastal tidal waters (flow not applicable). Shallow ocean zone or Great Lake (flow not applicable). Moderate depth ocean zone or Great Lake (flow not applicable). Deep ocean zone or Great Lake (flow not applicable). Three-mile mixing zone in quiet flowing river 10 cfs or greater.

cfs = Cubic feet per second.

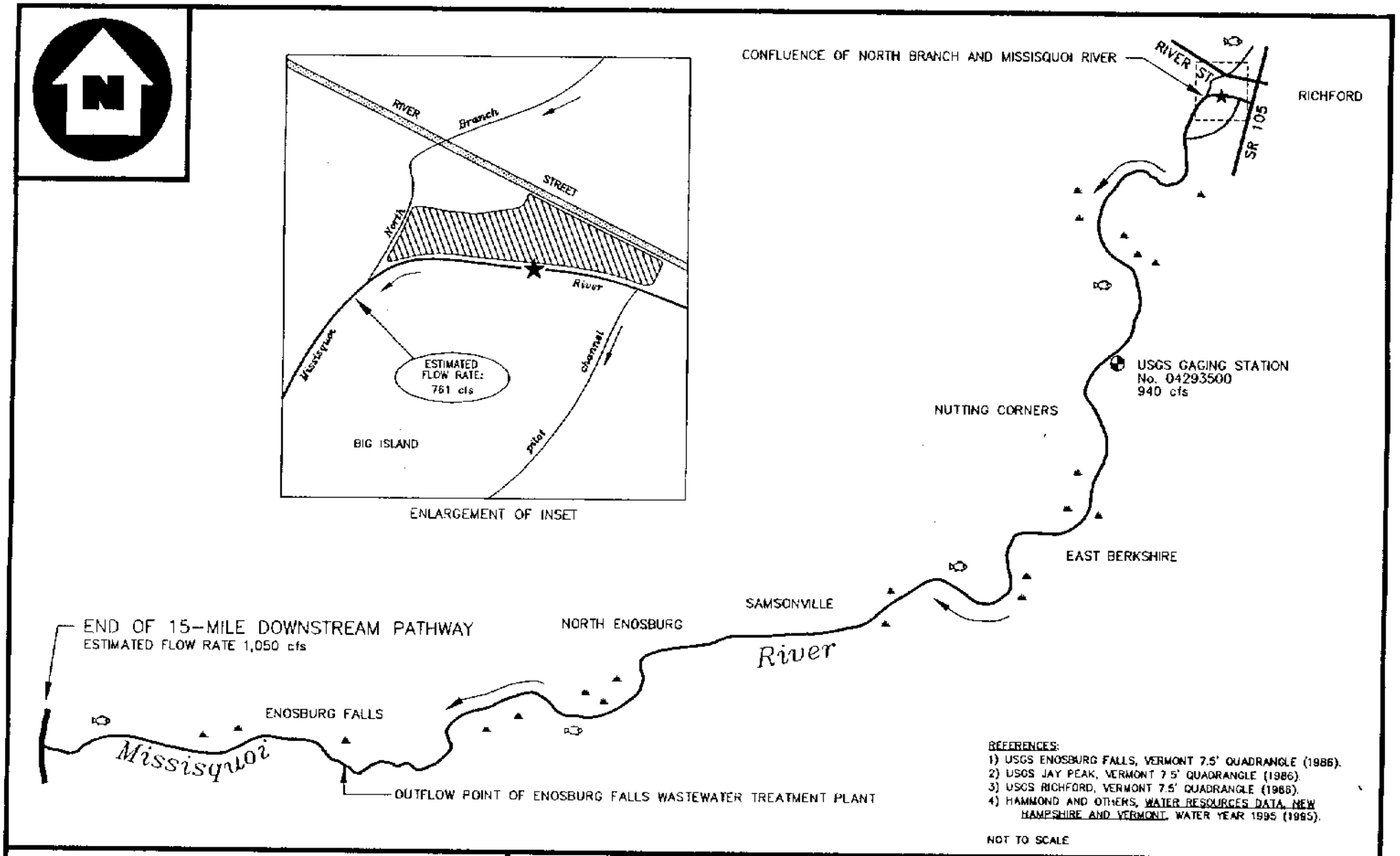
[22, p. 1; 26; 27; 31, p. 118]

The most upstream probable point of entry (PPE) of contaminants to the Missisquoi River is at the southeastern border of the property, near the riprap dike at the head of the former main channel (Figure 2). The downstream pathway extends from Richford to the 15-mile terminus at Enosburg Falls (Figure 3) [29; 30]. The terrain of the property is generally flat with a gentle slope toward the Missisquoi River. Stormwater run-off flows south into the Missisquoi River or into a catchbasin on the western portion of the property. The catchbasin discharges the overland flow to the Missisquoi River via the underground culvert located on the southwestern portion of the property. The length of the overland flow segment is approximately 100 feet at the point on the property farthest from the PPE [19].

The discharge and the drainage area of the Missisquoi River at the PPE is estimated by START to be approximately 760 cfs and 390 mi^2, respectively [13]. One gaging station is present along the downstream pathway. The discharge at USGS Gaging Station No. 04293500, 4.0 miles downstream of the property, is 940 cfs. The area of the drainage basin at the USGS gaging station is 479 mi^2 [31, p. 118]. The discharge and the drainage area of the Missisquoi River at the end of the downstream pathway is estimated by START to be approximately 1,050 cfs and 1,900 mi^2, respectively [13].

The Missisquoi River is designated as a Class B water body by the Vermont Water Resources Board [41]. Along the downstream pathway, the Missisquoi River is regarded as a cold-water fishery from the PPE to the outlet of the Enosburg Falls Wastewater Treatment Facility, 12.8 miles downstream. The Missisquoi River is regarded as a warm-water fishery for the remainder of the downstream pathway [15; 16; 17].

The Richford Public Water System is used throughout the year, supplying approximately 1,850 people via 525 service connections [40]. The surface water intake for the system is located on Stanhope Brook, 3.94 miles east-southeast and upgradient of the property at an altitude of



REFERENCES:
1) USGS ENOSBURG FALLS, VERMONT 7.5' QUADRANGLE (1986).
2) USGS JAY PEAK, VERMONT 7.5' QUADRANGLE (1986).
3) USGS RICHFORD, VERMONT 7.5' QUADRANGLE (1966).
4) HAMMOND AND OTHERS, WATER RESOURCES DATA, NEW HAMPSHIRE AND VERMONT, WATER YEAR 1995 (1995).

NOT TO SCALE

LEGEND

- RIVER STREET DUMP PROPERTY
- PROBABLE POINT OF ENTRY
- FLOW DIRECTION
- FISHERY
- WETLAND

SURFACE WATER PATHWAY SKETCH

RIVER STREET DUMP
RIVER STREET
RICHFORD, VERMONT

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FIGURE 3

approximately 760 feet above mean sea level [9; 14; 20, Figure 1]. A 950,000-gallon covered reservoir is used to store the drinking water [40]. No surface water drinking water intakes are located along the downstream pathway [10; 11; 12].

On 7 April 1998, START personnel collected seven sediment samples from six locations along the Missisquoi River. The sediment samples were analyzed for VOCs, SVOCs, pesticide/PCB compounds, and inorganics (total metals and cyanide) by a DAS laboratory. A description of sediment samples collected by START on 7 April 1998 is presented in Table 5.

Table 5

Sample Summary: River Street Dump
Sediment Samples Collected by START on 7 April 1998

Sample Location No.	Traffic Report No.	Time (hrs)	Sample Depth	Sample Source
MATRIX: Sediment				
SD-01 (MS/MSD)	DAFL79	0950	0-6 inches	Sediment sample collected from the most downstream outflow pipe to the Missisquoi River (Drainage Pipe D), approximately 300 feet upstream of the farm bridge. Sediment is light brown sand.
SD-02	DAFL80	1005	0-6 inches	Sediment sample collected from the Missisquoi River-North Branch confluence, approximately 600 feet downstream of the farm bridge. Sediment is gray clayey silt with orange mottles.
SD-03	DAFL81	1025	0-6 inches	Sediment sample collected from the downstream section of the filled former main channel at the rear (south) of Brown's Farm Supply, approximately 200 feet northwest of the farm bridge. Sediment is black muck.
SD-04	DAFL82	1040	0-6 inches	Sediment sample collected from the left shore of the North Branch, approximately 400 feet upstream of the Missisquoi River-North Branch confluence. Sediment is brown clayey silt.
SD-05	DAFL83	1050	0-6 inches	Reference sediment sample collected from right shore of the Missisquoi River, in an area of exposed bedrock approximately 200 feet upstream of the 18-inch corrugated metal stormwater drainage pipe and the hinged-cover sewage overflow pipe. Rusted pieces of scrap iron and other metal debris noted in the vicinity of SD-05. Sediment is light brown sand with some fine gravel.
SD-06	DAFL84	1100	0-6 inches	Reference sediment sample collected from the vicinity of SD-05, on the right shore of the Missisquoi River, in an area of exposed bedrock approximately 200 feet upstream of the 18-inch corrugated metal stormwater drainage pipe and the hinged-cover sewage overflow pipe. Rusted pieces of scrap iron and other metal debris noted in the vicinity of SD-06. Sample to be analyzed for inorganic elements only. Sediment is light brown sand with some fine gravel.
SD-07	DAFL85	0950	0-6 inches	Field duplicate sediment sample collected from the same location as SD-01.

hrs = Hours.
MS/MSD = Matrix spike/matrix spike duplicate.

Table 6 is a summary of organic compounds and inorganic elements detected through DAS laboratory analyses of the 7 April 1998 START sediment samples. For each sample location, a compound or element is listed if it is detected at three times or greater than the reference sample concentration (SD-05 and SD-06). However, if the compound or element is not detected in the reference sample, the reference sample's sample quantitation limit (SQL) (for organic analyses) or sample detection limit (SDL) (for inorganic analyses) is used as the reference value.

Table 6

Summary of START Analytical Results
Sediment Sample Analysis for River Street Dump
7 April 1998

Sample Location	Compound/ Element	Sample Concentration	Reference Concentration	Comments
SD-02 (DAFL80)	**INORGANICS**			
	Vanadium	12.4 mg/kg	9.0 U mg/kg	1.4 × SDL
SD-03 (DAFL81)	**INORGANICS**			
	Vanadium	18.1 mg/kg	9.0 U mg/kg	2.0 × SDL

U = Indicates the sample was analyzed but not detected and reports the detection value.
SDL = Sample Detection Limit.
mg/kg = Milligram per kilogram.

[45]

Complete analytical results of START sediment samples including quantitation and detection limits are presented in Attachment A. Sample results qualified with a "J" on analytical tables are considered approximate because of limitations identified during data validation. In addition, organic sample results reported at concentrations below quantitation limits and confirmed by mass spectrometry are also qualified by a "J" and considered approximate.

Several substances were either rejected or qualified during data validation. Non-detected results for 1,1,2,2-tetrachloroethane were rejected in all samples due to the laboratory's failure to identify and quantify the compound in the performance evaluation (PE) sample. The positive result for acetone in sediment sample SD-01 was rejected due to laboratory contamination [45, pp. 2-3]. Silver was rejected in analysis of sediment sample SD-05 due to interference of other inorganic elements. Positive results for lead were estimated due to poor field duplicate precision [46, pp. 2-3].

Analyses of the seven sediment samples collected by START indicated that one inorganic element was detected above the reference sample (SD-05) concentration value. Vanadium was detected at concentrations ranging from 1.4 to 2.0 times the reference sample detection limit (SDL); however, vanadium was not detected in soil samples collected from the property and therefore, is not considered attributable to on-site sources. Several inorganic elements (calcium, copper, iron, lead,

and zinc) were detected in the upstream reference sample SD-05 at concentrations greater than in any sediment sample collected from the Missisquoi River adjacent to the RSD property or from North Branch, suggesting a possible upgradient source of trace elements [46, Table 1].

START personnel performed sediment sampling as part of the RSD property SI. Based on analytical results from sediment samples collected by START, the Missisquoi River has not been impacted by a release of hazardous substances which may be attributable to the on-site source.

SOIL EXPOSURE PATHWAY

Surficial soils on the RSD property are composed of topsoil obtained from an unknown off-site source during development of the park in 1982 [36]. START personnel encountered medium to dark brown sandy silts during collection of the soil samples [19]. Reportedly, surficial soils in the vicinity of the RSD property are primarily composed of the Windsor, Munson, and Ondawa Variant series. The Windsor series soil is a deep (greater than 60 inches to bedrock), excessively drained, loamy fine sand formed on beaches, deltas, and terraces. The Munson series soil is a deep, somewhat poorly drained, silt loam formed in lacustrine or alluvial coarse silts deposited over clays. The Ondawa Variant series soil is a deep, well drained, silt loam formed in recent alluvium. The soils are moderately permeable and subject to seasonal flooding [23, pp. 88-94].

The property is located within the 100-year flood plain of the Missisquoi River [19]. According to a Richford town clerk, the park is maintained by an outside contractor, and pesticides are not used on the premises. Full-time employees or permanent residences are not present on the property. The nearest residence is located 100 feet to the north, on the north side of River Street, and an estimated 232 people live within 1-radial mile of the property [5; 19]. The nearest school is located 1.0 miles south of the property, and no day-care facilities are present within 200 feet of the alleged contamination [19; 30].

On 7 April 1998, START personnel collected six soil samples from five locations on the RSD property. The soil samples were analyzed for VOCs, SVOCs, pesticide/PCB compounds, total metals, and cyanide by CLP laboratories. Soil samples SO-04 and SO-05 were collected by START to establish reference conditions. Soil sample SO-05 was submitted for inorganics analysis only. A description of soil samples collected by START on 7 April 1998 is presented in Table 7.

Table 7

Sample Summary: River Street Dump
Soil Samples Collected by START on 7 April 1998

Sample Location No.	Traffic Report No.	Time (hrs)	Sample Depth	Sample Source
MATRIX: Soil				
SO-01 (MS/MSD)	ANN71 MALB51	0945	0-2 feet	Soil sample collected from the western portion of the former main channel; soil is medium brown sandy silt with organic matter (grass roots).
SO-02	ANN72 MALB52	1000	0-2 feet	Soil sample collected from the former main channel at a location situated between SO-01 and SO-03; soil is medium brown sandy silt with organic matter (grass roots).
SO-03	ANN73 MALB53	1015	0-2 feet	Soil sample collected from the eastern portion of the filled former main channel; soil is dark brown sandy silt with organic matter (grass roots).
SO-04	ANN74 MALB54	1030	0-2 feet	Soil sample collected from the northeastern portion of the property in an area undisturbed by the channel improvement project; soil is sandy silt with organic matter (grass roots).
SO-05	MALB55	1035	0-2 feet	Soil sample collected from the northeastern portion of the property in an area undisturbed by the channel improvement project; soil is sandy silt with organic matter (grass roots).
SO-06	ANN76 MALB56	0945	0-2 feet	Field duplicate soil sample collected from the same location as SO-01.

hrs = Hours.
ft = Feet.
MS/MSD = Matrix spike/matrix spike duplicate.

Table 8 is a summary of organic compounds and inorganic elements detected through CLP laboratory analyses of the 7 April 1998 START soil samples. For each sample location, a compound or element is listed if it is detected at three times or greater than the reference sample concentration (SO-04 and SO-05). However, if the compound or element is not detected in the reference sample, the reference sample's SQL (for organic analyses) or SDL (for inorganic analyses) is used as the reference value.

Table 8

Summary of START Analytical Results
Soil Sample Analysis for River Street Dump
7 April 1998

Sample Location	Compound/ Element	Sample Concentration		Reference Concentration		Comments
SO-01 (ANN71) (MALB51)	**INORGANICS**					
	Selenium	0.65	mg/kg	0.43 UJ	µg/kg	1.5 × SDL
SO-02 (ANN72) (MALB52	**VOCs**					
	Acetone	28 J	µg./kg	11 U	µg/kg	2.5 × SQL
	SVOCs					
	Chrysene	100 J	µg./kg	32 J	µg/kg	3.1 × Ref.
	Benzo(b)fluoranthene	80 J	µg/kg	22 J	µg./kg	3.6 × Ref.
	Benzo(k)fluoranthene	120 J	µg./kg	34 J	µg/kg	3.5 × Ref.
	INORGANICS					
	Calcium	11,200	mg/kg	1,650 J	mg/kg	6.79 × Ref.
SO-03 (ANN73) (MALB53)	**SVOCs**					
	Phenanthrene	2,400	µg/kg	27 J	µg/kg	89 × Ref.
	Fluoranthene	3,800*	µg/kg	53 J	µg/kg	72 × Ref.
	Pyrene	3,400*	µg/kg	54 J	µg/kg	63 × Ref.
	Benzo(a)anthracene	2,100	µg/kg	35 J	µg/kg	60 × Ref.
	Chrysene	2,100	µg/kg	32 J	µg/kg	66 × Ref.
	Benzo(b)fluoranthene	2,000	µg/kg	22 J	µg/kg	91 × Ref.
	Benzo(k)fluoranthene	1,500	µg/kg	34 J	µg/kg	44 × Ref.
	Benzo(a)pyrene	1,600	µg/kg	32 J	µg/kg	50 × Ref.
	Benzo(g,h,i)perylene	760	µg/kg	20 J	µg/kg	38 × Ref.
	Anthracene	520	µg/kg	330 U	µg/kg	1.6 × SQL
	Carbazole	420	µg/kg	330 U	µg/kg	1.3 × SQL
	Indeno(1,2,3-cd)pyrene	780	µg/kg	330 U	µg/kg	2.4 × SQL
	Dibenz(a,h)anthracene	340	µg/kg	330 U	µg/kg	1.0 × SQL
	INORGANICS					
	Calcium	7,910	mg/kg	1,650 J	µg/kg	4.79 × Ref.

Table 8

Summary of START Analytical Results
Soil Sample Analysis for River Street Dump
7 April 1998
(Concluded)

Sample Location	Compound/ Element	Sample Concentration	Reference Concentration	Comments
SO-06 (ANN76) (MALB56)	**VOCs**			
	Acetone	120 µg/kg	11 U µg/kg	11 × SQL
	PESTICIDES/PCBs			
	Heptachlor Epoxide	8.3 J µg/kg	1.7 U µg/kg	4.9 × SQL
	Aroclor-1254	140 µg/kg	3.4 U µg/kg	4.1 × SQL
	gamma-BHC (Lindane)	4.2 J µg/kg	1.7 U µg/kg	2.5 × SQL

*Sample diluted prior to analysis.

J = Quantitation is approximate due to limitations identified during the quality control review.
U = Indicates the sample was analyzed but not detected; reports the detection value.
UJ = Indicates the sample was analyzed but not detected; quantitation is approximate due to limitations identified during the quality control review.
SQL = Sample Quantitation Limit.
SDL = Sample Detection Limit.
Ref. = Reference value.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
VOCs = Volatile organic compounds.
SVOCs = Semivolatile organic compounds.
PCBs = Polychlorinated biphenyls.

[43; 44]

Complete analytical results of START soil samples including quantitation and detection limits are presented in Attachment B. Sample results qualified with a "J" on analytical tables are considered approximate because of limitations identified during data validation. In addition, organic sample results reported at concentrations below quantitation limits and confirmed by mass spectrometry are also qualified by a "J" and considered approximate.

Several substances were either rejected or qualified during data validation. Non-detected results for hexachlorocyclopentadiene were rejected in all soil samples due to the laboratory's failure to identify and quantify the compound in the performance evaluation (PE) sample. The positive result for dieldrin in soil sample SO-06 was rejected since compound identification criteria were not met by the laboratory. Positive results for heptachlor epoxide and Aroclor-1254 were estimated in field duplicate soil samples SO-01 and SO-06 due to poor field duplicate precision. Positive results for 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, and gamma-Chlordane were qualified as undetected in sample SO-06 due to co-elution with Aroclor-1254 [44, pp. 3-4].

Organic analysis of the soil samples collected by START indicated that one VOC, 13 SVOCs, and three pesticide/PCB compounds were detected at concentrations greater than or equal to the reference sample's SQL or at least three times the reference sample (SO-04) concentration. Concentrations range from being equal to the SQL (dibenz(a,h)anthracene in SO-03) to 91 times greater than the reference sample concentration (benzo(b)fluoranthene in SO-03). VOCs were detected at two sample locations (SO-02 and SO-06); SVOCs were detected at two locations (SO-02 and SO-03); pesticide/PCB compounds were detected at one location (SO-06) [44, Table 1].

Inorganic analysis of the soil samples collected by START indicated the presence of two inorganic elements at concentrations greater than or equal to the SDL or at least three times the reference sample (SO-04 or SO-05) concentration. Concentrations ranged from 1.5 times greater than the SDL (calcium in SO-01) to 6.79 times greater than the reference sample value (calcium in SO-05) [43, Table 1].

START personnel performed soil sampling as part of the RSD property SI. Analytical results of soil samples collected by START indicate that on-site surficial soils have been impacted by a release of substances which appears to be at least partially attributable to on-site sources. Aroclor-1254 was detected at a concentration of 140 parts per billion (ppb) in a soil sample collected from the filled portion of the former main channel. However, based on site observations and conditions, no impacts to nearby residential properties are known or suspected. Impacts to transient populations (*i.e.* park visitors) are unknown due largely to a lack of specific information regarding frequency of use and the nature of activities.

AIR PATHWAY

The RSD property is located in the northeastern United States, and according to the Köppen climate classification system, has a humid continental climate. The region experiences moist, warm summers and generally dry, cold winters. The regional wind pattern is dominated by mid-latitude cyclones and westerly winds. However, local wind patterns may be extremely variable and unrepresentative of regional wind patterns due to the effects of topography and forests [1, pp. 485-486].

The nearest residence is located 100 feet to the north, on the north side of River Street. The surrounding area is residential and agricultural. Big Island is located south of the RSD property (across the Missisquoi River) and is utilized for crop agriculture. No permanent full-time workers are present on the property. The park is maintained by an outside contractor, and pesticides are reportedly not used on the premises. Full-time employees or permanent residences are not present on the property. The nearest school is Richford Elementary, located approximately 1.0 miles south of the property [19; 30].

The estimated population within 4-radial miles of the property is 1,682 people. The estimated population distribution located within 4-radial miles of the RSD property is described in Table 9.

Table 9

Estimated Population Within 4-Radial Miles of River Street Dump

Radial Distance from the River Street Dump property (miles)	Estimated Population
On the source	0
> 0.00 to 0.25	17
> 0.25 to 0.50	54
> 0.50 to 1.00	232
> 1.00 to 2.00	673
> 2.00 to 3.00	225
> 3.00 to 4.00	481
TOTAL	1,682

[5, pp. 5-8]

Sensitive environments located within 4-radial miles of the RSD property are described in Table 10.

Table 10

Sensitive Environments Located Within 4-Radial Miles of River Street Dump

Radial Distance From River Street Dump (miles)	Sensitive Environment
On the source	None
> 0.00 to 0.25	Clean Water Act
> 0.25 to 0.50	10 acres of wetlands
> 0.50 to 1.00	40 acres of wetlands
> 1.00 to 2.00	60 acres of wetlands
> 2.00 to 3.00	60 acres of wetlands
> 3.00 to 4.00	30 acres of wetlands

[19; 41]

According to historical information, qualitative air samples have not been collected from or collected in the vicinity of the RSD property. Ambient air monitoring was conducted for START health and safety purposes during the on-site reconnaissance and sampling survey through the use of a combustible gas indicator, a flame ionization detector, and a mercury vapor analyzer. No ambient air readings above background levels were detected. Based on the available data, no release of hazardous substances to the ambient air from on-site sources is known or suspected to have occurred, and no impacts to nearby residential populations, workers, or sensitive environments are known or suspected.

SUMMARY

The River Street Dump (RSD) property is a 4-acre public recreational park located on River Street in Richford, Franklin County, Vermont. The property is owned by the Village of Richford, but is not listed on village tax assessor maps. The area surrounding the RSD property is residential and agricultural. The nearest residence is located 100 feet to the north, on the north side of River Street.

The RSD property was occupied by the former main channel of the Missisquoi River prior to a channel improvement project completed in 1964. Polychlorinated biphenyl-containing capacitors, mercury vapor lamps, and other unknown wastes were reportedly dumped in the open channel between 1975 and the development of the park in 1982.

According to historical information available to Roy F. Weston (WESTON®), Superfund Technical Assessment and Response Team (START), no prior sampling events have been conducted on or in reference to the RSD property. On 7 April 1998, START collected soil/source and sediment samples from the property. Analytical data from the START sampling event indicates that hazardous substances are present in on-site surficial soils, but have not impacted the Missisquoi River.

An estimated 303 persons within 4-radial miles of the property obtain drinking water from private groundwater sources. The nearest private drinking water well is located approximately 1,000 feet west and upgradient of the property. No public drinking water wells are located within 4-radial miles of the property. No private or monitoring wells are present on the property, and no known groundwater samples have been collected from the property or from local private wells to date. Based on the location and proximity of the surrounding residential wells, no nearby drinking water sources are known or suspected to have been impacted by a release from on-site sources.

The 15-mile downstream surface water pathway (downstream pathway) is comprised entirely of the Missisquoi River. The discharge of the Missisquoi River at the probable point of entry (PPE) is approximately 760 cubic feet per second (cfs), and the discharge at the terminus of the downstream pathway is approximately 1,050 cfs. No known surface water intakes are located along the downstream pathway. The Missisquoi River is classified as a cold- and warm-water fishery by the Vermont Water Resources Board for segments of the downstream pathway. An estimated 3.5 miles of wetland frontage is located along the downstream pathway. Based on analytical results from sediment samples collected by START, the Missisquoi River has not been impacted by a release of hazardous substances which are attributable to the potential on-site source to date. Vanadium was detected in sediment samples collected by START from the Missisquoi River, but was not detected in soil/source samples.

On-site surficial soils are comprised of non-native sandy silts obtained from sources of unknown origin. The soils were used to fill the open former main channel during development of the park in 1982. Based on analytical results from soil/source samples collected by START, surficial soils have been impacted by a release of hazardous substances at least partially attributable to potential on-site sources. One volatile organic compound, 13 semivolatile organic compounds, three pesticide/polychlorinated biphenyl compounds, and two inorganic elements were detected in surficial soil samples.

The property is not fenced and is accessible to the public. An estimated 1,682 persons reside within 4-radial miles of the property. The nearest school is located 1.0 miles south of the property. Approximately 200 acres of wetlands are located within 4-radial miles of the property. No additional known sensitive environments are located within 4-radial miles of the property or along the downstream pathway. However, the Vermont Agency of Natural Resources Nongame & Natural Heritage program reports that a systematic biological evaluation of the area has not been completed to date.

No known qualitative air samples have been collected from or collected in the vicinity of the RSD property to date. Ambient air monitoring was conducted for START health and safety purposes during the on-site reconnaissance and sampling survey through the use of a combustible gas indicator, a flame ionization detector, and a mercury vapor analyzer. No ambient air readings above background levels were detected. Based on the available data, no release of hazardous substances to the ambient air from on-site sources is known or suspected to have occurred, and no impacts to nearby residential populations, workers, or sensitive environments are known or suspected.

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ATTACHMENT A

RIVER STREET DUMP

SEDIMENT SAMPLE ANALYTICAL RESULTS

Samples collected by START 7 April 1998

E: RIVER STREET DUMP
ASE: 0122F SDG: DAFL79_O
LABORATORY: CEIMIC CORPORATION

TABLE 1
VOLATILE SOIL ANALYSIS
µg/kg

SAMPLE NUMBER:		DAFL79	DAFL80	DAFL81	DAFL82	DAFL83	DAFL85
SAMPLE LOCATION:		SD-01	SD-02	SD-03	SD-04	SD-05	SD-07
LABORATORY NUMBER:		980234-01	980234-02	980234-03	980234-04	980234-05	980234-07
COMPOUND	CRQL						
Chloromethane	10	13 U	12 U	17 U	12 U	13 U	14 U
Bromomethane	10	13 U	12 U	17 U	12 U	13 U	14 U
Vinyl Chloride	10	13 U	12 U	17 U	12 U	13 U	14 U
Chloroethane	10	13 U	12 U	17 U	12 U	13 U	14 U
Methylene Chloride	10	13 U	12 U	17 U	12 U	13 U	14 U
Acetone	10	13 U	12 UJ	17 UJ	12 UJ	13 UJ	14 UJ
Carbon Disulfide	10	13 U	12 U	17 U	12 U	13 U	14 U
1,1-Dichloroethene	10	13 U	12 U	17 U	12 U	13 U	14 U
1,1-Dichloroethane	10	13 U	12 U	17 U	12 U	13 U	14 U
1,2-Dichloroethene (Total)	10	13 U	12 U	17 U	12 U	13 U	14 U
Chloroform	10	13 U	12 U	17 U	12 U	13 U	14 U
1,2-Dichloroethane	10	13 U	12 U	17 U	12 U	13 U	14 U
2-Butanone	10	13 U	12 UJ	17 UJ	12 UJ	13 UJ	14 UJ
1,1,1-Trichloroethane	10	13 U	12 U	17 U	12 U	13 U	14 U
Carbon Tetrachloride	10	13 U	12 U	17 U	12 U	13 U	14 U
Bromodichloromethane	10	13 U	12 U	17 U	12 U	13 U	14 U
1,2-Dichloropropane	10	13 U	12 U	17 U	12 U	13 U	14 U
cis-1,3-Dichloropropene	10	13 U	12 U	17 U	12 U	13 U	14 U
Trichloroethene	10	13 U	12 U	17 U	12 U	13 U	14 U
Dibromochloromethane	10	13 U	12 U	17 U	12 U	13 U	14 U
1,1,2-Trichloroethane	10	13 U	12 U	17 U	12 U	13 U	14 U
Benzene	10	13 UJ	12 U	17 U	12 U	13 U	14 U
trans-1,3-Dichloropropene	10	13 U	12 U	17 U	12 U	13 U	14 U
Bromoform	10	13 U	12 U	17 U	12 U	13 U	14 U
4-Methyl-2-pentanone	10	13 U	12 U	17 U	12 U	13 U	14 U
2-Hexanone	10	13 U	12 U	17 U	12 U	13 U	14 U
Tetrachloroethene	10	13 U	12 U	17 U	12 U	13 U	14 U
1,1,2,2-Tetrachloroethane	10	R	R	R	R	R	R
Toluene	10	13 U	12 U	17 U	12 U	13 U	14 U
Chlorobenzene	10	13 U	12 U	17 U	12 U	13 U	14 U
Ethylbenzene	10	13 U	12 U	17 U	12 U	13 U	14 U
Styrene	10	13 U	12 U	17 U	12 U	13 U	14 U
Xylene (total)	10	13 U	12 U	17 U	12 U	13 U	14 U
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0	1.0
DATE SAMPLED:		04/07/98	04/07/98	04/07/98	04/07/98	04/07/98	04/07/98
DATE ANALYZED:		04/16/98	04/20/98	04/20/98	04/20/98	04/20/98	04/20/98
% MOISTURE:		25	15	41	19	23	28

NOTE: RESULTS ARE REPORTED ON A DRY WEIGHT BASIS.

TE: RIVER STREET DUMP
CASE: 0122F SDG: DAFL79_O
LABORATORY: CEIMIC CORPORATION

TABLE 2
VOLATILE AQUEOUS ANALYSIS
µg/L

SAMPLE NUMBER:		DAFL86
SAMPLE LOCATION:		TB-01D
LABORATORY NUMBER:		980234-08
COMPOUND	CRQL	
Chloromethane	10	10 U
Bromomethane	10	10 U
Vinyl Chloride	10	10 U
Chloroethane	10	10 U
Methylene Chloride	10	9 J
Acetone	10	10 UJ
Carbon Disulfide	10	10 U
1,1-Dichloroethene	10	10 U
1,1-Dichloroethane	10	10 U
1,2-Dichloroethene (Total)	10	10 U
Chloroform	10	7 J
1,2-Dichloroethane	10	10 U
2-Butanone	10	10 UJ
1,1,1-Trichloroethane	10	10 U
Carbon Tetrachloride	10	10 U
Bromodichloromethane	10	10 U
1,2-Dichloropropane	10	10 U
cis-1,3-Dichloropropene	10	10 U
Trichloroethene	10	10 U
Dibromochloromethane	10	10 U
1,1,2-Trichloroethane	10	10 U
Benzene	10	10 U
trans-1,3-Dichloropropene	10	10 U
Bromoform	10	10 U
4-Methyl-2-pentanone	10	10 U
2-Hexanone	10	10 UJ
Tetrachloroethene	10	10 U
1,1,2,2-Tetrachloroethane	10	R
Toluene	10	10 U
Chlorobenzene	10	10 U
Ethylbenzene	10	10 U
Styrene	10	10 U
Xylene (total)	10	10 U
DILUTION FACTOR:		1.0
DATE SAMPLED:		04/06/98
DATE ANALYZED:		04/15/98

SITE: RIVER STREET DUMP
CASE: 0122F SDG: DAFL79_0
LABORATORY: CEIMIC CORPORATION

TABLE 3
SEMIVOLATILE SOIL ANALYSIS
µg/kg

SAMPLE NUMBER:		DAFL79	DAFL80	DAFL81	DAFL82	DAFL83	DAFL85
SAMPLE LOCATION:		SD-01	SD-02	SD-03	SD-04	SD-05	SD-07
LABORATORY NUMBER:		980234-01	980234-02	980234-03	980234-04	980234-05	980234-07
COMPOUND	CRQL						
Phenol	330	410 U	380 U	580 U	430 U	2000 U	410 U
bis(2-Chloroethyl)ether	330	410 U	380 U	580 U	430 U	2000 U	410 U
2-Chlorophenol	330	410 U	380 U	580 U	430 U	2000 U	410 U
1,3-Dichlorobenzene	330	410 U	380 U	580 U	430 U	2000 U	410 U
1,4-Dichlorobenzene	330	410 U	380 U	580 U	430 U	2000 U	410 U
1,2-Dichlorobenzene	330	410 U	380 U	580 U	430 U	2000 U	410 U
2-Methylphenol	330	410 U	380 U	580 U	430 U	2000 U	410 U
2,2'-Oxybis(1-chloropropane)	330	410 UJ	380 UJ	580 UJ	430 UJ	2000 UJ	410 UJ
4-Methylphenol	330	410 U	380 U	580 U	61 J	2000 U	410 U
N-Nitroso-di-n-propylamine	330	410 U	380 U	580 U	430 U	2000 U	410 U
Hexachloroethane	330	410 U	380 U	580 U	430 U	2000 U	410 U
Nitrobenzene	330	410 U	380 U	580 U	430 U	2000 U	410 U
Isophorone	330	410 U	380 U	580 U	430 U	2000 U	410 U
2-Nitrophenol	330	410 U	380 U	580 U	430 U	2000 U	410 U
2,4-Dimethylphenol	330	410 U	380 U	580 U	430 U	2000 U	410 U
bis(2-Chloroethoxy)methane	330	410 U	380 U	580 U	430 U	2000 U	410 U
2,4-Dichlorophenol	330	410 U	380 U	580 U	430 U	2000 U	410 U
1,2,4-Trichlorobenzene	330	410 U	380 U	580 U	430 U	2000 U	410 U
Naphthalene	330	410 U	380 U	580 U	430 U	2000 U	410 U
4-Chloroaniline	330	410 U	380 U	580 U	430 U	2000 U	410 U
Hexachlorobutadiene	330	410 U	380 U	580 U	430 U	2000 U	410 U
4-Chloro-3-methylphenol	330	410 U	380 U	580 U	430 U	2000 U	410 U
2-Methylnaphthalene	330	410 U	380 U	580 U	430 U	2000 U	410 U
Hexachlorocyclopentadiene	330	410 U	380 U	580 U	430 U	2000 U	410 U
2,4,6-Trichlorophenol	330	410 U	380 U	580 U	430 U	2000 U	410 U
2,4,5-Trichlorophenol	830	1000 U	970 U	1500 U	1100 U	5100 U	1000 U
2-Chloronaphthalene	330	410 U	380 U	580 U	430 U	2000 U	410 U
2-Nitroaniline	830	1000 U	970 U	1500 U	1100 U	5100 U	1000 U
Dimethylphthalate	330	410 U	380 U	580 U	430 U	2000 U	410 U
Acenaphthylene	330	410 U	380 U	580 U	430 U	2000 U	410 U
2,6-Dinitrotoluene	330	410 U	380 U	580 U	430 U	2000 U	410 U
3-Nitroaniline	830	1000 U	970 U	1500 U	1100 U	5100 U	1000 U
Acenaphthene	330	410 UJ	380 U	580 U	430 U	2000 U	410 U
2,4-Dinitrophenol	830	1000 UJ	970 UJ	1500 UJ	1100 UJ	5100 UJ	1000 UJ
4-Nitrophenol	830	1000 UJ	970 UJ	1500 UJ	1100 UJ	5100 UJ	1000 UJ
Dibenzofuran	330	410 U	380 U	580 U	430 U	2000 U	410 U
2,4-Dinitrotoluene	330	410 U	380 U	580 U	430 U	2000 U	410 U
Diethylphthalate	330	410 U	380 U	580 U	430 U	2000 U	410 U
4-Chlorophenyl-phenylether	330	410 U	380 U	580 U	430 U	2000 U	410 U
Fluorene	330	410 U	380 U	580 U	430 U	2000 U	410 U
4-Nitroaniline	830	1000 U	970 U	1500 U	1100 U	5100 U	1000 U
4,6-Dinitro-2-methylphenol	830	1000 U	970 U	1500 U	1100 U	5100 U	1000 U
N-Nitrosodiphenylamine(1)	330	410 U	380 U	580 U	430 U	2000 U	410 U
4-Bromophenyl-phenylether	330	410 U	380 U	580 U	430 U	2000 U	410 U
Hexachlorobenzene	330	410 U	380 U	580 U	430 U	2000 U	410 U
Pentachlorophenol	830	1000 U	970 U	1500 U	1100 U	5100 U	1000 U
Phenanthrene	330	410 U	380 U	580 U	430 U	530 J	410 U
Anthracene	330	410 U	380 U	580 U	430 U	2000 U	410 U
Carbazole	330	410 U	380 U	580 U	430 U	2000 U	410 U
Di-n-butylphthalate	330	410 U	380 U	580 U	430 U	2000 U	410 U
Fluoranthene	330	410 U	380 U	580 U	44 J	1600 J	410 U
Pyrene	330	410 U	380 U	580 U	430 U	990 J	410 U
Butylbenzylphthalate	330	410 U	380 U	580 U	430 U	2000 U	410 U
3,3'-Dichlorobenzidine	330	410 UJ	380 UJ	580 UJ	430 UJ	2000 UJ	410 UJ
Benzo(a)anthracene	330	410 U	380 U	580 U	430 U	840 J	410 U
Chrysene	330	410 U	380 U	580 U	430 U	550 J	410 U
Bis(2-ethylhexyl)phthalate	330	410 U	380 U	80 J	430 U	2000 U	410 U
Di-n-octylphthalate	330	410 UJ	380 U	580 U	430 U	2000 U	410 U
Benzo(b)fluoranthene	330	410 UJ	380 U	580 U	430 U	990 J	410 U
Benzo(k)fluoranthene	330	410 UJ	380 U	580 U	49 J	310 J	410 U
Benzo(a)pyrene	330	410 UJ	380 U	580 U	430 U	720 J	410 U
Indeno(1,2,3-cd)pyrene	330	410 UJ	380 U	580 U	430 U	450 J	410 U
Dibenzo(a,h)anthracene	330	410 UJ	380 U	580 U	430 U	2000 U	410 U
Benzo(g,h,i)perylene	330	410 UJ	380 U	580 U	430 U	300 J	410 U
DILUTION FACTOR:		1.0	1.0	1.0	1.0	5.0	1.0
DATE SAMPLED:		04/07/98	04/07/98	04/07/98	04/07/98	04/07/98	04/07/98
DATE EXTRACTED:		04/13/98	04/13/98	04/13/98	04/13/98	04/13/98	04/13/98
DATE ANALYZED:		04/17/98	04/17/98	04/17/98	04/17/98	04/17/98	04/17/98
% MOISTURE		20	15	44	23	19	21

NOTE: RESULTS ARE REPORTED ON A DRY WEIGHT BASIS

TE: RIVER STREET DUMP
Case: 0122F SDG No. DAFL79_O
LABORATORY: CEIMIC CORPORATION

TABLE 4
PESTICIDE/POLYCHLORINATED BIPHENYL SOIL ANALYSIS
µg/kg

SAMPLE NUMBER:		DAFL79	DAFL80	DAFL81	DAFL82	DAFL83	DAFL85
SAMPLE LOCATION:		SD-01	SD-02	SD-03	SD-04	SD-05	SD-07
LABORATORY NUMBER:		980234-01	980234-02	980234-03	980234-04	980234-05	980234-07
COMPOUND	CRQL						
alpha-BHC	1.7	2.1 U	2.0 U	3.0 U	2.2 U	2.1 U	2.1 U
beta-BHC	1.7	2.1 U	2.0 U	3.0 U	2.2 U	2.1 U	2.1 U
delta-BHC	1.7	2.1 U	2.0 U	3.0 U	2.2 U	2.1 U	2.1 U
gamma-BHC(Lindane)	1.7	2.1 UJ	2.0 U	3.0 U	2.2 U	2.1 U	2.1 U
Heptachlor	1.7	2.1 U	2.0 U	3.0 U	2.2 U	2.1 U	2.1 U
Aldrin	1.7	2.1 U	2.0 U	3.0 U	2.2 U	2.1 U	2.1 U
Heptachlor Epoxide	1.7	2.1 U	2.0 U	3.0 U	2.2 U	2.1 U	2.1 U
Endosulfan I	1.7	2.1 U	2.0 U	3.0 U	2.2 U	2.1 U	2.1 U
Dieldrin	3.3	4.1 U	3.8 U	5.8 U	4.3 U	4.0 U	4.2 U
4,4'-DDE	3.3	4.1 U	3.8 U	5.8 U	4.3 U	4.0 U	4.2 U
Endrin	3.3	4.1 U	3.8 U	5.8 U	4.3 U	4.0 U	4.2 U
Endosulfan II	3.3	4.1 U	3.8 U	5.8 U	4.3 U	4.0 U	4.2 U
4,4'-DDD	3.3	4.1 U	3.8 U	5.8 U	4.3 U	4.0 U	4.2 U
Endosulfan Sulfate	3.3	4.1 U	3.8 U	5.8 U	4.3 U	4.0 U	4.2 U
4,4'-DDT	3.3	4.1 U	3.8 U	5.8 U	4.3 U	4.0 U	4.2 U
Methoxychlor	17	21 U	20 U	30 U	22 U	21 U	4.2 U
Endrin Ketone	3.3	4.1 U	3.8 U	5.8 U	4.3 U	4.0 U	4.2 U
Endrin Aldehyde	3.3	4.1 U	3.8 U	5.8 U	4.3 U	4.0 U	21 U
alpha-Chlordane	1.7	2.1 U	2.0 U	3.0 U	2.2 U	2.1 U	4.2 U
gamma-Chlordane	1.7	2.1 U	2.0 U	3.0 U	2.2 U	2.1 U	4.2 U
Toxaphene	170	210 U	200 U	300 U	220 U	210 U	2.1 U
Aroclor-1016	33	41 U	38 U	58 U	43 U	40 U	2.1 U
Aroclor-1221	67	83 U	78 U	120 U	87 U	81 U	210 U
Aroclor-1232	33	41 U	38 U	58 U	43 U	40 U	42 U
Aroclor-1242	33	41 U	38 U	58 U	43 U	40 U	85 U
Aroclor-1248	33	41 U	38 U	58 U	43 U	40 U	42 U
Aroclor-1254	33	41 U	38 U	58 U	43 U	40 U	42 U
Aroclor-1260	33	41 U	38 U	58 U	43 U	40 U	42 U
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0	1.0
DATE SAMPLED:		04/07/98	04/07/98	04/07/98	04/07/98	04/07/98	04/07/98
DATE EXTRACTED:		04/13/98	04/13/98	04/13/98	04/13/98	04/13/98	04/13/98
DATE ANALYZED:		05/03/98	05/03/98	05/03/98	05/03/98	05/03/98	05/03/98
% MOISTURE:		20	15	44	23	19	21

NOTE: RESULTS ARE REPORTED ON A DRY WEIGHT BASIS.

SITE: RIVER STREET DUMP
CASE: 26108 SDG: ANN68
LABORATORY: SWOK

TABLE 5
PESTICIDE/POLYCHLORINATED BIPHENYL AQUEOUS ANALYSIS
µg/L

SAMPLE NUMBER:		ANN69
SAMPLE LOCATION:		RB-01C
LABORATORY NUMBER:		33539.02
COMPOUND	CRQL	
alpha-BHC	0.050	0.050 U
beta-BHC	0.050	0.050 U
delta-BHC	0.050	0.050 U
gamma-BHC (Lindane)	0.050	0.050 U
Heptachlor	0.050	0.050 U
Aldrin	0.050	0.050 U
Heptachlor Epoxide	0.050	0.050 U
Endosulfan I	0.050	0.050 U
Dieldrin	0.10	0.10 U
4,4'-DDE	0.10	0.10 U
Endrin	0.10	0.10 U
Endosulfan II	0.10	0.10 U
4,4'-DDD	0.10	0.10 U
Endosulfan Sulfate	0.10	0.10 U
4,4'-DDT	0.10	0.10 U
Methoxychlor	0.50	0.50 U
Endrin Ketone	0.10	0.10 U
Endrin Aldehyde	0.10	0.10 U
alpha-Chlordane	0.050	0.050 U
gamma-Chlordane	0.050	0.050 U
Toxaphene	5.0	5.0 U
Aroclor-1016	1.0	1.0 U
Aroclor-1221	2.0	2.0 U
Aroclor-1232	1.0	1.0 U
Aroclor-1242	1.0	1.0 U
Aroclor-1248	1.0	1.0 U
Aroclor-1254	1.0	1.0 U
Aroclor-1260	1.0	1.0 U
DILUTION FACTOR:		1.0
DATE SAMPLED:		04/07/98
DATE EXTRACTED:		04/10/98
DATE ANALYZED:		04/19/98

SITE: RIVER STREET DUMP
CASE: 0122F SDG: DAFL79_I
LABORATORY: CEIMIC CORPORATION

TABLE 1
INORGANIC SOIL ANALYSES
mg/kg

SAMPLE NUMBER:			DAFL79	DAFL80	DAFL81	DAFL82	DAFL83	DAFL84	DAFL85	
SAMPLE LOCATION:			SD-01	SD-02	SD-03	SD-04	SD-05	SD-06	SD-07	
LABORATORY NUMBER:			80234-01	980234-02	980234-03	980234-04	980234-05	980234-06	980234-07	
% SOLIDS			77.9	84.1	59.4	81.9	79.7	76.2	78.9	
INORGANIC ELEMENTS	METHOD	INSTRUMENT DETECTION LIMITS (mg/kg)								CONTRACT DETECTION LIMITS (mg/kg)
ALUMINUM	P	7.34	4970	6250	8710	5640	3940	3780	3270	40
ANTIMONY	P	0.46	0.57 UJ	0.53 UJ	0.74 UJ	0.52 UJ	0.56 UJ	0.79 J	0.54 UJ	12
ARSENIC	P	0.46	2.0 J	2.3 J	4.5 J	1.3 J	2.3 J	1.7 J	1.3 J	2
BARIUM	P	0.58	15.9	25.8	54.8	19.3	31.7	17.1	12.8	40
BERYLLIUM	P	0.12	0.15 U	0.46	0.43	0.14 U	0.16 J	0.15 J	0.14 U	1
CADMIUM	P	0.06	0.07 U	0.06 U	0.09 U	0.06 U	0.07 U	0.06 U	0.06 U	1
CALCIUM	P	18.5	1440	1340	3440	1640	20400	8290	1300	1000
CHROMIUM	P	1.32	10.5	14.8	22.1	11.0	11.0	11.9	8.2	2
COBALT	P	1.14	6.0 U	8.1 U	12.3 U	6.8 U	5.6 U	7.3 U	4.8 U	10
COPPER	P	1.1	6.8 U	7.8 U	18	7.2 U	25.1	13.2	5.6 U	5
IRON	P	1.44	11200	12900	17400	12200	21700	13100	7860	20
LEAD	P	0.34	8.6 J	5.9 J	19.8 J	94.0 J	236 J	200 J	15.4 J	0.6
MAGNESIUM	P	27.42	2860	2820	4090	3090	2430	2560	1690	1000
MANGANESE	P	0.28	191	230	921	256	448	230	142	3
MERCURY	CV	0.05	0.06 U	0.06 U	0.08 U	0.05 U	0.06 U	0.60 U	0.06 U	0.1
NICKEL	P	1.36	16.5	18.0	33.9	15.9	15.8 U	17.5	13.5 U	8
POTASSIUM	P	44.4	242	287	610	260	270	220	231	1000
SELENIUM	P	0.72	0.90 UJ	0.82 UJ	1.2 UJ	0.81 UJ	0.88 UJ	0.81 UJ	0.85 UJ	1
SILVER	P	0.56	1.2 UJ	0.68 UJ	1.4 UJ	1.2 UJ	R	1.4 U	0.66 U	2
SODIUM	P	16.0	62.1 U	46.8 U	189 U	51.1 U	90 U	92.8 U	60.5 U	1000
THALLIUM	P	0.34	3.1 U	0.39 U	0.55 U	0.38 U	0.41 U	0.38 U	0.40 U	2
VANADIUM	P	1.16	10.7 U	12.4	18.1	11.2 U	9.0 U	8.6 U	7.5 U	10
ZINC	P	0.54	38.1 J	29.6 J	75.3 J	36.4 J	367 J	217 J	28.6 J	4
CYANIDE	AS	0.5	0.64 U	0.58 U	0.83 U	0.60 U	0.60 U	NA	0.62 U	0.5

ANALYTICAL METHOD
F - FURNACE
P - ICP/FLAME AA
CV - COLD VAPOR
AS - SEMI AUTOMATED SPECTROPHOTOMETRIC

NOTE:
J - QUANTITATION IS ESTIMATED DUE TO LIMITATIONS IDENTIFIED IN THE QUALITY CONTROL REVIEW (DATA REVIEW).
U - VALUE IS NON-DETECTED AND DETECTION LIMIT IS RAISED.
UJ - VALUE IS NON-DETECTED AND DETECTION LIMIT IS ESTIMATED.
R - VALUE IS REJECTED.
NA - NOT ANALYZED.

NOTE: RESULTS ARE REPORTED ON A DRY WEIGHT BASIS

ATTACHMENT B

RIVER STREET DUMP

SOIL SAMPLE ANALYTICAL RESULTS

Samples collected by START 7 April 1998

SITE: RIVER STREET DUMP
CASE: 26108 SDG: ANN68
LABORATORY: SWOK

TABLE 2
VOLATILE SOIL ANALYSIS - LOW LEVEL
µg/kg

SAMPLE NUMBER:		ANN71	ANN72RE	ANN73	ANN74	ANN76
SAMPLE LOCATION:		S0-01	S0-02	S0-03	S0-04	S0-06
LABORATORY NUMBER:		33539.03	33539.04RA	33539.05	33539.06	33539.07
COMPOUND	CRQL					
Chloromethane	10	12 UJ	11 U	11 U	11 U	13 U
Bromomethane	10	12 UJ	11 U	11 U	11 U	13 U
Vinyl Chloride	10	12 UJ	11 U	11 U	11 U	13 U
Chloroethane	10	12 UJ	11 U	11 U	11 U	13 U
Methylene Chloride	10	12 UJ	11 UJ	11 U	11 U	13 U
Acetone	10	12 UJ	28 J	11 U	11 U	120 J
Carbon Disulfide	10	12 UJ	11 U	11 U	11 U	13 U
1,1-Dichloroethene	10	12 UJ	11 U	11 U	11 U	13 U
1,1-Dichloroethane	10	12 UJ	11 U	11 U	11 U	13 U
1,2-Dichloroethene (Total)	10	12 UJ	11 U	11 U	11 U	13 U
Chloroform	10	12 UJ	11 U	11 U	11 U	13 U
1,2-Dichloroethane	10	12 UJ	11 U	11 U	11 U	13 U
2-Butanone	10	12 UJ	11 U	11 U	11 U	13 U
1,1,1-Trichloroethane	10	12 UJ	11 UJ	11 UJ	11 U	13 U
Carbon Tetrachloride	10	12 UJ	11 UJ	11 UJ	11 U	13 U
Bromodichloromethane	10	12 UJ	11 UJ	11 UJ	11 U	13 U
1,2-Dichloropropane	10	12 UJ	11 UJ	11 UJ	11 U	13 U
cis-1,3-Dichloropropene	10	12 UJ	11 UJ	11 UJ	11 U	13 U
Trichloroethene	10	12 UJ	11 UJ	11 UJ	11 U	13 U
Dibromochloromethane	10	12 UJ	11 UJ	11 UJ	11 U	13 U
1,1,2-Trichloroethane	10	12 UJ	11 UJ	11 UJ	11 U	13 U
Benzene	10	12 UJ	11 UJ	11 UJ	11 U	13 U
trans-1,3-Dichloropropene	10	12 UJ	11 UJ	11 UJ	11 U	13 UJ
Bromoform	10	12 UJ	11 UJ	11 UJ	11 U	13 U
4-Methyl-2-pentanone	10	12 UJ	11 UJ	11 UJ	11 U	13 UJ
2-Hexanone	10	12 UJ	11 UJ	11 UJ	11 U	13 UJ
Tetrachloroethene	10	12 UJ	11 U	11 UJ	11 U	13 U
1,1,2,2-Tetrachloroethane	10	12 UJ	11 U	11 UJ	11 U	13 U
Toluene	10	12 UJ	11 U	11 UJ	11 U	13 U
Chlorobenzene	10	12 UJ	11 U	11 UJ	11 U	13 U
Ethylbenzene	10	12 UJ	11 U	11 UJ	11 U	13 U
Styrene	10	12 UJ	11 U	11 UJ	11 U	13 U
Xylene (total)	10	12 UJ	11 U	11 UJ	11 U	13 U
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0
DATE SAMPLED:		04/07/98	04/07/98	04/07/98	04/07/98	04/07/98
DATE ANALYZED:		04/14/98	04/15/98	04/14/98	04/14/98	04/16/98
% MOISTURE:		18	12	13	8	22

NOTE: RESULTS ARE REPORTED ON A DRY WEIGHT BASIS.

SITE: RIVER STREET DUMP
CASE: 26108 SDG: ANN68
LABORATORY: SWOK

TABLE 1
VOLATILE AQUEOUS ANALYSIS
µg/L

SAMPLE NUMBER:		ANN68	ANN69
SAMPLE LOCATION:		TB-01C	RB-01C
LABORATORY NUMBER:		33539.01	33539.02
COMPOUND	CRQL		
Chloromethane	10	10 U	10 U
Bromomethane	10	10 U	10 U
Vinyl Chloride	10	10 U	10 U
Chloroethane	10	10 U	10 U
Methylene Chloride	10	10 U	10 U
Acetone	10	10 U	10 U
Carbon Disulfide	10	10 U	10 U
1,1-Dichloroethene	10	10 U	10 U
1,1-Dichloroethane	10	10 U	10 U
1,2-Dichloroethene (Total)	10	10 U	10 U
Chloroform	10	10 U	5 J
1,2-Dichloroethane	10	10 U	10 U
2-Butanone	10	10 UJ	10 UJ
1,1,1-Trichloroethane	10	10 U	10 U
Carbon Tetrachloride	10	10 U	10 U
Bromodichloromethane	10	10 U	10 U
1,2-Dichloropropane	10	10 U	10 U
cis-1,3-Dichloropropene	10	10 U	10 U
Trichloroethene	10	10 U	10 U
Dibromochloromethane	10	10 U	10 U
1,1,2-Trichloroethane	10	10 U	10 U
Benzene	10	10 U	10 U
trans-1,3-Dichloropropene	10	10 U	10 U
Bromoform	10	10 UJ	10 UJ
4-Methyl-2-pentanone	10	10 UJ	10 UJ
2-Hexanone	10	10 U	10 U
Tetrachloroethene	10	10 U	10 U
1,1,2,2-Tetrachloroethane	10	10 U	10 U
Toluene	10	10 U	10 U
Chlorobenzene	10	10 U	10 U
Ethylbenzene	10	10 U	10 U
Styrene	10	10 U	10 U
Xylene (total)	10	10 U	10 U
DILUTION FACTOR:		1.0	1.0
DATE SAMPLED:		04/06/98	04/07/98
DATE ANALYZED:		04/13/98	04/13/98

SITE: RIVER STREET DUMP
CASE: 26108 SDG: ANN68
LABORATORY: SWOK

TABLE 4
SEMIVOLATILE SOIL ANALYSIS
µg/kg

SAMPLE NUMBER:		ANN71	ANN72	ANN73	ANN74	ANN76RE
SAMPLE LOCATION:		S0-01	S0-02	S0-03	S0-04	S0-06
LABORATORY NUMBER:		33539.03	33539.04	33539.05	33539.06	33539.07RE
COMPOUND	CRQL					
Phenol	330	400 U	360 U	330 U	330 U	420 U
bis(2-Chloroethyl)ether	330	400 U	360 U	330 U	330 U	420 U
2-Chlorophenol	330	400 U	360 U	330 U	330 U	420 U
1,3-Dichlorobenzene	330	400 U	360 U	330 U	330 U	420 U
1,4-Dichlorobenzene	330	400 U	360 U	330 U	330 U	420 U
1,2-Dichlorobenzene	330	400 U	360 U	330 U	330 U	420 U
2-Methylphenol	330	400 U	360 U	330 U	330 U	420 U
2,2'-Oxybis(1-chloropropane)	330	400 U	360 U	330 U	330 U	420 UJ
4-Methylphenol	330	400 U	360 U	330 U	330 U	420 U
N-Nitroso-di-n-propylamine	330	400 U	360 U	330 U	330 U	420 U
Hexachloroethane	330	400 U	360 U	330 U	330 U	420 U
Nitrobenzene	330	400 U	360 U	330 U	330 U	420 U
Isophorone	330	400 U	360 U	330 U	330 U	420 U
2-Nitrophenol	330	400 U	360 U	330 U	330 U	420 U
2,4-Dimethylphenol	330	400 U	360 U	330 U	330 U	420 U
bis(2-Chloroethoxy)methane	330	400 U	360 U	330 U	330 U	420 U
2,4-Dichlorophenol	330	400 U	360 U	330 U	330 U	420 U
1,2,4-Trichlorobenzene	330	400 U	360 U	330 U	330 U	420 U
Naphthalene	330	36 J	360 U	27 J	330 U	420 U
4-Chloroaniline	330	400 U	360 U	330 U	330 U	420 U
Hexachlorobutadiene	330	400 U	360 U	330 U	330 U	420 UJ
4-Chloro-3-methylphenol	330	400 U	360 U	330 U	330 U	420 U
2-Methylnaphthalene	330	400 U	360 U	17 J	330 U	420 U
Hexachlorocyclopentadiene	330	R	R	R	R	R
2,4,6-Trichlorophenol	330	400 U	360 U	330 U	330 U	420 U
2,4,5-Trichlorophenol	830	1000 U	900 U	820 U	840 U	1100 U
2-Chloronaphthalene	330	400 U	360 U	330 U	330 U	420 U
2-Nitroaniline	830	1000 U	900 U	820 U	840 U	1100 UJ
Dimethylphthalate	330	400 U	360 U	330 U	330 U	420 U
Acenaphthylene	330	400 U	360 U	330 U	330 U	420 U
2,6-Dinitrotoluene	330	400 U	360 U	330 U	330 U	420 U
3-Nitroaniline	830	1000 U	900 U	820 U	840 U	1100 UJ
Acenaphthene	330	400 U	360 U	80 J	330 U	420 U
2,4-Dinitrophenol	830	1000 UJ	900 UJ	820 UJ	840 UJ	1100 U
4-Nitrophenol	830	1000 U	900 U	820 U	840 U	1100 UJ
Dibenzofuran	330	400 U	360 U	35 J	330 U	420 U
2,4-Dinitrotoluene	330	400 U	360 U	330 U	330 U	420 U
Diethylphthalate	330	400 U	360 U	330 U	330 U	23 J
4-Chlorophenyl-phenylether	330	400 U	360 U	330 U	330 U	420 U
Fluorene	330	400 U	360 U	87 J	330 U	420 U
4-Nitroaniline	830	1000 U	900 U	820 U	840 U	1100 UJ
4,6-Dinitro-2-methylphenol	830	1000 UJ	900 UJ	820 UJ	840 UJ	1100 U
N-Nitrosodiphenylamine(1)	330	400 U	360 U	330 U	330 U	420 UJ
4-Bromophenyl-phenylether	330	400 U	360 U	330 U	330 U	420 U
Hexachlorobenzene	330	400 U	360 U	330 U	330 U	420 U
Pentachlorophenol	830	1000 UJ	900 UJ	820 UJ	840 UJ	1100 U
Phenanthrene	330	55 J	38 J	2400	27 J	420 U
Anthracene	330	400 U	360 U	520	330 U	420 U
Carbazole	330	400 U	360 U	420	330 U	420 U
Di-n-butylphthalate	330	400 U	360 U	330 U	330 U	420 UJ
Fluoranthene	330	71 J	120 J	3800*	53 J	30 J
Pyrene	330	83 J	130 J	3400*	54 J	29 J
Butylbenzylphthalate	330	400 U	360 U	330 U	330 U	420 UJ
3,3'-Dichlorobenzidine	330	400 U	360 U	330 U	330 U	420 U
Benzo(a)anthracene	330	31 J	83 J	2100	35 J	22 J
Chrysene	330	44 J	100 J	2100	32 J	32 J
Bis(2-ethylhexyl)phthalate	330	180 J	130 J	110 J	230 J	100 J
Di-n-octylphthalate	330	400 U	360 U	330 U	330 U	420 UJ
Benzo(b)fluoranthene	330	56 J	80 J	2000	22 J	420 U
Benzo(k)fluoranthene	330	41 J	120 J	1500	34 J	42 J
Benzo(a)pyrene	330	44 J	84 J	1600	32 J	40 J
Indeno(1,2,3-cd)pyrene	330	400 U	57 J	780	330 U	420 U
Dibenz(a,h)anthracene	330	400 U	360 U	340	330 U	420 U
Benzo(g,h,i)perylene	330	400 U	57 J	760	20 J	33 J
DILUTION FACTOR:		1.0	1.0	1.0/2.0	1.0	1.0
DATE SAMPLED:		04/07/98	04/07/98	04/07/98	04/07/98	04/07/98
DATE EXTRACTED:		04/10/98	04/10/98	04/10/98	04/10/98	04/21/98
DATE ANALYZED:		04/18/98	04/18/98	04/18/98	04/18/98	04/24/98
% MOISTURE:		18	12	13	8	22

NOTE: RESULTS ARE REPORTED ON A DRY WEIGHT BASIS.

*RESULTS ARE REPORTED FROM DILUTED ANALYSIS.

SITE: RIVER STREET DUMP
CASE: 26108 SDG: ANN68
LABORATORY: SWOK

TABLE 3
SEMIVOLATILE WATER ANALYSIS
µg/L

SAMPLE NUMBER:		ANN69
SAMPLE LOCATION:		RB-01C
LABORATORY NUMBER:		33539.02
COMPOUND	CRQL	
Phenol	10	10 U
bis(2-Chloroethyl)ether	10	10 U
2-Chlorophenol	10	10 U
1,3-Dichlorobenzene	10	10 U
1,4-Dichlorobenzene	10	10 U
1,2-Dichlorobenzene	10	10 U
2-Methylphenol	10	10 U
2,2'-Oxybis(1-chloropropane)	10	10 U
4-Methylphenol	10	10 U
N-Nitroso-di-n-propylamine	10	10 U
Hexachloroethane	10	10 U
Nitrobenzene	10	10 U
Isophorone	10	10 U
2-Nitrophenol	10	10 U
2,4-Dimethylphenol	10	10 U
bis(2-Chloroethoxy)methane	10	10 U
2,4-Dichlorophenol	10	10 U
1,2,4-Trichlorobenzene	10	10 U
Naphthalene	10	10 U
4-Chloroaniline	10	10 U
Hexachlorobutadiene	10	10 U
4-Chloro-3-methylphenol	10	10 U
2-Methylnaphthalene	10	10 U
Hexachlorocyclopentadiene	10	R
2,4,6-Trichlorophenol	10	10 U
2,4,5-Trichlorophenol	25	25 U
2-Chloronaphthalene	10	10 U
2-Nitroaniline	25	25 U
Dimethylphthalate	10	10 U
Acenaphthylene	10	10 U
2,6-Dinitrotoluene	10	10 U
3-Nitroaniline	25	25 U
Acenaphthene	10	10 U
2,4-Dinitrophenol	25	25 UJ
4-Nitrophenol	25	25 UJ
Dibenzofuran	10	10 U
2,4-Dinitrotoluene	10	10 U
Diethylphthalate	10	10 U
4-Chlorophenyl-phenylether	10	10 U
Fluorene	10	10 U
4-Nitroaniline	25	25 U
4,6-Dinitro-2-methylphenol	25	25 UJ
N-Nitrosodiphenylamine(1)	10	10 U
4-Bromophenyl-phenylether	10	10 U
Hexachlorobenzene	10	10 U
Pentachlorophenol	25	25 UJ
Phenanthrene	10	10 U
Anthracene	10	10 U
Carbazole	10	10 U
Di-n-butylphthalate	10	10 U
Fluoranthene	10	10 U
Pyrene	10	10 U
Butylbenzylphthalate	10	10 U
3,3'-Dichlorobenzidine	10	10 U
Benzo(a)anthracene	10	10 U
Chrysene	10	10 U
Bis(2-ethylhexyl)phthalate	10	10 UJ
Di-n-octylphthalate	10	10 UJ
Benzo(b)fluoranthene	10	10 U
Benzo(k)fluoranthene	10	10 U
Benzo(a)pyrene	10	10 U
Indeno(1,2,3-cd)pyrene	10	10 UJ
Dibenz(a,h)anthracene	10	10 UJ
Benzo(g,h,i)perylene	10	10 UJ
DILUTION FACTOR:		1.0
DATE SAMPLED:		04/07/98
DATE EXTRACTED:		04/10/98
DATE ANALYZED:		04/16/98

SITE: RIVER STREET DUMP
CASE: 26108 SDG: ANN68
LABORATORY: SWOK

TABLE 5
PESTICIDE/POLYCHLORINATED BIPHENYL AQUEOUS ANALYSIS
µg/L

SAMPLE NUMBER:		ANN69
SAMPLE LOCATION:		RB-01C
LABORATORY NUMBER:		33539.02
COMPOUND	CRQL	
alpha-BHC	0.050	0.050 U
beta-BHC	0.050	0.050 U
delta-BHC	0.050	0.050 U
gamma-BHC (Lindane)	0.050	0.050 U
Heptachlor	0.050	0.050 U
Aldrin	0.050	0.050 U
Heptachlor Epoxide	0.050	0.050 U
Endosulfan I	0.050	0.050 U
Dieldrin	0.10	0.10 U
4,4'-DDE	0.10	0.10 U
Endrin	0.10	0.10 U
Endosulfan II	0.10	0.10 U
4,4'-DDD	0.10	0.10 U
Endosulfan Sulfate	0.10	0.10 U
4,4'-DDT	0.10	0.10 U
Methoxychlor	0.50	0.50 U
Endrin Ketone	0.10	0.10 U
Endrin Aldehyde	0.10	0.10 U
alpha-Chlordane	0.050	0.050 U
gamma-Chlordane	0.050	0.050 U
Toxaphene	5.0	5.0 U
Aroclor-1016	1.0	1.0 U
Aroclor-1221	2.0	2.0 U
Aroclor-1232	1.0	1.0 U
Aroclor-1242	1.0	1.0 U
Aroclor-1248	1.0	1.0 U
Aroclor-1254	1.0	1.0 U
Aroclor-1260	1.0	1.0 U
DILUTION FACTOR:		1.0
DATE SAMPLED:		04/07/98
DATE EXTRACTED:		04/10/98
DATE ANALYZED:		04/19/98

SITE: RIVER STREET DUMP
CASE: 26108 SDG: ANN68
LABORATORY: SWOK

TABLE 6
PESTICIDE/POLYCHLORINATED BIPHENYL SOIL ANALYSIS
µg/kg

SAMPLE NUMBER:		ANN71	ANN72	ANN73	ANN74	ANN76
SAMPLE LOCATION:		S0-01	S0-02	S0-03	S0-04	S0-06
LABORATORY NUMBER:		33539.03	33539.04	33539.05	33539.06	33539.07
COMPOUND	CRQL					
alpha-BHC	1.7	2.0 U	1.8 U	1.8 U	1.7 U	2.0 U
beta-BHC	1.7	2.0 U	1.8 U	1.8 U	1.7 U	2.0 U
delta-BHC	1.7	2.0 U	1.8 U	1.8 U	1.7 U	2.0 U
gamma-BHC (Lindane)	1.7	2.0 UJ	1.8 U	1.8 U	1.7 U	4.2 J
Heptachlor	1.7	2.0 U	1.8 U	1.8 U	1.7 U	2.0 U
Aldrin	1.7	2.0 U	1.8 U	1.8 U	1.7 U	2.0 U
Heptachlor Epoxide	1.7	2.0 UJ	1.8 U	1.8 U	1.7 U	8.3 J
Endosulfan I	1.7	2.0 U	1.8 U	1.8 U	1.7 U	2.0 U
Dieldrin	3.3	3.9 U	3.4 U	3.5 U	3.4 U	R
4,4'-DDE	3.3	3.9 UJ	3.4 U	3.5 U	3.4 U	6.6 UJ
Endrin	3.3	3.9 U	3.4 U	3.5 U	3.4 U	3.9 U
Endosulfan II	3.3	3.9 U	3.4 U	3.5 U	3.4 U	3.9 U
4,4'-DDD	3.3	3.9 UJ	3.4 U	3.5 U	3.4 U	11 UJ
Endosulfan Sulfate	3.3	3.9 U	3.4 U	3.5 U	3.4 U	3.9 U
4,4'-DDT	3.3	3.9 UJ	3.4 U	3.5 U	3.4 U	24 UJ
Methoxychlor	17	20 U	18 U	18 U	3.6 J	20 U
Endrin Ketone	3.3	3.9 U	3.4 U	3.5 U	3.4 U	3.9 U
Endrin Aldehyde	3.3	3.9 U	3.4 U	3.5 U	3.4 U	3.9 U
alpha-Chlordane	1.7	2.0 U	1.8 U	1.8 U	1.7 U	2.0 U
gamma-Chlordane	1.7	2.0 UJ	1.8 U	1.8 U	1.7 U	5.0 UJ
Toxaphene	170	200 U	180 U	180 U	170 U	200 U
Aroclor-1016	33	39 U	34 U	35 U	34 U	39 U
Aroclor-1221	67	78 U	69 U	71 U	68 U	80 U
Aroclor-1232	33	39 U	34 U	35 U	34 U	39 U
Aroclor-1242	33	39 U	34 U	35 U	34 U	39 U
Aroclor-1248	33	39 U	34 U	35 U	34 U	39 U
Aroclor-1254	33	39 UJ	34 U	35 U	34 U	140 J
Aroclor-1260	33	39 U	34 U	35 U	34 U	39 U
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0
DATE SAMPLED:		04/07/98	04/07/98	04/07/98	04/07/98	04/07/98
DATE EXTRACTED:		04/10/98	04/10/98	04/10/98	04/10/98	04/10/98
DATE ANALYZED:		04/22/98	04/22/98	04/22/98	04/22/98	04/28/98
% MOISTURE:		18	12	13	8	22

NOTE: RESULTS ARE REPORTED ON A DRY WEIGHT BASIS.

SITE: RIVER STREET DUMP
CASE: 26108 SDG: MALB45
LABORATORY: SENTINEL, INC.

TABLE 1
INORGANIC SOIL ANALYSES
mg/kg

SAMPLE NUMBER:			MALB51	MALB52	MALB53	MALB54	MALB55	MALB56	
SAMPLE LOCATION:			SO-01	SO-02	SO-03	SO-04	SO-05	SO-06	
LABORATORY NUMBER:			11739S	11740S	11741S	11742S	11743S	11744S	
			73.5	87.9	85.8	93.6	93.6	82.1	
INORGANIC ELEMENTS		INSTRUMENT DETECTION LIMITS (mg/kg)							CONTRACT DETECTION LIMITS (mg/kg)
ALUMINUM	P	3.0	8580 J	5860 J	5550 J	5020 J	5940 J	8970 J	40
ANTIMONY	P	0.62	0.84 UJ	0.71 UJ	0.72 UJ	0.66 UJ	0.66 UJ	0.76 UJ	12
ARSENIC	P	0.62	3.8 J	2.7 J	2.8 J	3.0 J	3.3 J	2.6 J	2
BARIUM	P	0.080	35.7 J	25.5 J	28.4 J	20.3 J	24.3 J	36.1 J	40
BERYLLIUM	P	0.020	0.22 J	0.15 J	0.16 J	0.14 J	0.15 J	0.23 J	1
CADMIUM	P	0.06	0.08 UJ	0.07 UJ	0.07 UJ	0.06 UJ	0.06 UJ	0.07 UJ	1
CALCIUM	P	5.3	2220 J	11200 J	7910 J	1600 J	1650 J	1830 J	1000
CHROMIUM	P	0.12	18.0 J	8.4 J	9.7 J	8.1 J	10.5 J	19.0 J	2
COBALT	P	0.24	6.4 J	7.3 J	6.1 J	6.3 J	7.2 J	7.3 J	10
COPPER	P	0.16	17.2 UJ	19.6 UJ	23.8 UJ	20.5 UJ	36.9 UJ	19.6 UJ	5
IRON	P	2.5	14200 J	12800 J	12100 J	11200 J	12500 J	15500 J	20
LEAD	P	0.38	23.0 UJ	17.0 UJ	21.4 UJ	18.2 UJ	16.0 UJ	23.3 UJ	0.6
MAGNESIUM	P	4.4	3200 J	3760 J	3070 J	2610 J	3080 J	3310 J	1000
MANGANESE	P	0.04	346 J	441 J	383 J	362 J	507 J	417 J	3
MERCURY	CV	0.10	0.14 UJ	0.11 UJ	0.12 UJ	0.11 UJ	0.11 UJ	0.12 UJ	0.1
NICKEL	P	0.34	23.5 J	17.9 J	17.1 J	16.2 J	19.1 J	24.9 J	8
POTASSIUM	P	2.4	613 J	650 J	761 J	545 J	623 J	574 J	1000
SELENIUM	P	0.40	0.65 UJ	0.46 UJ	0.47 UJ	0.43 UJ	0.43 UJ	0.49 UJ	1
SILVER	P	0.16	0.40 J	0.49 J	0.35 J	0.57 J	0.50 J	0.46 J	2
SODIUM	P	29.3	86.0 UJ	156 UJ	126 UJ	91.1 UJ	118 UJ	109 UJ	1000
THALLIUM	P	0.92	1.3 UJ	1.0 UJ	1.1 UJ	0.98 UJ	0.98 UJ	1.1 UJ	2
VANADIUM	P	0.16	15.0 J	8.7 J	8.5 J	7.8 J	8.4 J	15.8 J	10
ZINC	P	0.54	42.8 J	37.4 J	40.0 J	33.6 J	36.8 J	42.4 J	4
CYANIDE	CA	0.05	0.63 UJ	0.55 UJ	0.37 UJ	0.30 UJ	NA	0.39 UJ	0.5

ANALYTICAL METHOD
P - ICP
CV - COLD VAPOR
CA - MIDI-DISTILLATION SPECTROPHOTOMETRIC

NOTE:
J = QUANTITATION IS ESTIMATED DUE TO LIMITATIONS IDENTIFIED IN THE QUALITY CONTROL REVIEW (DATA REVIEW).
U = VALUE IS NON-DETECTED.
UJ = VALUE IS NON-DETECTED AND DETECTION LIMIT IS ESTIMATED.
R = VALUE IS REJECTED.
NA = NOT ANALYZED

NOTE: RESULTS ARE REPORTED ON A DRY WEIGHT BASIS

SITE: RIVER STREET DUMP
CASE: 26108 SDG: MALB45
LABORATORY: SENTINEL, INC.

TABLE 2
INORGANIC AQUEOUS ANALYSIS
µg/L

SAMPLE NUMBER:	MALB49
SAMPLE LOCATION:	RB-01C
LABORATORY NUMBER:	11738S

INORGANIC ELEMENTS	METHOD	INSTRUMENT DETECTION LIMITS (µg/L)		CONTRACT DETECTION LIMITS (µg/L)
ALUMINUM	P	14.9	66.0 J	200
ANTIMONY	P	3.1	3.1 UJ	60
ARSENIC	P	3.1	3.1 UJ	10
BARIUM	P	0.4	0.92 UJ	200
BERYLLIUM	P	0.1	0.10 UJ	5
CADMIUM	P	0.3	0.30 UJ	5
CALCIUM	P	26.4	233 UJ	5000
CHROMIUM	P	0.6	0.60 UJ	10
COBALT	P	1.2	1.2 UJ	50
COPPER	P	0.8	42.4 J	25
IRON	P	12.3	27.9 UJ	100
LEAD	P	1.9	33.6 J	3
MAGNESIUM	P	22.0	75.2 UJ	5000
MANGANESE	P	0.2	3.5 J	15
MERCURY	CV	0.2	0.20 UJ	0.2
NICKEL	P	1.7	1.7 UJ	40
POTASSIUM	P	12.1	84.8 J	5000
SELENIUM	P	2.0	2.0 UJ	5
SILVER	P	0.8	0.80 UJ	10
SODIUM	P	146.6	401 J	5000
THALLIUM	P	4.6	4.6 UJ	10
VANADIUM	P	0.8	0.80 UJ	50
ZINC	P	2.7	24.5 J	20
CYANIDE	CA	1.0	1.0 UJ	10

ANALYTICAL METHOD
P - ICP
CV - COLD VAPOR
CA - MIDI-DISTILLATION SPECTROPHOTOMETRIC

NOTE:
J - QUANTITATION IS ESTIMATED DUE TO LIMITATIONS IDENTIFIED IN THE QUALITY CONTROL REVIEW (DATA REVIEW).
U - VALUE IS NON-DETECTED AND DETECTION LIMIT IS RAISED.
UJ VALUE IS NON-DETECTED AND DETECTION LIMIT IS ESTIMATED.
R - VALUE IS REJECTED.