

77-0016



Roy F. Weston, Inc.
Federal Programs Division
217 Middlesex Turnpike
Burlington, Massachusetts 01803-3308
781-229-6430 • Fax 781-272-3619

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

8 July 1998
11098-031-001-5069-70
DC No. A-2725

AUG 21 11 25 AM '98

Mr. Charles Schwer
Vermont Department of Environmental Conservation
103 South Main Street
Waterbury, VT 05671

Subject: Final Site Inspection Prioritization Report
Ethan Allen Orleans Division
Barton, Vermont
CERCLIS No. VTD001082841
TDD No. 98-05-0142

Dear Mr. Schwer:

Enclosed are two copies of the Final Site Inspection Prioritization (SIP) Report for the Ethan Allen Orleans Division property in Barton, Vermont. No comments were received from the U.S. Environmental Protection Agency Region I (EPA Region I), Office of Site Remediation and Restoration or the Vermont Department of Environmental Conservation (VT DEC) regarding the contents of the Draft SIP Report. Attachments have been omitted from this final deliverable as no comments or changes to the attachments were requested during the review process.

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

Kerri Cattabriga
Site Leader

Jocelyn Boesch
Project Leader

KMC:kmc
Enclosures
cc: L. Johnson (EPA Task Monitor)

S:\9602001\1\ETHAN.FNL

In Association with Resource Applications, Inc., C.C. Johnson & Malhotra, P.C., and Tetra Tech EM Inc.

**FINAL SITE INSPECTION PRIORITIZATION REPORT
FOR
ETHAN ALLEN ORLEANS DIVISION
BARTON, VERMONT**

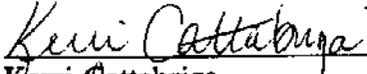
Prepared For:
U.S. Environmental Protection Agency
Region I
Office of Site Remediation and Restoration
John F. Kennedy Federal Building
Boston, MA 02203-0001

CONTRACT NO. 68-W5-0009
CERCLIS NO. VTD001082841
TDD NO. 98-05-0142
PCS NO. 5069
DC NO. A-2725

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

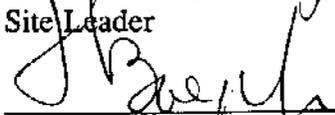
8 July 1998

Region I START
Reviewed and Approved:



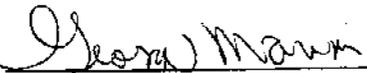
Kerri Cattabriga
Site Leader

8 July 1998
Date



Jocelyn Boesch
Project Leader

8 July 1998
Date



QA Review

8 July 1998
Date

Work Order No. 11098-031-001-5069-70

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.

TABLE OF CONTENTS

Title	Page
INTRODUCTION	1
SITE DESCRIPTION	1
OPERATIONAL AND REGULATORY HISTORY AND WASTE CHARACTERISTICS	4
WASTE/SOURCE SAMPLING	11
GROUNDWATER PATHWAY	11
SURFACE WATER PATHWAY	15
SOIL EXPOSURE PATHWAY	24
AIR PATHWAY	24
SUMMARY	27
 REFERENCES	
 ATTACHMENT A - ETHAN ALLEN ORLEANS DIVISION SEDIMENT SAMPLE ANALYTICAL RESULTS START Samples collected 17 September 1997	 A-1

LIST OF FIGURES

Figure No.	Title	Page
1	Location Map	2
2	Site Sketch	3

LIST OF TABLES

Table No.	Title	Page
1	Source Evaluation for Ethan Allen Orleans Division	8
2	Hazardous Waste Quantity for Ethan Allen Orleans Division	10
3	RCRA Sites Located Within 1-Radial Mile of the Ethan Allen Orleans Division	10
4	Public Groundwater Supply Sources Within 4-Radial Miles of Ethan Allen Orleans Division	12
5	Estimated Drinking Water Populations Served by Groundwater Sources Within 4-Radial Miles of Ethan Allen Orleans Division	13
6	Highest Levels of Volatile Organic Compound Concentrations Detected in Groundwater Samples from Ethan Allen Orleans Division between 14 December 1987 and August 1993	14
7	Surface Water Bodies Along the 15-Mile Downstream Pathway from Ethan Allen Orleans Division	17
8	Sensitive Environments Along the 15-Mile Downstream Pathway from Ethan Allen Orleans Division	18
9	Sample Summary: Ethan Allen Orleans Division Sediment Samples Collected by START on 17 September 1997	20
10	Summary of Analytical Results: Sediment Sample Analysis for Ethan Allen Orleans Division	22
11	Estimated Population Within 4-Radial Miles of Ethan Allen Orleans Division	25
12	Sensitive Environments Located Within 4-Radial Miles of Ethan Allen Orleans Division	26

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 Prioritization (SIP) of the Ethan Allen Orleans Division property at Railroad Avenue in Barton, Vermont. Tasks were conducted in accordance with the SIP scope of work and technical specifications provided by EPA Region I. A Site Investigation (SI) report for the Ethan Allen Orleans Division property was prepared by the Johnson Company, Inc. in September 1993. The SI report documented subsurface soil contamination on the property. On the basis of the information provided in the SI report, the Ethan Allen Orleans Division SIP was initiated.

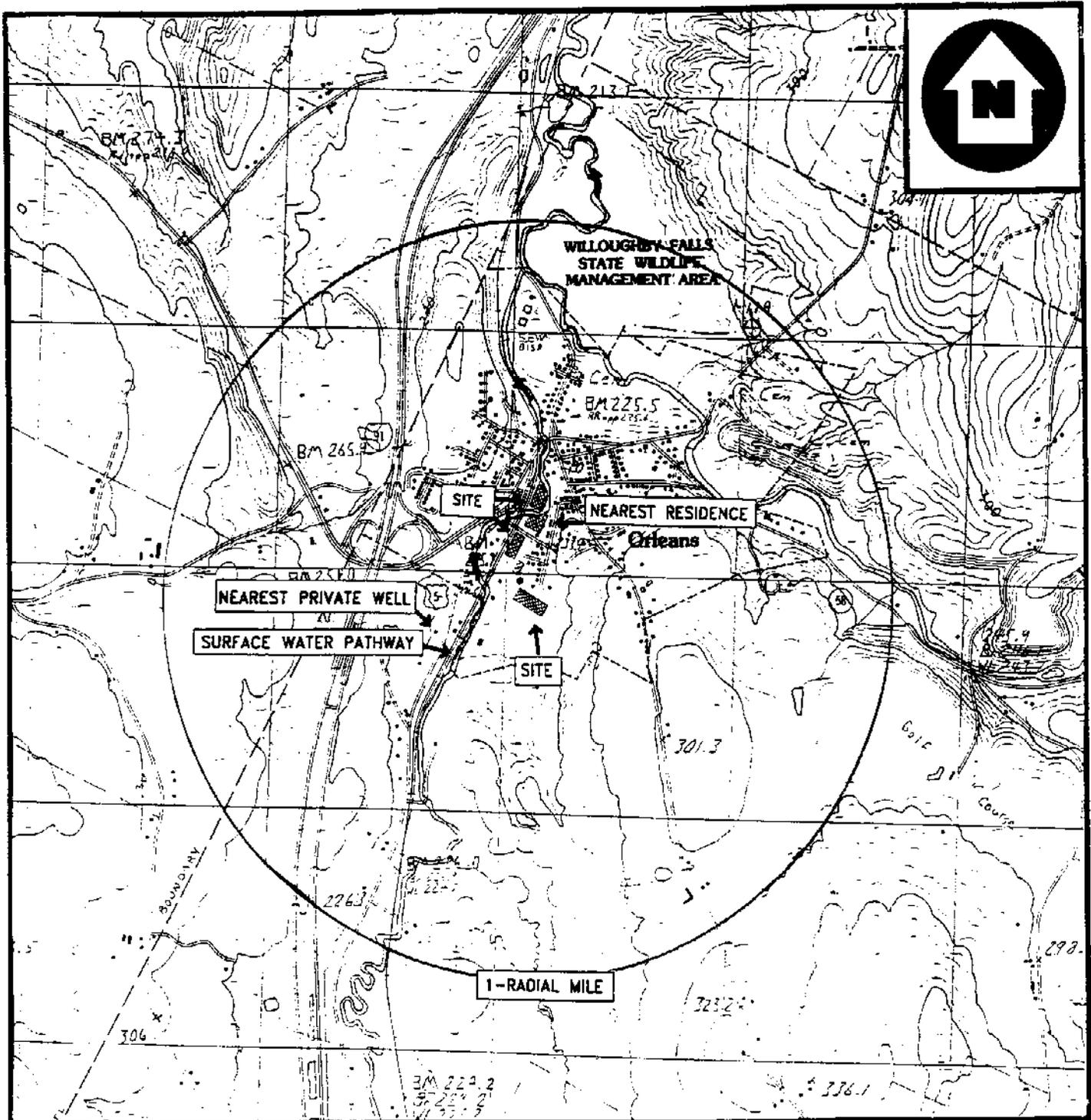
Background information used in the generation of this report was obtained through file searches conducted at the EPA Region I, Vermont Department of Environmental Conservation (VT DEC), telephone interviews with town officials, conversations with persons knowledgeable of the Ethan Allen Orleans Division property and conversations with other Federal, State, and local agencies, and on-site reconnaissance and sampling activities.

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. SIPs 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.

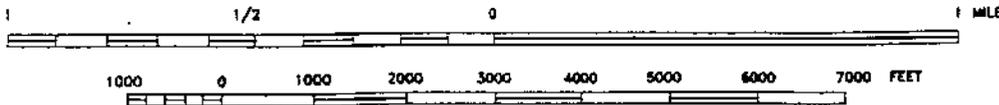
SITE DESCRIPTION

The Ethan Allen Orleans Division (Ethan Allen) property occupies approximately 52 acres on Railroad Avenue in Barton, Orleans County, Vermont (Figure 1) [1, p. 1; 2; 3, p. 4]. The geographical coordinates are at latitude 44° 48' 21.5" north and longitude 72° 12' 11.5" west. Lot number and property line information were unavailable to START [26].

The Ethan Allen property is bound by wetlands and an open field to the south; pasture, residences, and South Street to the east; Orleans Village to the north; and railroad tracks, Barton River and Route 5 to the west (Figure 2) [3, pp. 4-5]. North-flowing Barton River is located along the western perimeter of the Ethan Allen property [3, pp. 4, 18]. A 12-acre wetland area is located just south of the southern perimeter of the Ethan Allen property [3, p. 5; 18; 37, pp. 19-20].



BASE MAP IS A PORTION OF THE FOLLOWING 7.5 X 15' U.S.G.S. QUADRANGLE(S):
Orleans, Vermont 1988.



LOCATION MAP

ETHAN ALLEN ORLEANS DIVISION
RAILROAD AVENUE
BARTON, VERMONT

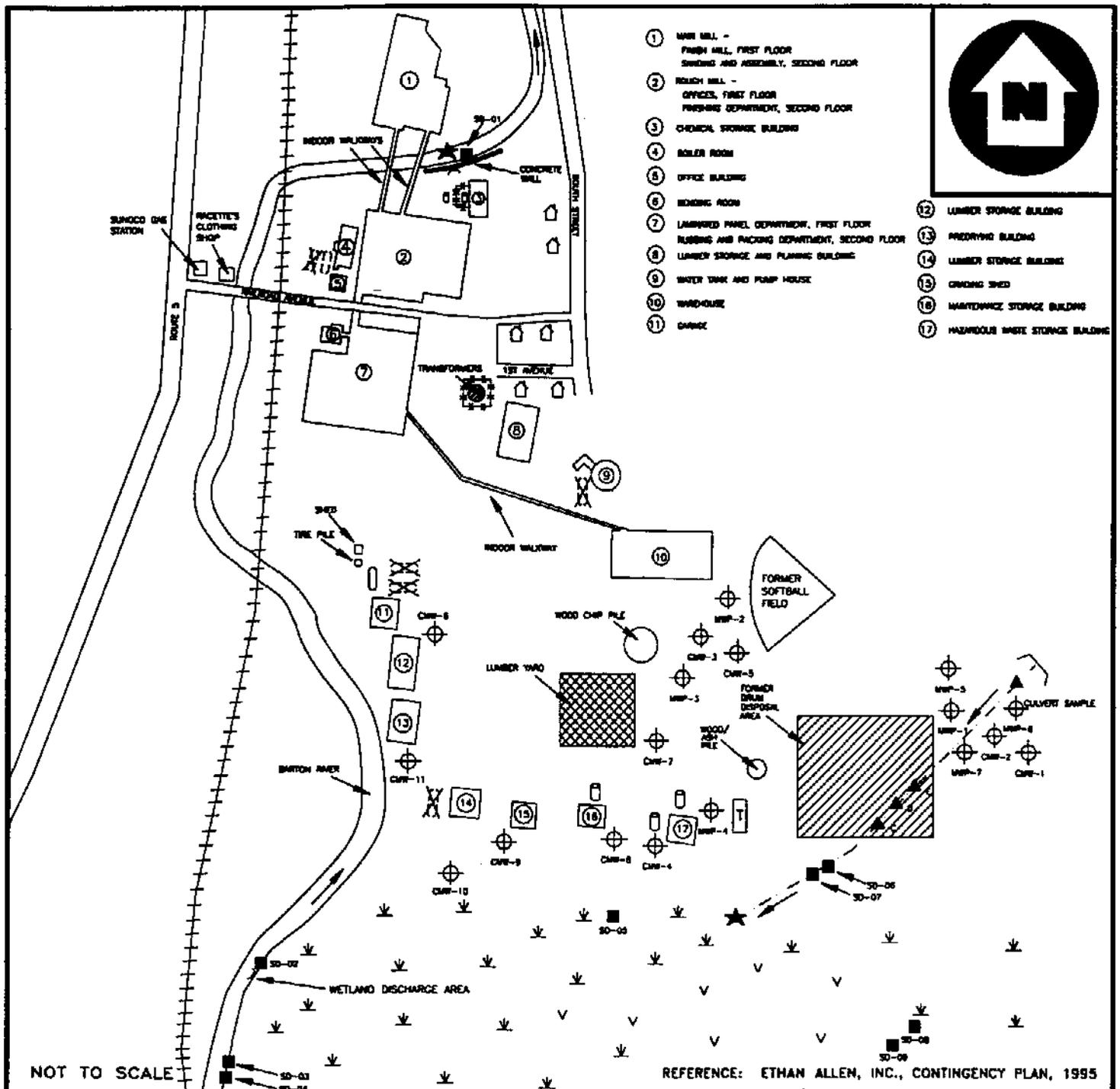


REGION I SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM

TDD # 96020011	DRAWN BY: K. CATTABRIGA	DATE 1/17/96
-------------------	----------------------------	-----------------

FILE NAME:
S:\96020011\ETNLOC.DWG

FIGURE 1



- ① MILL MILL -
FINISH MILL, FIRST FLOOR
SHEDS AND ASSEMBLY, SECOND FLOOR
- ② ROUGH MILL -
OFFICES, FIRST FLOOR
FINISHING DEPARTMENT, SECOND FLOOR
- ③ CHEMICAL STORAGE BUILDING
- ④ BOILER ROOM
- ⑤ OFFICE BUILDING
- ⑥ BEDDING ROOM
- ⑦ LAMBERED PANEL DEPARTMENT, FIRST FLOOR
RUBBING AND PACKING DEPARTMENT, SECOND FLOOR
- ⑧ LUMBER STORAGE AND PLANING BUILDING
- ⑨ WATER TANK AND PUMP HOUSE
- ⑩ WAREHOUSE
- ⑪ CHANGE
- ⑫ LUMBER STORAGE BUILDING
- ⑬ PREFERRED BUILDING
- ⑭ LUMBER STORAGE BUILDING
- ⑮ CRACKING SHED
- ⑯ MAINTENANCE STORAGE BUILDING
- ⑰ HAZARDOUS WASTE STORAGE BUILDING



SITE MAP

ETHAN ALLEN ORLEANS DIVISION
RAILROAD AVENUE
BARTON, VERMONT



REGION I SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM

TDD # 96-02-0011 DRAWN BY: K. Cattabriga DATE 6/25/97

FILE NAME: ETNSITE.DWG **FIGURE 2**

A former 2-acre company softball field is located in the eastern portion of the Ethan Allen property [3, p. 5]. A former 2.5-acre drum disposal area is located in the southeastern corner of the property just northeast of the wetland area [3, p. 4]. A lumber storage yard is located in the central southern portion of the property [3, p. 5].

There are 17 buildings located on the Ethan Allen property [36, p. 22]. Building locations are shown on Figure 2. The buildings occupy approximately 750,000 cubic feet (ft³) [37, p. 13]. Building Nos. 1, 2, 6, and 7 are used for sanding, assembly, finishing, and packing [36, p. 22]. Building Nos. 3, 16, and 17 are used for chemical and hazardous waste storage [36, p. 22]. Building No. 4 contains a boiler room [36, p. 22]. Building No. 5 contains office space [36, p. 22]. Building Nos. 8, 10, 12, 13, 14, and 15 are used for lumber and furniture storage, planing, predrying, sorting, and grading [36, p. 22]. Building No. 9 is a fire pump house [36, p. 22]. Building No. 11 is a garage [36, p. 22].

Six trailers containing machinery, spare parts, and scrap metal were located just east of Building No. 17 [37, p. 18]. A pile of an estimated 26,000 ft³ of wood ash, produced by the boiler room located on the Ethan Allen property, was observed just northeast of the trailers [37, p. 18]. Six power transformers stored on concrete inside a chain-linked fence were observed near the northwestern corner of Building No. 8 [37, p. 12].

A small shed is located near the northwestern corner of Building No. 11 [37, p. 13]. The shed was locked with a padlock and its contents are unknown [37, p. 13]. An estimated 50 tires were observed on the ground near the shed [37, p. 13]. A 350-gallon diesel fuel oil aboveground storage tank (AST) was observed in a small earthen berm adjacent to the northern corner of Building No. 11 [37, p. 14]. Spillage and dead grass were observed near the AST [37, p. 14].

During the 17 September 1997 START sampling event, two drainage pipes located north of Building No. 3 were observed along the east side of Barton River. Water was observed flowing from the drainage pipes into Barton River. Bright orange colored leachate was observed along the outflow drainage route of one of the pipes [37, p. 32-33]. No catch basins were observed by START personnel during the 16 May 1997 on-site reconnaissance.

A paved access road is located between Route 5 and South Street just south of Building Nos. 2 and 5, oriented west to east [36, p. 22]. Vehicular and pedestrian access to the Ethan Allen property is unrestricted.

During the START on-site reconnaissance, several overburden monitoring wells were observed on the Ethan Allen property. The monitoring wells were unlocked, and several monitoring wells were not capped [37, pp. 16-20].

OPERATIONAL AND REGULATORY HISTORY AND WASTE CHARACTERISTICS

Prior to 1953, the Ethan Allen property was farmland [3, p. 6]. Ethan Allen, Inc. furniture manufacturing operations began in 1953 [3, p. 6]. Between 1953 and 1979, Ethan Allen, Inc. disposed of approximately 9,000 ft³ of waste solvents, stains, lacquers, and glue in the former drum disposal area located on the Ethan Allen property [3, pp. 6, 21]. There was no formal

closure of the former drum disposal area located on the Ethan Allen property [3, p. 6]. Liquid wastes were poured directly onto the ground or into shallow pits [3, p. 6]. In addition, an unlined pit was excavated, filled with an unknown number of sealed 55-gallon drums, and covered with native soil between 1953 and 1979 [3, p. 6]. START was unable to locate additional information on manufacturing operations and processes in available background files.

In the mid-1960s, an unknown contractor for Ethan Allen, Inc. diverted the Barton River flow for company expansion toward the south [3, p. 9]. Previously, Barton River flowed adjacent to the southern, eastern, and northern perimeters of the Ethan Allen property and then north at the northwestern corner of the Ethan Allen property [3, p. 9]. Currently, Barton River flows north along the western perimeter of the Ethan Allen property and then crosses the northern toe of the Ethan Allen property [3, p. 9].

In 1979, Ethan Allen, Inc. began shipping wastes, including waste solvents, stains, lacquers, and glue, to Barton Landfill, located in Barton, Vermont [3, p. 6]. However, the first hazardous waste shipment to a certified disposal site occurred in June 1982 [3, p. 6].

On 4 February 1985, Johnson Company, Inc. and a hydrogeologist contracted by Ethan Allen, Inc. completed a preliminary site inspection of the former drum disposal area located on the Ethan Allen property [5, p. 1]. Johnson Company, Inc. performed a magnetometer survey which indicated the presence of buried drums or scrap metal [5, p. 2]. Volatile organic compound (VOC) analyses of soil samples collected near the former drum disposal area indicated xylene ranging between 5 and 66 micrograms per kilogram ($\mu\text{g}/\text{kg}$) at depths ranging between 5 and 10 feet (ft) [5, p. 6].

Between 26 August and 30 September 1985, an unknown contractor for Ethan Allen, Inc. removed buried scrap metal and approximately 362 buried drums just east of the lumber storage yard on the Ethan Allen property [4, pp. 14-15]. The drums contained paint thinner, stain, glue, oil, and soil [4, p. 20]. Approximately 6,600 gallons of liquid wastes were transferred from the drums into an 8,000-gallon bulk tank at an unknown location [4, p. 21]. Drums containing solids were crushed in a lined staging area and shipped to an unknown certified hazardous waste landfill as bulk waste [4, p. 21]. In addition, approximately 75 cubic yards (yd^3) of contaminated soil were excavated from the buried drum area and then thinly spread on wooden bins to volatilize [4, p. 32]. Further information regarding this contaminated soil is unavailable to START.

In June 1988, Johnson Company, Inc. completed an ongoing subsurface investigation report for the Ethan Allen property [6, p. 1]. Groundwater flow patterns were determined, and groundwater samples from monitoring wells on the Ethan Allen property were collected and analyzed for VOCs [6, p. 1]. Groundwater sample analyses indicated VOCs ranging between 4.1 and 132.1 micrograms per liter ($\mu\text{g}/\text{L}$) [6, p. 17].

On 5 and 6 September 1990, two 1,000-gallon underground storage tanks (USTs) located on the Ethan Allen property were removed by James Shippee Welding under Vermont Department of Environmental Conservation (VT DEC) supervision [1, p. 4; 40]. The USTs were used to store No. 2 fuel oil for heating [1, p. 4]. One of the 1,000-gallon USTs was located just west of Building No. 14, and the other was located off of the property on land previously owned by Ethan

Allen, Inc. [40]. Approximately 20 yd³ of petroleum-contaminated soil was excavated in the areas of the USTs and then spread on the Ethan Allen property with VT DEC approval [1, p. 4].

In 1990, an unknown contractor for Ethan Allen, Inc. removed two 4,000-gallon USTs located near the northeastern corner of Building No. 11 [40]. The USTs were used to store diesel fuel for Ethan Allen vehicles [40]. Further information regarding the USTs is unavailable to START.

On 20 August 1992, Earnest Cleavland, contractor for Ethan Allen, Inc., removed a 20,000-gallon UST used to store No. 6 fuel oil located adjacent to the western side of Building No. 4 on the Ethan Allen property [1, p. 4; 7, p. 1; 37, p. 2-3; 40]. After removal, the UST was pressure tested with air, soap, and water [7, p. 3]. No leaks were detected [7, p. 3]. Approximately 18 yd³ of petroleum-contaminated soil was excavated in the area of the UST and then polyencapsulated and stockpiled on the Ethan Allen property [1, p. 4]. According to Mr. James Shippee, contractor for Ethan Allen, Inc., petroleum-contaminated soils were attributable only to UST petroleum overfills [7, p. 3]. Currently, there is a 20,000-gallon UST containing No. 6 fuel oil used for heating located adjacent to the western side of Building No. 4 [40]. The 20,000-gallon UST has not been used since 1991 [40].

In 1992, James Shippee Welding removed a 2,000-gallon UST containing No. 2 fuel heating oil located near the southwestern corner of Building No. 9 [40].

In September 1993, Johnson Company, Inc. completed a Site Investigation report for Ethan Allen, Inc. Soil samples were collected from the former drum disposal area at depths ranging between 0 and 7.5 ft; groundwater samples were collected from monitoring wells located upgradient and downgradient of the former drum disposal area; and surface water and sediment samples were collected from the wetland located just south of the former drum disposal area [1, p. ii]. Samples were analyzed for VOCs. Analyses indicated VOCs ranging between 3 µg/kg and 405 µg/kg in soil and sediment samples [1, Appendix A]. In addition, analyses indicated VOCs ranging between 1 µg/L and 12 µg/L in groundwater and surface water samples [1, Appendix A].

On 16 May 1997, START conducted an on-site reconnaissance. START personnel also surveyed the vicinity of the property, including off-site surface water bodies and other nearby features.

During the START on-site reconnaissance, no hazardous materials were observed in Building Nos. 4, 8, 10, 12, 13, and 15 [37, pp. 4-18]. START personnel did not enter Building Nos. 5 and 9. Building No. 5 is an office building [37, p. 11]. According to Mr. Bob Rice, a 275-gallon No. 2 fuel oil AST used for heating and a 500-gallon diesel fuel AST used for the fire pump engine, are located in Building No. 9 [37, p. 12; 40].

Two flammable materials storage lockers containing approximately 30 cans of paint and stain and three gasoline containers were observed in the maintenance area in the southeast corner of Building No. 1 [37, p. 5]. The gasoline is used for lawnmowers [37, p. 5]. Six 55-gallon drums containing cutting oil used for machine maintenance were observed in the garage connected to the maintenance area [37, p. 5]. A Safety-Kleen parts cleaning station was also observed in this maintenance area [37, p. 6]. A spraybooth used for prestaining was observed on the second level of Building No. 1 [37, p. 7].

An estimated 12 55-gallon drums full of waste glue were observed in the center of the first level of Building No. 2 [37, p. 4]. An unknown number of 55-gallon drums containing paints and solvents were observed on the second level of Building No. 2 [37, p. 9]. Five storage lockers containing finishes were observed in the southwest corner of the second level of Building No. 2 [37, pp. 9-10].

A hazardous materials satellite storage area was observed outside and adjacent to the west side of Building No. 3 [37, p. 8]. Four 55-gallon drums were observed inside a locked chain-linked cage [37, p. 8]. An estimated 26 55-gallon drums were observed outside the locked cage [37, p. 8]. All drums were stored on asphalt [37, p. 8]. Sixteen 55-gallon drums containing stains, toners, sealers, lacquers and thinners were observed in the northern mixing room of Building No. 3. An estimated 100 5-gallon pails and 70 55-gallon drums were observed in the southern storage area of Building No. 3 [37, p. 9]. Four 4,000-gallon ASTs containing lacquers and sealers were located behind concrete walls in the southern storage area of Building No. 3 [37, p. 9]. Building No. 3 was bermed for spill containment [37, p. 9].

A 55-gallon drum containing water with an unknown amount of carboxylic acid, used for wood bleaching, was observed in Building No. 6 [37, p. 11]. The 55-gallon drum appeared to be leaking [37, p. 11]. A floor drain located in Building No. 6 drains to a sump located in the same building [37, p. 12]. According to Mr. Bob Rice, the sump most likely drains to Barton River [37, p. 12].

A Safety-Kleen parts cleaning station and five 55-gallon drums containing motor oil were observed inside Building No. 11 [37, p. 14]. A 275-gallon AST containing diesel fuel used for forklifts was observed in the northwestern corner of Building No. 11 [37, p. 14; 40]. Six drums containing lube oil were observed in the southwest corner of Building No. 11 [37, p. 14].

A floor drain oriented from northwest to southeast was observed near the southern side of Building No. 13 [37, p. 14]. According to Mr. Bob Rice, the floor drain leads to a leachfield likely located on the Ethan Allen property [37, p. 15].

A flammable materials storage cabinet containing gasoline used for chainsaws and lawn maintenance equipment was observed in Building No. 14 [37, p. 16].

An estimated 44 55-gallon drums of finishing material and an estimated 40 5-gallon cans and pails were observed in Building No. 16 [37, p. 16]. The inside of Building No. 16 was bermed except for the garage door located on the northern side of the building [37, p. 17]. An estimated 100 empty 55-gallon drums were located outside on the ground surface between Building Nos. 16 and 17 [37, p. 17].

Level one of Building No. 7 is used for furniture return storage [37, p. 10]. An estimated nine empty steel drums were observed on the loading dock of Building No. 7 [37, p. 10]. An estimated 15 containers of stained rags were observed in the basement of Building No. 7 [37, p. 11]. In addition, office furniture and machinery were observed in the basement of Building No. 7 [37, p. 11]. Several pails of mineral spirits were observed on level two of Building No. 7, as well as two 55-gallon drums containing polishing wax [37, p. 10].

An estimated 60 55-gallon drums containing hazardous wastes, including stain filters, lacquers, and sealers, were observed in Building No. 17 [37, p. 17]. An estimated 30 55-gallon drums were observed just outside of Building No. 17 on the ground surface [37, p. 17]. Approximately 1 square foot (ft²) of stained soil was observed near the 55-gallon drums [37, p. 17]. Building No. 17 was bermed for spill containment [37, p. 17].

On 17 September 1997, START personnel collected sediment samples from four locations along Barton River and from five locations in the wetland area located just south of the Ethan Allen property. Sample locations are identified on Figure 2. Samples were analyzed for VOCs, semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyl compounds (PCBs), metals, and cyanide. Details of the sediment sampling event and results are summarized in the Surface Water Pathway Section of this report.

Table 1 presents identified structures or areas on the Ethan Allen property that are documented or potential sources of contamination, the containment factors associated with each source, and the relative location of each source.

Table 1
Source Evaluation for Ethan Allen Orleans Division

Source Area	Containment Factors	Spatial Location
Former drum disposal area	None	Southeastern corner of property
Former 1,000-gallon UST	None	West of Building No. 14
Former 1,000-gallon UST	None	Off-site on property previously owned by Ethan Allen
Two former 4,000-gallon USTs	None	Northeast corner of Building No. 11
Former 20,000-gallon UST	None	West of Building No. 4
Former 2,000-gallon UST	None	Southwest corner of Building No. 9
One 55-gallon drum	None	Inside of Building No. 6
Six 55-gallon drums	Concrete, inside building	Inside of Building No. 1
11 55-gallon drums	Concrete, inside building	Inside of Building No. 11
12 55-gallon drums	Concrete, inside building	Inside of Building No. 2
86 55-gallon drums	Concrete, inside building	Inside of Building No. 3
Two 55-gallon drums	Concrete, inside building	Inside of Building No. 7
An estimated 44 55-gallon drums	Concrete, inside building	Inside of Building No. 16

Table 1

**Source Evaluation for Ethan Allen Orleans Division
(Concluded)**

Source Area	Containment Factors	Spatial Location
An estimated 60 55-gallon drums	Concrete, inside building	Inside of Building No. 17
An estimated 30 55-gallon drums	None	Just outside of Building No. 17
Approximately 1 ft ² of stained soil	None	Just outside of Building No. 17
One 275-gallon AST and one 500-gallon AST	Inside building	Inside Building No. 9
Four 4,000-gallon ASTs	Concrete, inside building	Inside Building No. 3
One 275-gallon AST	Concrete, inside building	Inside Building No. 11
One 350-gallon AST	None	Northern corner of Building No. 11
30 cans	Flammable lockers	Inside of Building No. 1
100 5-gallon pails	Concrete, inside building	Inside of Building No. 3
40 5-gallon cans and pails	Concrete, inside building	Inside of Building No. 16
Wood ash pile	None	Northeast of trailers
Four 4,000-gallon ASTs	Concrete, inside building	Inside of Building No. 3

UST = Underground Storage Tank

AST = Aboveground Storage Tank

[1, p. 4; 3, p. 4; 7, p. 1; 37, pp. 11-12; 40]

Table 2 summarizes the types of potentially hazardous substances which have been disposed, used, or stored on the Ethan Allen property.

Table 2

Hazardous Waste Quantity for Ethan Allen Orleans Division

Substance	Quantity or Volume/Area	Years of Use/Storage	Years of Disposal	Source Area
Industrial wastes (solvents, stains, lacquers, glue)	9,000 ft ³	1953 - 1979	1953 - 1979	Former drum disposal area
Drums containing paint thinner, stain, glue, oil, and soil	362 55-gallon drums	Unknown - 1979	Unknown - 1979	Former drum disposal area
Petroleum-contaminated soil	18 yd ³	Unknown - 1992	Unknown	West of Building No. 4
Petroleum-contaminated soil	20 yd ³	Unknown - 1990	Unknown	West of Building No. 14
Carboxylic acid	Unknown	Unknown - 1997	Unknown - 1997	Inside of Building No. 6

[1, p. 4; 3, p. 6; 3, p. 21; 4, pp. 14-15; 4, p. 20; 7, p. 1; 37, pp. 11-12; 40]

One CERCLA site in the 8 October 1997 Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) listing is located approximately 1.7 miles south of the Ethan Allen property, Barton Landfill [2; 18]. No further remedial action is planned for two other CERCLA sites located in Barton: Tarbox Monitoring Wells and Barton Electronic Department [2]. Table 3 summarizes five known Resource Conservation and Recovery Information System (RCRIS) sites located in the Town of Barton [41].

Table 3

RCRA Sites Located Within 1-Radial Mile of the Ethan Allen Orleans Division

Property Name	EPA Identification No.
Barton Cleaners	VTD048728646
Barton Motor Company, Inc.	VT5000001826
Carls Equipment, Inc.	VT5000001347
Sandri A R Sunoco Station	VTR000003681
VT Agency of Transportation	VTD982763369

[41]

WASTE/SOURCE SAMPLING

In December 1984, VT DEC collected soil boring samples at four locations, MWP-1, MWP-2, MWP-3, and MWP-4, on the Ethan Allen property [5, pp. 3-6]. Sample locations MWP-2 and MWP-3 are located upgradient of sample locations MWP-1 and MWP-4. Sample locations are shown on Figure 2. Soil samples were collected at depths ranging between 5 and 67.5 ft at each sample location. Samples were analyzed for VOCs. Analyses indicated five VOCs ranging between 5 $\mu\text{g}/\text{kg}$ and 113 $\mu\text{g}/\text{kg}$ [5, Figure 2]. VOCs included acetone, 2-butanone, 4-methyl-2-pentanone, methylene chloride, and total xylenes.

Between December 1988 and April 1990, several soil samples were collected by Johnson Company, Inc. from the former drum disposal area [35, pp. 1-3]. Soil samples were collected at depths ranging between 2 ft and 8 ft and were analyzed for VOCs. Analyses indicated four VOCs ranging between 14.6 $\mu\text{g}/\text{kg}$ and 732,000 $\mu\text{g}/\text{kg}$ [35, Table 1]. VOCs included ethylbenzene, tetrachloroethylene, toluene, and total xylenes.

GROUNDWATER PATHWAY

Depth to bedrock beneath the Ethan Allen property could not be determined based on available background information. However, depth to bedrock in drilled wells within 0.5-radial miles of Ethan Allen property ranges between 6 ft and 42 ft [3, pp. 12-13]. According to VT DEC, bedrock underlying the property is composed of slates, phyllites, quartzites, limestones, and schists [3, p. 12]. Overlying deposits on the Ethan Allen property are composed of sand, silt, and clay [3, p. 11; 5, Figure 1]. No bedrock formation mapped within 4-radial miles of the property exhibits karst characteristics.

According to Johnson Company, Inc., groundwater in overburden on the Ethan Allen property consists of an upper aquifer and a lower aquifer [6, p. 8]. The upper aquifer flows from east toward the wetland area located just south of the southern perimeter of the Ethan Allen property [6, p. 21]. Flow direction of the lower aquifer was undetermined in available background information. Average annual precipitation in the area of the Ethan Allen property is 39.94 inches [11, pp. 3-4].

According to VT DEC, groundwater in overburden was encountered between 0 and 3 feet below ground surface in the vicinity of the former drum disposal area [3, p. 15]. Groundwater outflow in overburden could not be determined from available background information. According to VT DEC, the average groundwater outflow in bedrock is 11 gallons per minute (gpm) [3, p. 15].

Groundwater within 4-radial miles of the property is used for public and private drinking water. Four public drinking water supply wells are located within 4-radial miles of the Ethan Allen property [8; 24; 27; 28]. The closest public supply well is the Maple Lane Nursing Home well, which is located approximately 1.5 miles south-southeast of the Ethan Allen property [8; 28]. The Maple Lane Nursing Home well is screened in bedrock and serves an estimated 65 people [28]. The Lake Region Union High School well, which is located approximately 1.7 miles south-southwest of the Ethan Allen property, serves an estimated 444 people [8; 29]. The Irasburg Well

Nos. 1 and 2 are located approximately 3.8 and 3.9 miles west of the Ethan Allen property, respectively. The Irasburg wells, which are blended and screened in bedrock, serve an estimated 195 people [8; 24; 27]. The Irasburg Well No. 1 contributes 86.2%, and Irasburg Well No. 2 contributes 13.8% to the system [27]. An estimated 704 people rely on public water supply wells within 4-radial miles of the Ethan Allen property [8; 24; 27; 28; 29].

Table 4 summarizes the public groundwater supply sources within 4-radial miles of the Ethan Allen property.

Table 4
Public Groundwater Supply Sources Within 4-Radial Miles of
Ethan Allen Orleans Division

Distance/ Direction from Site	Source Name	Location of Source ^a	Estimated Population Served	Source Type ^b
1.5 miles south-southeast	Maple Lane Nursing Home	Barton	65	Bedrock
1.7 miles south-southwest	Lake Region Union High School	Barton	444	Unknown
3.8 miles west	Irasburg Well No. 1	Irasburg	168	Bedrock
3.9 miles west	Irasburg Well No. 2	Irasburg	27	Bedrock

^aIndicate Town in which well is located.

^bOverburden, Bedrock, or Unknown.

[8; 24; 27; 28; 29]

Private well users within 4-radial miles of the property were estimated using equal distribution calculations of U.S. Census CENTRACTS data identifying populations, households, and private water wells for "Block Groups" which lie within or partially within individual radial distance rings of the Ethan Allen property [25].

Table 5 summarizes the estimated drinking water populations served by groundwater sources within 4-radial miles of the Ethan Allen property.

Table 5**Estimated Drinking Water Populations Served by Groundwater Sources
Within 4-Radial Miles of Ethan Allen Orleans Division**

Radial Distance from Ethan Allen Orleans Division (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	4	0	4
> 0.25 to 0.50	11	0	11
> 0.50 to 1.00	38	0	38
> 1.00 to 2.00	134	509	643
> 2.00 to 3.00	222	0	222
> 3.00 to 4.00	320	195	515
TOTAL	729	704	1,433

[8; 24; 25; 27; 28; 29]

An inactive private drinking water supply well, Orleans Freezer Locker Well, is located on the Ethan Allen property approximately 500 ft west of the former drum disposal area [3, p. 19]. The Orleans Freezer Locker Well was used for meat processing and as a drinking water supply for one unknown residence [3, p. 19]. In 1993, the Orleans Freezer Locker supply well was abandoned [37, pp. 3-4]. Further information regarding this well is unavailable.

According to an Orleans Wastewater Treatment Plant representative, the two closest active private drinking water supply wells are located along the west side of Route 5 approximately 0.25 miles southwest of the Ethan Allen property [37, p. 21]. The Souliere private drinking water supply well is located just east of Barton River, approximately 1,500 ft southwest of the former drum disposal area [3, p. 19]. According to Johnson Company, Inc., two additional private drinking water supply wells, the Marsh and Valley wells, were previously sampled [6, p. 21]. The Marsh private supply well is located along the west side of Route 5, approximately 0.1 miles southwest of the Ethan Allen property [6, p. 20; 37, p. 21]. The Valley private supply well location was not found in available background information.

At an unknown time prior to August 1984, VT DEC collected samples from the Orleans Freezer Locker Well and the Souliere private supply well [3, p. 19]. Samples were analyzed for VOCs only [3, p. 19]. Analyses indicated no VOCs in the samples [3, p. 19].

Sometime prior to August 1985, an unknown contractor for Ethan Allen, Inc. installed overburden monitoring wells CMW-1, CMW-2, CMW-3, CMW-4, CMW-5, MWP-1, MWP-2, MWP-3, MWP-4, MWP-5, MWP-6, and MWP-7 on the Ethan Allen property [4, p. 6]. Monitoring well locations are shown on Figure 2.

Between August 1985 and April 1986, groundwater samples were collected from monitoring wells CMW-1, CMW-2, CMW-3, CMW-4, and CMW-5 by Johnson Company, Inc. from five sampling rounds. Samples were analyzed for VOCs only [4, p. 22]. Analytical results indicated 14 VOCs ranging between 5 µg/L and 6,700 µg/L [4, p. 24]. In addition, on 12 August 1985, groundwater samples were collected from these five monitoring wells and composited. The composited groundwater sample was analyzed for SVOCs and PCBs. No pesticide/PCBs were detected in the sample. One SVOC, pentachlorophenol, was detected in the composited sample at 240 µg/L.

On 23 and 24 November 1987, Adams Engineering, contracted by Johnson Company, Inc., installed overburden monitoring wells CMW-6, CMW-7, CMW-8, CMW-9, CMW-10, and CMW-11 [6, p. 1]. Monitoring well locations are shown on Figure 2.

Between 14 December 1987 and August 1993, Ethan Allen, Inc. and Johnson Company, Inc. collected six sampling rounds of groundwater samples from monitoring wells CMW-1, CMW-2, CMW-3, CMW-4, CMW-5, CMW-6, CMW-7, CMW-8, CMW-9, CMW-10, and CMW-11 [1, Appendix A; 6, p. 17; 30; 31; 32; 33]. Samples were analyzed for VOCs only. Highest levels of VOCs detected in groundwater samples are summarized in Table 6.

Table 6

**Highest Levels of Volatile Organic Compound
Concentrations Detected in Groundwater Samples
from Ethan Allen Orleans Division Between
14 December 1987 and August 1993**

Monitoring Well (Date)	Compound	Concentration (µg/L)	MCL (µg/L)
CMW-1 (8/88)	Benzene	24	5
CMW-1 (8/93)	Bromodichloromethane	5	100
CMW-1 (3/88)	Chloroethane	7	NL
CMW-10 (11/88)	2-Chloroethylvinyl ether	1.27	NL
CMW-1 (8/88)	1,1-Dichloroethane	13.4	NL
CMW-1 (12/87)	1,2-Dichloroethane	35	5
CMW-1 (3/88)	1,1-Dichloroethene	12.4	7
CMW-1 (8/88)	trans-1,2-dichloroethene	13.4	100
CMW-1 (8/93)	1,2-Dichloropropane	1	5
CMW-1 (8/88)	Ethylbenzene	74	700
CMW-1 (8/88)	Toluene	178	1,000

Table 6

**Highest Levels of Volatile Organic Compound
Concentrations Detected in Groundwater Samples
from Ethan Allen Orleans Division Between
14 December 1987 and August 1993
(Concluded)**

Monitoring Well (Date)	Compound	Concentration ($\mu\text{g/L}$)	MCL ($\mu\text{g/L}$)
CMW-1 (8/88)	1,1,1-Trichloroethane	18	200
CMW-1 (8/88)	Total xylenes	166	10,000

MCL = Maximum Contaminant Level
 $\mu\text{g/L}$ = micrograms per liter

[6, p. 17; 30; 31; 32; 39]

Between 30 December 1987 and 17 March 1988, groundwater samples from two sampling rounds were collected by Johnson Company, Inc. from the Orleans Freezer Locker, Marsh, and Valley private drinking water supply wells. Groundwater samples were analyzed for VOCs. Analyses from the first sampling round indicated one VOC, 1,1,1-trichloroethane, in all three wells at 0.5 $\mu\text{g/L}$ [6, p. 19]. The maximum contaminant level (MCL) for 1,1,1-trichloroethane is 200 $\mu\text{g/L}$. Analyses from the second sampling round indicated no VOCs in the wells [6, p. 19]. No background sample was collected during these sampling rounds.

START did not perform groundwater sampling as part of the Ethan Allen SIP. Based on analytical results from previous monitoring well samples collected from the Ethan Allen property, groundwater beneath the property has been impacted by a release of hazardous substances which appears to be partially attributable to on-site sources. However, based on the location and distance from the property of the surrounding residential wells, no nearby drinking water sources are known or suspected to have been impacted by the release from on-site sources. To date, no actions have been taken to address the release to groundwater.

SURFACE WATER PATHWAY

Two probable points of entry (PPE) exist for the surface water pathway from the property. During the START on-site reconnaissance, a concrete wall was observed just north of Building No. 3 along Barton River [37, p. 8]. A hole, encompassing approximately 2 ft², was observed at the base of the concrete wall [37, p. 8]. The pavement slopes toward the hole north of Building No. 3. Overland runoff flows north through the hole and then enters into Barton River at the first PPE area [37, p. 8]. Barton River flows north into South Bay of Lake Memphremagog approximately 10.5 miles downstream of the PPE [8; 9; 10]. South Bay empties into Lake Memphremagog approximately 12.5 miles downstream of the PPE [8; 9; 10]. The 15-mile downstream pathway ends in Lake Memphremagog [8; 9; 10].

The Ethan Allen property slopes gradually to the southwest [3, p. 8]. Overland runoff flows southwest toward the wetland area in the southern portion of the property [3, p. 8]. An unnamed intermittent stream flows from northeast to southwest across the southeastern corner of the Ethan Allen property. The unnamed intermittent stream flows through the former drum disposal area located in the southeastern corner of the property and then joins the wetland area at the second uppermost PPE area just south of the disposal area [3, p. 23]. The wetland flows for approximately 0.7 miles [18; 19; 22]. Effluent from the wetland flows into Barton River through a culvert just south of the southwestern corner of the Ethan Allen property, approximately 0.5 miles south of the northernmost PPE area [3, p. 24; 8; 9; 10]. Barton River flows north into South Bay of Lake Memphremagog approximately 11.7 miles downstream of the second uppermost PPE area [8; 9; 10]. South Bay empties into Lake Memphremagog approximately 13.7 miles downstream of the second uppermost PPE area [8; 9; 10]. The 15-mile downstream pathway ends in Lake Memphremagog [8; 9; 10].

For the purpose of this investigation, START will consider the second PPE as the beginning of the in-water segment of the surface water pathway from the Ethan Allen property. There are no known drinking water surface water intakes along the 15-mile downstream pathway.

During the START on-site reconnaissance, water was observed flowing southwest along the unnamed intermittent stream [37, p. 19]. The unnamed intermittent stream flow rate was visually estimated at < 10 cubic feet per second (cfs) [37, p. 19]. There are no gaging stations located along the Barton River, South Bay, or Lake Memphremagog. The Barton River drainage basin area is 174 square miles [13]. An estimate of the mean annual flow rates for New England streams and rivers was made by multiplying the drainage basin area in square miles by 1.8 cfs/square mile [14]. The estimated long-term mean annual flow rate of Barton River is 313.2 cfs (174 square miles \times 1.8 cfs/square mile = 313.2 cfs). The approximate flow rate for Lake Memphremagog is based on the total of the long-term mean annual flow rates of Clyde, Barton, and Black Rivers, which flow into Lake Memphremagog [9]. Outflow from Lake Memphremagog is located in Canada; therefore, outflow rivers and flow rates were not evaluated. The long-term mean annual flow rates of Clyde and Black Rivers are 256 cfs and 199 cfs, respectively [15, pp. 135-138]. The estimated long-term mean annual flow rate of Lake Memphremagog is 768.2 cfs [(313.2 cfs + 256 cfs + 199 cfs) = 768.2 cfs].

Table 7 summarizes the water bodies located along the 15-mile downstream pathway from the Ethan Allen property.

Table 7

**Surface Water Bodies Along the 15-Mile Downstream Pathway
from Ethan Allen Orleans Division**

Surface Water Body	Descriptor ^a	Length of Reach (miles)	Flow Characteristics (cfs) ^b	Length of Wetlands (miles)
Wetland	Minimal stream	0.7	<10	1.3
Barton River	Mod. to large stream	11	313.2	8.7
Lake Memphremagog	Lake	>3.3	768.2	2.4

- ^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.
- ^b Cubic feet per second.

[9; 13; 14; 15, pp. 135-138]

May Pond, located in the Town of Barton, is a surface water intake which serves approximately 1,200 people in the Town of Barton [11, p. 5; 12]. May Pond is located approximately 5.5 miles southeast of the Ethan Allen property and is not part of the 15-mile downstream pathway [10]. A surface water intake is also located along Willoughby River, located approximately 0.5 miles northeast of the Ethan Allen property, which serves approximately 1,200 people in Orleans Village [11, p. 5]. Willoughby River is a tributary to Barton River and is not part of the 15-mile downstream pathway [8].

Barton River is popular for fishing and canoeing [11, p. 4]. Rainbow trout spring spawning runs are located approximately 2.5 miles downstream of the second PPE area [8; 9; 10]. South Bay and Lake Memphremagog are used for salmon, smelt, and bass fishing [16, p. 4]. In addition, Lake Memphremagog is used for swimming and boating [16, p. 4].

Approximately 617 acres of wetlands are located within 4-radial miles of the property. The closest wetland with a perimeter greater than 0.1 miles is located south of the southern perimeter of the Ethan Allen property [18; 19; 20; 21; 22; 23]. There are no State-listed threatened or Federally-listed endangered species located along the 15-mile downstream pathway [17]. Willoughby Falls State Wildlife Management Area is located along Barton River approximately 2.7 miles downstream of the second PPE area [8; 9; 10]. South Bay State Wildlife Management Area is located along Barton River between 7.7 and 11.7 miles downstream from the second PPE area [8; 9; 10]. Table 8 summarizes sensitive environments along the 15-mile downstream pathway.

Table 8

**Sensitive Environments Along the 15-Mile Downstream Pathway from
Ethan Allen Orleans Division**

Sensitive Environment Name	Sensitive Environment Type	Downstream Distance from PPE (miles)	Flow Rate at Environment (cfs) ^a
CWA	Wetland	0 to 0.7	< 10
Wetlands (1.3 miles)	Wetland	0 to 0.7	< 10
Wetlands (8.7 miles)	Barton River	0.7 to 11.7	313.2
Willoughby Falls State Wildlife Management Area	Barton River	2.7 to 11.7	313.2
South Bay State Wildlife Management Area	Barton River	7.7 to 11.7	313.2
Wetlands (2.4 miles)	Lake Memphremagog	11.7 to 15	768.2

^a Cubic feet per second
CWA = Clean Water Act

[9; 13; 14; 15, pp. 135-138]

In 1984, VT DEC collected surface water samples C, D, and E along the unnamed intermittent stream through the former drum disposal area [3, pp. 23, 27]. Two surface water samples, F and a culvert sample, were collected along the unnamed intermittent stream at unknown distances upstream of the former drum disposal area [3, p. 25]. Surface water sample F is located upstream of the culvert surface water sample and is considered the background sample. All surface water sample locations are shown on Figure 2 except for sample location F. In addition, one surface water sample was collected at an unknown location in the wetland area, and one surface water sample was collected at the wetland discharge to Barton River [3, p. 23]. Surface water samples were analyzed for VOCs. No VOCs were detected in surface water samples C, E, and F. Analyses indicated several VOCs in surface water sample D ranging in concentration between 67 µg/L and 26,100 µg/L. Two VOCs, benzene and total xylenes, were detected in the surface water culvert sample at 1 µg/L and 4 µg/L, respectively [3, p. 25]. Toluene was detected at 199 µg/L and 6 µg/L in the wetland area and wetland discharge surface water samples, respectively [3, p. 26].

In December 1984, Johnson Company, Inc. collected three surface water samples, SL-1, SL-2, and SL-3, along the unnamed intermittent stream adjacent to the former drum disposal area and one surface water sample, SL-7, at the wetland discharge to Barton River. In addition, one surface water sample, SL-6, was collected along Barton River upstream of the wetland discharge area to Barton River, and three surface water samples, SL-8, SL-9, and SL-12, were collected along Barton River downstream of the wetland discharge area [5, p. 6]. Sample locations are not shown on Figure 2 since exact locations were not found in available background information.

Samples were analyzed for VOCs. Two VOCs, chloroform and total xylenes, were detected in surface water samples SL-2 and SL-3 at 5 µg/L [5, Appendix II]. In addition, chloroform was detected at 5 µg/L in surface water sample SL-7 [5, Appendix II].

Between 26 August and 30 September 1985, an unknown contractor for Ethan Allen, Inc. removed buried scrap metal and approximately 362 buried drums from the former drum disposal area east of the lumber storage yard on the Ethan Allen property [4, pp. 14-15]. Some of the excavated drums were buried beneath the unnamed intermittent stream that flows across the southeast corner of the property [4, p. 21]. Prior to removal of these drums, a small dam was constructed to obstruct the unnamed intermittent stream flow [4, p. 21]. Following the drum removal, the area was backfilled, the dam was removed, and the unnamed intermittent stream flowed along its former channel again [4, p. 21].

Between 30 September 1985 and 24 April 1986, Johnson Company, Inc. collected two sediment samples and two surface water samples along the unnamed intermittent stream on the Ethan Allen property [4, Appendix IV]. Exact sample locations could not be found in available background information. Samples were analyzed for VOCs. Analyses indicated no VOCs except 4-methyl-2-pentanone, which was detected at 10 µg/L in one surface water sample collected on 24 April 1986 [4, Appendix IV].

In August 1993, Johnson Company, Inc. collected three surface water samples, SW-1, SW-2, and SW-3, in the wetland area along the Ethan Allen perimeter just south of the former drum disposal area [1, p. 7]. Sample locations are not shown on Figure 2 since exact locations could not be found in available background information. Samples were analyzed for VOCs. Toluene was detected in sample SW-1 at 7 µg/L [1, p. 11].

On 17 September 1997, START personnel collected sediment samples from four locations along Barton River and from five locations in the wetland area located just south of the Ethan Allen property. Sample locations are identified on Figure 2. Sediment samples SD-01, SD-02, SD-03, and SD-04 are located along Barton River. Sediment samples SD-03 and SD-04 are located upstream of sediment samples SD-01 and SD-02 and are considered background samples. Sediment samples SD-08 and SD-09, located in the wetland area south of the southern perimeter of the property, are considered background samples for sediment samples SD-05. Sediment samples SD-06 and SD-07 are located along the intermittent stream which flows through the disposal area located in the southeastern corner of the property. Samples were analyzed for VOCs, SVOCs, pesticides, PCBs, metals, and cyanide.

Table 9 presents a summary of the sediment samples collected by START.

Table 9

**Sample Summary: Ethan Allen Orleans Division
Sediment Samples Collected by START on 17 September 1997**

Sample Location No.	Traffic Report No.	Time (hrs)	Remarks	Sample Depth (inches)	Sample Source
MATRIX: Sediment					
SD-01	AMY59 MAKM79	0855	Grab	0 to 6	Sediment sample from Barton River; the sample location is 5 feet below the easternmost drainage pipe. Material is dark gray sandy clay; PID reading (Microtip) = 17 ppm above background.
SD-02	AMY60 MAKM80	1015	Grab	0 to 6	Sediment sample from the eastern side of Barton River; the sample location is 5 feet downstream of the wetland discharge area. Material is light gray sand and pebbles; no PID reading was taken.
SD-03	AMY61 MAKM81	0945	Grab	0 to 6	Reference sediment sample from the eastern side of Barton River; the sample location is 50 feet upstream of the wetland discharge area. Material is dark gray sandy silt; no PID reading was taken.
SD-04	MAKM82	0955	Grab	0 to 6	Reference sediment sample from the eastern side of Barton River; the sample location is 55 feet upstream of the wetland discharge area. Material is dark gray sandy silt; no PID reading was taken.
SD-05	AMY62 MAKM83	1145	Grab	0 to 6	Sediment sample from the wetland located south of the southern perimeter of the Ethan Allen property; the sample location is 50 feet southwest of the trailers located east of Building No. 17 and 75 feet southwest of Building No. 17. Material is dark gray silty clay; no PID reading was taken.
SD-06	AMY63 MAKM84	1050	Grab	0 to 6	Sediment sample from the intermittent stream located in the southeastern portion of the Ethan Allen property; the sample location is 100 feet downstream of the culvert located just northeast of the former drum disposal area. Material is gray clay; no PID reading was taken.
SD-07	AMY64 MAKM85	1100	Grab	0 to 6	Duplicate sediment sample of SD-06 for quality control (MS/MSD for quality control).

Table 9

**Sample Summary: Ethan Allen Orleans Division
Sediment Samples Collected by START on 17 September 1997
(Concluded)**

Sample Location No.	Traffic Report No.	Time (hrs)	Remarks	Sample Depth (inches)	Sample Source
SD-08	AMY65 MAKM86	1200	Grab	0 to 6	Reference sediment sample from the wetland located south of the southern perimeter of the Ethan Allen property; the sample location is 200 feet southeast of the trailers located east of Building No. 17 and 225 feet southeast of Building No. 17. Material is dark gray silty clay; no PID reading was taken.
SD-09	MAKM87	1200	Grab	0 to 6	Reference sediment sample from the wetland located south of the southern perimeter of the Ethan Allen property; the sample location is 1 foot east of sediment sample SD-08. Material is dark gray silty clay; no PID reading was taken.
MATRIX: Aqueous					
RB-01	AMY66 MAKM88	1230	Grab	NA	Sampling equipment rinsate blank for quality control.
TB-01	AMY67	1245	Grab	NA	Trip blank for quality control.

- MS/MSD = Matrix Spike/Matrix Spike Duplicate
- VOCs = Volatile Organic Compounds
- NA = Not applicable
- SVOCs = Semivolatile Organic Compounds
- PID = Photoionization detector
- PCBs = Polychlorinated Biphenyls

Table 10 is a summary of organic compounds and inorganic elements detected through Contract Laboratory Program (CLP) analyses of 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-03/SD-04 or SD-08/SD-09. However, if the compound or element is not detected in the reference sample, the reference sample's quantitation limit (SQL) (for organic analyses) or sample detection limit (SDL) (for inorganic analyses) is used as the reference value. These compounds or elements are listed if they occurred at a value equal to or greater than the reference sample's SQL or SDL and are designated by their approximate relative concentration above these values.

Table 10

Summary of Analytical Results
Sediment Sample Analysis for Ethan Allen Orleans Division

Sample Location	Compound/Element	Sample Concentration	Reference Concentration	Comments
SD-01 (AMY59) (MAKM79)	SVOCs			
	Phenanthrene	680 ppb	38 J ppb	17.9 × Ref.
	Fluoranthene	820 ppb	66 J ppb	12.4 × Ref.
	Pyrene	700 ppb	56 J ppb	12.5 × Ref.
	Benzo(a)anthracene	380 ppb	35 J ppb	10.8 × Ref.
	Chrysene	380 ppb	37 J ppb	10.3 × Ref.
	Bis(2-ethylhexyl)phthalate	4,600 ppb	460 U ppb	10.0 × SQL
	Di-n-octylphthalate	1,200 ppb	460 U ppb	2.6 × SQL
	Benzo(b)fluoranthene	440 ppb	36 J ppb	12.2 × Ref.
Benzo(a)pyrene	330 J ppb	28 J ppb	11.8 × Ref.	
SD-02 (AMY60) (MAKM80)	SVOCs			
	Phenanthrene	310 J ppb	38 J ppb	8.2 × Ref.
	Fluoranthene	460 ppb	66 J ppb	7.0 × Ref.
	Pyrene	420 J ppb	56 J ppb	7.5 × Ref.
	Benzo(a)anthracene	220 J ppb	35 J ppb	6.3 × Ref.
	Chrysene	220 J ppb	37 J ppb	5.9 × Ref.
	Benzo(b)fluoranthene	200 J ppb	36 J ppb	5.6 × Ref.
Benzo(a)pyrene	150 J ppb	28 J ppb	5.4 × Ref.	
SD-06 (AMY63) (MAKM84)	PCBs			
	Aroclor-1254	140 J ppb	56 U ppb	2.5 × SQL
	Inorganics			
	Calcium	15,300,000 ppb	3,250,000 ppb	4.7 × Ref.
Potassium	2,130,000 ppb	350,000 J ppb	6.1 × Ref.	

Table 10

**Summary of Analytical Results
Sediment Sample Analysis for Ethan Allen Orleans Division
(Concluded)**

Sample Location	Compound/Element	Sample Concentration	Reference Concentration	Comments
SD-07 (AMY64) (MAKM85)	PCBs			
	Aroclor-1254	110 J ppb	56 U ppb	2.0 × SQL
	Inorganics			
	Calcium	14,700,000 ppb	2,860,000 ppb	5.1 × Ref.
	Potassium	1,910,000 ppb	350,000 J ppb	5.4 × Ref.

- Ref. = Reference value.
- ppb = Parts per billion.
- PCBs = Polychlorinated biphenyls.
- SVOCs = Semivolatile organic compounds.
- SQL = Sample Quantitation Limit.
- J = Quantitation is approximate due to limitations identified during the quality control review.
- U = Indicates the sample was analyzed for but not detected and reports the detection value.

[42; 43]

Complete analytical results of START sediment samples including quantitation and detection limits are presented in Attachment A. Sample results quantified with a "J" on analytical tables are considered approximate because of limitations identified during CLP 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.

No VOCs were detected above reference concentrations in sediment samples. Several SVOCs were detected above the reference concentrations in sediment samples SD-01 and SD-02. Sample SD-01 is located just downstream of two drainage pipes on the east side of Barton River. Water was observed flowing from the drainage pipes into Barton River. In addition, bright orange colored leachate was observed just upstream of sediment sample location SD-01. Sample SD-02 is located just downstream of the wetland discharge area. The SVOC results indicate a release to the surface water pathway.

No pesticides were detected above reference concentrations in sediment samples. However, one pesticide, heptachlor epoxide, was rejected in analytical results for sediment sample SD-01 because compound identification criteria were not met. One PCB, Aroclor-1254, was detected in two sediment samples. Aroclor-1254 was detected at 140 J µg/kg in sediment sample SD-06 and at 110 J µg/kg in sediment sample SD-07.

Two metals were detected above reference concentrations in the sediment samples and ranged in concentrations between 1,910,000 $\mu\text{g}/\text{kg}$ and 15,300,000 $\mu\text{g}/\text{kg}$. One metal, antimony, was rejected in analytical results for all samples. No cyanide was detected in sediment samples.

START performed surface water pathway sampling as part of the Ethan Allen SIP. Based on the START analytical results, a release of hazardous substances to Barton River has been noted from on-site sources. As a result of the release, a Clean Water Act-protected water body and a fishery have been impacted. No other sensitive environments are known or suspected to have been impacted. To date, no known actions have been taken to address the release to Barton River.

SOIL EXPOSURE PATHWAY

The nearest residence is located approximately 500 ft east of the Ethan Allen property [37, pp. 20-21]. There are an estimated 557 people living within 1-radial mile of the Ethan Allen property [25]. No known soil samples have been collected on adjacent residential properties.

There are 592 workers employed by Ethan Allen, Inc. located on the property [37, p. 2]. There are no schools or day-care facilities within 200 ft of the area of observed contamination. The nearest school is Orleans Elementary School located approximately 0.3 miles northeast of the Ethan Allen property [37, p. 20].

Between 26 August and 30 September 1985, an unknown contractor for Ethan Allen, Inc. excavated approximately 75 yd^3 of soil from the former drum disposal area [4, p. 32]. The soil was then thinly spread in three wooden bins to volatilize [4, p. 32]. On 10, 18, and 29 October 1985, a composite soil sample was collected by VT DEC from each of the wooden bins and analyzed for VOCs [4, p. 32]. Analyses indicated two VOCs, ethylbenzene and toluene, ranging between 11 $\mu\text{g}/\text{kg}$ and 520 $\mu\text{g}/\text{kg}$ on 10 October 1985. However, no VOCs were detected from samples collected on 18 and 29 October 1985 [4, p. 32].

On 14 December 1987, a soil sample was collected by Johnson Company, Inc. from the excavated soil from the former drum disposal area and analyzed for VOCs [6, p. 21]. Analyses indicated no VOCs [6, p. 21]. In addition, three soil samples were collected from the former drum disposal area at a depth of 2 ft [4, pp. 27-29]. No background sample was collected. Exact sample locations could not be determined from available background information. Samples were analyzed for VOCs. Analyses indicated eight VOCs ranging between 32 $\mu\text{g}/\text{kg}$ and 1,600,000 $\mu\text{g}/\text{kg}$ [4, p. 27]. VOCs included acetone, benzene, 2-butanone, ethylbenzene, 4-methyl-2-pentanone, methylene chloride, toluene, and total xylenes.

START did not perform surface soil sampling as part of the Ethan Allen SIP. Based on available data a release of hazardous substances to surficial soils from on-site sources has been documented. However, based on site observations and conditions, and lack of public use of the property, no impacts to nearby residential populations are known or suspected.

AIR PATHWAY

Between 10 and 20 December 1984, air monitoring was performed by an unknown contractor on the Ethan Allen property [5, pp. 7-8]. Four charcoal tubes through which ambient air was drawn

were analyzed for VOCs [5, Appendix III]. Acetone was detected in all samples ranging between 2 and 2.6 $\mu\text{g}/\text{tube}$. According to the analytical laboratory, acetone may be attributable to laboratory contamination [5, Appendix III]. In addition, methylene chloride, chloroform, and 2-butanone were detected in all samples at concentrations less than 2 $\mu\text{g}/\text{tube}$ [5, Appendix III].

The nearest residence is located approximately 500 ft east and topographically upgradient from the Ethan Allen property [37, pp. 20-21]. Table 11 summarizes the estimated population within each target distance ring up to 4-radial miles from the property.

Table 11

Estimated Population Within 4-Radial Miles of Ethan Allen Orleans Division

Radial Distance from Ethan Allen (miles)	Estimated Population
On a source	592
> 0.00 to 0.25	46
> 0.25 to 0.50	128
> 0.50 to 1.00	383
> 1.00 to 2.00	764
> 2.00 to 3.00	608
> 3.00 to 4.00	808
TOTAL	3,329*

* includes on-site workers

[25]

No known Federally-listed threatened/endangered species are known to occur on the Ethan Allen property. However, there is one State-listed threatened species located within 4-radial miles of the Ethan Allen property [17]. Table 12 summarizes sensitive environments within 4-radial miles of the Ethan Allen property.

Table 12

**Sensitive Environments Located Within 4-Radial Miles of
Ethan Allen Orleans Division**

Radial Distance from Ethan Allen (miles)	Sensitive Environment/Species (status)
> 0.00 to 0.25	5 acres wetlands CWA
> 0.25 to 0.50	7 acres wetlands
> 0.50 to 1.00	30 acres wetlands
> 1.00 to 2.00	140 acres wetlands
> 2.00 to 3.00	215 acres wetlands
> 3.00 to 4.00	220 acres wetlands 1 State-listed threatened species

[18; 19; 20; 21; 22; 23]

Several readings on the Microtip ranging between 1.9 and 6 units above background levels were indicated throughout Building Nos. 1, 2, and 3 during the START on-site reconnaissance [37, pp. 2-9]. In addition, a Microtip reading of 34 units above background levels was detected in the spraybooth located in the southwest corner of the second level of Building No. 1 [37, p. 7].

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 or sensitive environments are known or suspected.

SUMMARY

The Ethan Allen Orleans Division (Ethan Allen) property occupies approximately 52 acres on Railroad Avenue in Barton, Orleans County, Vermont. Ethan Allen, Inc. is an active furniture manufacturer. A former 2.5-acre drum disposal area is located in the southeastern corner of the property. A 12-acre wetland area is located just south of the southern perimeter of the Ethan Allen property.

There are 17 buildings located on the Ethan Allen property. The buildings occupy approximately 750,000 cubic feet (ft³).

The closest public drinking water supply well is the Maple Lane Nursing Home well, which is located approximately 1.5 miles south-southeast of the Ethan Allen property. There are no people relying on public drinking water wells within 1-radial mile of the Ethan Allen property and an estimated 704 people relying on public drinking water wells within 4-radial miles of the Ethan Allen property.

During the Roy F. Weston, Inc. (WESTON®), Superfund Technical Assessment and Response Team (START) sampling event, two drainage pipes located north of Building No. 3 were observed along the east side of Barton River. Water was observed flowing from the drainage pipes into Barton River. Bright orange colored leachate was observed along the outflow drainage route of one of the pipes.

Analytical data from sediment samples collected by START along Barton River and from the wetland area located just south of the Ethan Allen property indicated no volatile organic compounds (VOCs), pesticides, or cyanide above reference values in sediment samples. Several semivolatile organic compounds (SVOCs) and two metals, and one polychlorinated biphenyl (PCB) compound were detected in samples above reference values.

The nearest residence is located approximately 500 feet (ft) east of the Ethan Allen property. An estimated 557 people live within 1-radial mile of the Ethan Allen property. No permanent residence has been identified on the Ethan Allen property. An estimated 2,737 people live within 4-radial miles of the Ethan Allen property.

There are 592 workers employed by Ethan Allen, Inc. There are no schools or day-care facilities within 200 ft of the area of observed contamination. The nearest school is Orleans Elementary School located approximately 0.3 miles northeast of the Ethan Allen property.

Several readings on the Microtip ranging between 1.9 and 6 units above background levels were indicated throughout Building Nos. 1, 2, and 3 during the START on-site reconnaissance. In addition, a Microtip reading of 34 units above background levels was detected in the spraybooth located in the southwest corner of the second level of Building No. 1.

**ETHAN ALLEN ORLEANS DIVISION
REFERENCES**

- [1] Johnson Company, Inc. 1993. Report of a Site Investigation, Ethan Allen, Inc. Orleans Division. September.
- [2] EPA (U.S. Environmental Protection Agency). 1997. U.S. Environmental Protection Agency Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Superfund Program. Region I. Printout dated 8 October.
- [3] VT DEC (Vermont Department of Environmental Conservation). 1984. Draft Report, Orleans Division of Ethan Allen, Inc., Hazardous Waste Disposal Site. August.
- [4] VT DEC (Vermont Department of Environmental Conservation). 1986. Remedial Action Report, Orleans Division of Ethan Allen, Inc. June.
- [5] VT DEC (Vermont Department of Environmental Conservation). 1985. Hazardous Waste Investigation, Phase I, Interim Report. February 4.
- [6] Johnson Company, Inc. 1988. Ethan Allen-Orleans Progress Report: Ongoing Subsurface Investigation. June.
- [7] Shippee, J. 1992. UST Site Assessment for Orleans Division of Ethan Allen. 23 August.
- [8] USGS (U. S. Geological Survey). 1986. Orleans, VT. (7.5-minute series topographic map).
- [9] USGS (U. S. Geological Survey). 1986. Newport, VT. (7.5-minute series topographic map).
- [10] USGS (U. S. Geological Survey). 1986. Crystal Lake, VT. (7.5-minute series topographic map).
- [11] VT DEC (Vermont Department of Environmental Conservation). 1989. Site Inspection Report, Barton Landfill. July.
- [12] Cattabriga K. (START). 1996. Phone Conversation Record with Mr. Steve Mooney, Superintendent of Water and Sewer of Barton Village, RE: Drinking Water Supplies. TDD No. 96-02-0010. 5 April.
- [13] Cattabriga, K. (START). 1996. Phone Conversation Record with Mr. Jeffrey Cueto, VT DEC, RE: Barton River Drainage Basin Area. TDD No. 96-02-0010. 12 August.

**ETHAN ALLEN ORLEANS DIVISION
REFERENCES (Continued)**

- [14] Schmidl, J. (START). 1995. Phone Conversation Record with Mr. Tom Shepard, USGS, RE: Flow Rate on the Merrimack River. TDD No. 95-07-0031. 6 December.
- [15] USGS (U. S. Geological Survey). 1994. Water Resources Data, NH-VT Water year 1994. United States Geological Survey Water - Data Report, NH-VT-94-1.
- [16] NUS/FIT (NUS Corporation Field Investigation Team). 1991. Final Screening Site Inspection Report, Newport Plastics. 22 January.
- [17] VT DEC (Vermont Department of Environmental Conservation). 1996. State and Federally Threatened and Endangered species near the Ethan Allen property, Barton, Vermont, by Mr. Everett Marshall. 1 November.
- [18] U.S. DOI (U.S. Department of the Interior). 1994. Wetland Inventory Map of Orleans Quadrangle, Vermont.
- [19] U.S. DOI (U.S. Department of the Interior). 1994. Wetland Inventory Map of Newport Quadrangle, Vermont.
- [20] U.S. DOI (U.S. Department of the Interior). 1994. Wetland Inventory Map of Irasburg Quadrangle, Vermont.
- [21] U.S. DOI (U.S. Department of the Interior). 1994. Wetland Inventory Map of Craftsbury Quadrangle, Vermont.
- [22] U.S. DOI (U.S. Department of the Interior). 1994. Wetland Inventory Map of Crystal Lake Quadrangle, Vermont.
- [23] U.S. DOI (U.S. Department of the Interior). 1994. Wetland Inventory Map of Westmore Quadrangle, Vermont.
- [24] USGS (U. S. Geological Survey). 1986. Irasburg, VT. (7.5-minute series topographic map).
- [25] Frost Associates. 1997. CENTRACTS report for the Ethan Allen Orleans Division property reporting population and private well users within the target distance limit. TDD No. 96-02-0011. 17 January.
- [26] Cattabriga, K. (START). 1996. Phone Conversation Record with Ms. Kathy White, Barton Town Clerk, RE: Barton Landfill. TDD No. 96-02-0010. 28 June.
- [27] VT DEC (Vermont Department of Environmental Conservation). 1991. Community Public Water Supply Sanitary Survey Form, Irasburg Water Corporation. 7 May.

**ETHAN ALLEN ORLEANS DIVISION
REFERENCES (Continued)**

- [28] VT DEC (Vermont Department of Environmental Conservation). 1993. Community Public Water Supply Sanitary Survey Form, Maple Lane Nursing Home. 22 July.
- [29] Cattabriga, K. (START). 1996. Phone Conversation Record with Ms. Kathy White, Barton Town Clerk, RE: Barton Landfill. TDD No. 96-02-0010. 31 July.
- [30] Endyne, Inc. 1988. Laboratory Report on groundwater samples. 22 August.
- [31] Department of Water Resources Lab Management System. 1988. Final Laboratory Report. 11 August.
- [32] Endyne, Inc. 1988. Laboratory Report on groundwater samples. 5 December.
- [33] Endyne, Inc. 1989. Laboratory Report on groundwater samples. 22 March.
- [34] VT GIS (Vermont Geographic Information System). 1993. Barton, VT. (Natural Resources Impact Map).
- [35] Johnson Company, Inc. 1990. Ethan Allen - Orleans Disposal Area "D" Soil Contamination. 26 April.
- [36] Ethan Allen, Inc. 1995. Hazardous Material and Waste Contingency Plan. 24 August.
- [37] START (Roy F. Weston Superfund Technical Assessment and Response Team). 1997 (Issued). Field logbook for the Ethan Allen property. Logbook No. 00183-S. TDD No. 96-02-0011. 16 May.
- [38] Endyne, Inc. 1988. Laboratory Report on groundwater samples. 7 April.
- [39] Johnson Company, Inc. 1993. Laboratory Report on groundwater samples. 30 August.
- [40] Cattabriga, K. (START). 1997. Phone Conversation Record with Mr. Bob Rice, RE: Ethan Allen USTs and ASTs. TDD No. 96-02-0011. June 26.
- [41] EPA (U.S. Environmental Protection Agency). 1997. Resource and Conservation and Recovery Information System (RCRIS) Program, Region I. Printout dated 6 November.
- [42] START (Roy F. Weston Superfund Technical Assessment and Response Team). 1998. Memorandum to Ms. Christine Clark, EPA, Organic Sample Results, Case No. 25692. 11 March.

**ETHAN ALLEN ORLEANS DIVISION
REFERENCES (Concluded)**

- [43] START (Roy F. Weston Superfund Technical Assessment and Response Team). 1998. Memorandum to Ms. Christine Clark, EPA, Inorganic Sample Results, Case No. 25692. 17 February.

ATTACHMENT A
ETHAN ALLEN ORLEANS DIVISION
SEDIMENT SAMPLE ANALYTICAL RESULTS
START
Samples Collected on 17 September 1997