RANSOM
Environmental
Consultants, Inc.

Consulting
Engineering
Hydrogeology
Applied Sciences

December 9, 1993

Project 93142

Ms. Linda Weddespoon
Vermont Department of Environmental Conservation
103 South Main Street
Waterbury, Vermont 05676

RE: Limited Field Investigation
Former Bullpen
Vernon Hydroelectric Power Generating Station
Vernon, Vermont

Dear Ms. Wedderspoon:

Attached please find one final copy of the Limited Field Investigation report for the above referenced site. This investigation was completed on behalf of New England Power (NEP).

If you have any questions regarding this submittal or the project, please feel free to give us a call.

Sincerely,

Jonathan B. Higgins, C.P.G.
Project Manager

JBH:ptd
Enclosure

Brown's Wharf
Newburyport, MA 01950
Tel (508) 465-1822
Fax (508) 465-2986

45 Knollwood Road
Elmsford, NY 10523
Tel (914) 345-2116
Fax (914) 345-2123

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December 9, 1993

Project 93142

Ms. Liv K. Jemsek
New England Power Company
407 Miracle Mile
Suite 2
Lebanon, New Hampshire 03766-2637

RE: Limited Field Investigation
Former Bullpen
Vernon Hydroelectric Power Generating Station
Vernon, Vermont

Dear Liv:

Ransom Environmental Consultants, Inc. (Ransom) has prepared the following letter report for New England Power Company (NEP) to summarize the limited field investigation that was performed in the vicinity of the former storage area (former bullpen) associated with NEP's Vernon Hydroelectric Power Generating Station (Vernon Station) in Vernon, Vermont. This limited field investigation included the advancement of hand-augured soil borings, collection and field screening of soil samples, and laboratory chemical analysis of a soil sample. The locations of the soil samples are shown on Figure 1.

Based on Ransom observations, results of the field screening and chemical analyses, soils within the former bullpen appear to have been impacted by a release of petroleum hydrocarbons. The area of impact measures approximately 18 feet by 22 feet by 12 feet deep. The total volume of impacted soils is estimated to be approximately 300 cubic yards. The soils do not appear to exhibit the characteristics of a hazardous waste as defined by the State of Vermont, Agency of Natural Resources, Hazardous Waste Management Regulations, or Title 40 Code of Federal Regulations (CFR) 261. Based on the findings of this investigation, Ransom has evaluated the remedial alternatives for the former bullpen and prepared a scope of work dated November 5, 1993.

BACKGROUND

According to NEP personnel at the site, the former bullpen was likely utilized from the 1930s until approximately 1978, when a new storage area was utilized. The former bullpen is located in a field to the northwest of the Vernon Station along the east side of Route 142. The land, owned by NEP, is currently leased to a local resident and used to grow alfalfa for feed. An unpaved access road borders the north side of the former bullpen.

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The sheen extraction test consisted of collecting a soil sample in a clean mason jar, immersing in distilled water, and noting any presence or absence of an oily sheen on the surface of the water. The sheen extraction test is truly a screening method with a positive (oil sheen observed) or negative (no sheen) result. It was used to assist field observations in delineating the oil-impacted area. All sampling equipment was decontaminated prior to sampling.

A sheen was not noted (negative result) in the samples collected from the eastern and southern portions of the former bullpen. Ransom also resampled the composite soil sample areas, screening each individual location. Locations outside the limits of the former bullpen were also screened using the sheen extraction test, with negative results. The location and screen test result of each soil sample is shown on Figure 1.

Based on the combined results of the Hnu-Hanby and sheen-extraction screening tests, the horizontal extent appeared limited to the area of stressed vegetation (sample Area A) and localized points within sample Areas B and C.

To determine the vertical extent of impact to soils, Ransom collected soil samples at 3-foot depth intervals from a hand-augured soil boring within sample Area A. Each of the samples was screened with the Hnu-Hanby and compared to two standard references (MODF and diesel fuel). The results are presented below.

Sample Number	Sample Depth	Screening Results (ppm)	Soil Description
SA-SS2	3' - 3'4"	2,000 + MODF/300 diesel	Light gray fine sand and silt.
SA-SS3	6' - 6'4"	500 MODF/25 diesel	Gray-brown fine-to-medium sand, trace of silt.
SA-SS4	9' - 9'4"	500 MODF/25 diesel	Similar to SS3.
SA-SS5	12' - 12'4"	500 MODF/25 diesel	Brown fine-to-coarse sand, trace of silt.

Based on the results of the Hnu-Hanby screening, Ransom informed NEP that impact to subsurface soils in the vicinity of sample Area A extended to at least 12 feet below the ground surface. Ground water was not encountered during the sampling.

At NEP's request, Ransom collected a composite soil sample from sample Area A at depths of approximately 6 to 8 inches below grade for laboratory chemical analysis. This sample consisted of the visually most-impacted soils. Prior to collecting the composite soil sample, all sampling utensils were decontaminated. The soil sample was collected with a stainless steel trowel, composited in a stainless steel bowl, as previously described, and placed in laboratory- prepared glassware. The samples were kept cool until delivery to the laboratory. The samples were delivered under chain of custody to Alpha Analytical Laboratory (Alpha) of Westborough, Massachusetts.

The composite soil sample was submitted for the following characterization analyses:

1. Toxicity Characteristic Leaching Procedure (TCLP) for:
   a. SemiVolatile Organic Compounds (SemiVOCs), by U.S. Environmental Protection Agency (U.S. EPA) Method 8270,
   b. Volatile Organic Compounds (VOCs), by U.S. EPA Method 8240,
   c. Metals (Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, and Silver), and
   d. Herbicides;
2. Polychlorinated Biphenyls (PCBs) and Pesticides by U.S. EPA Method 8080;
3. Petroleum Hydrocarbons by a gas chromatography technique;
4. Flashpoint;
5. Reactivity; and
6. pH.

CHEMICAL ANALYSES RESULTS

Based on the Alpha report, the sample did not exhibit characteristics that would classify the soils as a hazardous waste, as defined by the State of Vermont Hazardous Waste Management Regulations or 40 CFR 261. TCLP-SemiVOCs, TCLP-VOCs, TCLP-Herbicides, Pesticides, and PCBs were not detected above the method detection limits. The TCLP-Metal lead was detected at a concentration of 2.3 ppm in the extract, but this is below the threshold of 5 ppm. All the other extract metal concentrations were below the laboratory method detection limit. Petroleum hydrocarbons were detected at a concentration of 19,000 ppm. The type of hydrocarbon was tentatively identified by Alpha as motor oil. The sample was not reactive with either sulfide or cyanide, had a flashpoint of >200°F, and a pH of 5.1. A copy of the Alpha laboratory report is provided as Attachment A.

SUMMARY

Based upon Ransom's observations, results of the field screening, and chemical analysis results, it appears that a historical release of motor oil has impacted the soils within the area of the former bullpen. The area of impact is approximately 18 feet by 22 feet and 15 feet deep. Elevated concentrations of petroleum hydrocarbons (19,000 ppm) are present in the impacted soils.

Based on the elevated concentrations of petroleum hydrocarbons detected, it is Ransom's opinion that remedial measures are necessary at the site. Excavation of soils in the vicinity of

sample Areas A, B, and C would be the most direct remedial approach. Ransom anticipates that approximately 300 cubic yards of impacted soil will be removed.

Should you have any questions concerning the information presented in this letter report, please feel free to contact us.

Sincerely,

RANSOM ENVIRONMENTAL CONSULTANTS, INC.

Sarah K. Butler for TV

Thomas V. Hankins
Project Geologist

Jonathan B. Higgins, C.P.G.
Project Manager

TVH/SKB/JBH/ARW:ptd
Attachments

cc: Dorothy A. McGlincy, Westborough
Linda Wedderspoon, VT DEC

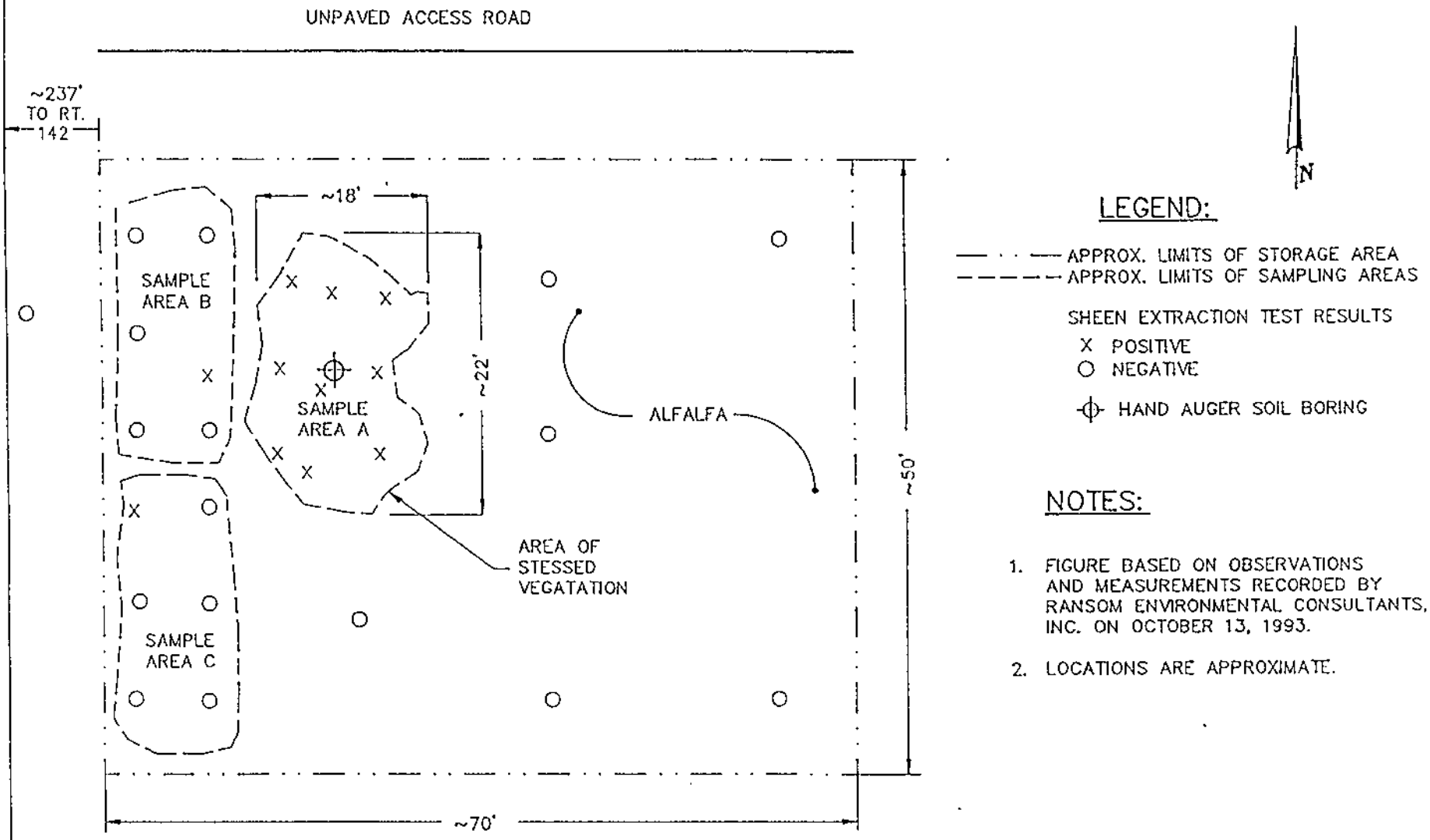

FIGURE NOT TO SCALE

RANSOM Environmental Consultants, Inc.

PREPARED FOR:

NEW ENGLAND POWER COMPANY
33 WEST LEBANON ROAD
LEBANON, NEW HAMPSHIRE

SITE:

NEW ENGLAND POWER COMPANY
OLD STORAGE AREA (BULLPEN)
VERNON, VERMONT

PLAN OF
SAMPLING LOCATION

DATE: NOVEMBER 1993
PROJECT: 93142
FIGURE: 1

93142-1

ATTACHMENT A

Laboratory Analyses Data Sheets for Composite Soil Sample
Sample collected by Ransom on October 13, 1993 and
Analyzed by Alpha Analytical Labs of Westborough, Massachusetts

Limited Field Investigation
Former Bullpen
Vernon Hydroelectric Power Generating Station
Vernon, Vermont

ALPHA ANALYTICAL LABORATORIES

Eight Walkup Drive
Westborough, Massachusetts 01581-1019
(508) 898-9220

MA 086 NH 198958-A CT PH-0574 NY 11148 NC 320 SC 88006 RI A65

CERTIFICATE OF ANALYSIS

Client: Ransom

Address: Brown's Wharf

Newburyport, MA 01950

Attn: John Higgins

Project Number: 93142

Site: Nepsco Vernon

Laboratory Job Number: L9308454

Invoice Number: 56976

Date Received: 22-OCT-93

Date Reported: 27-OCT-93

Delivery Method: Alpha

ALPHA SAMPLE NUMBER	CLIENT IDENTIFICATION	SAMPLE LOCATION
L9308454-01	93142-SA-SS1	

Authorized by: James R. Roth

James R. Roth, PhD - Laboratory Manager

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA 086 NH 198958-A CT PH-0574 NY 11148 NC 320 SC 88006 RI A65

Laboratory Sample Number: L9308454-01
93142-SA-SS1
Sample Matrix: SOIL
Condition of Sample: Satisfactory
Number & Type of Containers: 6 Glass

Date Received: 22-OCT-93
Date Reported: 27-OCT-93
Field Prep: None

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATES PREP	DATES ANALYSIS
Solids, Total	82.	%	0.10	3	2540B		25-Oct
pH	5.1	SU		1	9040		22-Oct
Flash Point	>200	F	70	1	1010		25-Oct
Cyanide, Reactive	ND	mg/kg	0.25	1	7.3		25-Oct
Sulfide, Reactive	ND	mg/kg	0.20	1	7.3		25-Oct
TCLP Extraction				1	1311	22-OCT	
Arsenic, TCLP	ND	mg/l	1.0	1	6010	24-Oct	25-Oct
Barium, TCLP	ND	mg/l	0.50	1	6010	24-Oct	25-Oct
Cadmium, TCLP	ND	mg/l	0.10	1	6010	24-Oct	25-Oct
Chromium, TCLP	ND	mg/l	0.20	1	6010	24-Oct	25-Oct
Lead, TCLP	2.3	mg/l	0.50	1	6010	24-Oct	25-Oct
Mercury, TCLP	ND	mg/l	0.005	1	7470/7471	25-Oct	25-Oct
Selenium, TCLP	ND	mg/l	0.50	1	6010	24-Oct	25-Oct
Silver, TCLP	ND	mg/l	0.10	1	6010	24-Oct	25-Oct
Polychlorinated Biphenyls				1	8080	22-Oct	26-OCT
Arochlor 1221	ND	ug/l	2.5				
Arochlor 1232	ND	ug/l	2.5				
Arochlor 1242/PCB 1016	ND	ug/l	2.5				
Arochlor 1248	ND	ug/l	2.5				
Arochlor 1254	ND	ug/l	2.5				
Arochlor 1260	ND	ug/l	2.5				
Arochlor 1262	ND	ug/l	2.5				
Arochlor 1268	ND	ug/l	2.5				
SURROGATE RECOVERY							
2,4,5,6-Tetrachloro-m-xylene	19.0	%					
Decachlorobiphenyl	24.0	%					

Comments: * Complete list of References found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L9308454-01

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATES PREP	DATES ANALYSIS
Organochlorine Pesticides				1 8080	22-Oct	26-OCT
Delta-BHC	ND	ug/l	0.20			
Lindane	ND	ug/l	0.20			
Alpha-BHC	ND	ug/l	0.20			
Beta-BHC	ND	ug/l	0.20			
Heptachlor	ND	ug/l	0.20			
Aldrin	ND	ug/l	0.20			
Heptachlor epoxide	ND	ug/l	0.20			
Endrin	ND	ug/l	0.20			
Endrin aldehyde	ND	ug/l	0.20			
Endrin ketone	ND	ug/l	0.20			
Dieldrin	ND	ug/l	0.20			
4,4'-DDE	ND	ug/l	0.20			
4,4'-DDD	ND	ug/l	0.20			
4,4'-DDT	ND	ug/l	0.20			
Endosulfan I	ND	ug/l	0.20			
Endosulfan II	ND	ug/l	0.20			
Endosulfan sulfate	ND	ug/l	0.20			
Methoxychlor	ND	ug/l	0.20			
Chlordane	ND	ug/l	0.20			
Toxaphene	ND	ug/l	0.20			
SURROGATE RECOVERY						
2,4,5,6-Tetrachloro-m-xylene	19.0	%				
Decachlorobiphenyl	24.0	%				
TCLP Volatile Organics				1 8240		25-OCT
Benzene	ND	mg/l	0.005			
Carbon tetrachloride	ND	mg/l	0.005			
Chlorobenzene	ND	mg/l	0.018			
Chloroform	ND	mg/l	0.0075			
1,4-Dichlorobenzene	ND	mg/l	0.05			
1,2-Dichloroethane	ND	mg/l	0.0075			
1,1-Dichloroethene	ND	mg/l	0.0075			
Tetrachloroethene	ND	mg/l	0.0075			
Trichloroethene	ND	mg/l	0.005			
Vinyl chloride	ND	mg/l	0.018			
Methyl ethyl ketone	ND	mg/l	0.05			
SURROGATE RECOVERY						
1,2-Dichloroethane-d4	98.0	%				
Toluene-d8	96.0	%				
4-Bromofluorobenzene	97.0	%				
TCLP Extraction				1 1311		20-OCT

Comments: * Complete list of References found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L9308454-01

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATES PREP	DATES ANALYSIS
TCLP Semi-Volatile Organics				1	8270	25-Oct	26-OCT
Cresol, Total	ND	mg/l	0.029				
2,4-Dinitrotoluene	ND	mg/l	0.015				
Hexachlorobenzene	ND	mg/l	0.011				
Hexachloro-1,3-butadiene	ND	mg/l	0.032				
Hexachloroethane	ND	mg/l	0.020				
Nitrobenzene	ND	mg/l	0.0076				
Pentachlorophenol	ND	mg/l	0.0368				
2,4,5-Trichlorophenol	ND	mg/l	0.019				
2,4,6-Trichlorophenol	ND	mg/l	0.011				
Pyridine	ND	mg/l	0.10				
SURROGATE RECOVERY							
2-Fluorophenol	32.0	%					
Phenol-d6	40.0	%					
Nitrobenzene-d5	82.0	%					
2-Fluorobiphenyl	76.0	%					
2,4,6-Tribromophenol	74.0	%					
4-Terphenyl-d14	90.0	%					
TCLP Extraction				1	1311		22-OCT
TCLP Pesticides				1	8080	25-Oct	26-OCT
Chlordane	ND	mg/l	0.01				
Endrin	ND	mg/l	0.001				
Heptachlor	ND	mg/l	0.001				
Heptachlor epoxide	ND	mg/l	0.001				
Lindane	ND	mg/l	0.001				
Methoxychlor	ND	mg/l	0.002				
Toxaphene	ND	mg/l	0.01				
SURROGATE RECOVERY							
2,4,5,6-Tetrachloro-m-xylene	81.0	%					
Decachlorobiphenyl	39.0	%					
TCLP Extraction				1	1311		22-OCT
TCLP Herbicides				1	8150	25-Oct	26-OCT
2,4-D	ND	mg/l	0.005				
2,4,5-TP	ND	mg/l	0.005				
TCLP Extraction				1	1311		22-OCT

Comments: * Complete list of References found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L9308454-01

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATES PREP	DATES ANALYSIS
Hydrocarbon Scan GC 8100 Modified				1 8100M	22-Oct	25-OCT
Mineral Spirits	ND	mg/kg	50.			
Gasoline	ND	mg/kg	50.			
Fuel Oil #2/Diesel	ND	mg/kg	50.			
Fuel Oil #4	ND	mg/kg	50.			
Fuel Oil #6	ND	mg/kg	50.			
Motor Oil	19000	mg/kg	50.			
Kerosene	ND	mg/kg	50.			

Comments: * Complete list of References found in Addendum I

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE DUPLICATE ANALYSIS

Laboratory Job Number: L9308454

Parameter	Value 1	Value 2	RPD	Units
pH	DUPLICATE for sample(s) 01			
	6.8	7.0	3	SU
TCLP Extraction	DUPLICATE for sample(s) 01			
Mercury, TCLP	ND	ND	NC	mg/l
TCLP Extraction	DUPLICATE for sample(s) 01			
Arsenic, TCLP	ND	ND	NC	mg/l
Barium, TCLP	ND	ND	NC	mg/l
Cadmium, TCLP	ND	ND	NC	mg/l
Chromium, TCLP	ND	ND	NC	mg/l
Lead, TCLP	2.3	2.0	14	mg/l
Selenium, TCLP	ND	ND	NC	mg/l
Silver, TCLP	ND	ND	NC	mg/l

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE SPIKE ANALYSES

Laboratory Job Number: L9308454

Parameter	% Recovery
TCLP Extraction	SPIKE for sample(s) 01
Mercury, TCLP	120
TCLP Extraction	SPIKE for sample(s) 01
Arsenic, TCLP	99
Barium, TCLP	100
Cadmium, TCLP	97
Chromium, TCLP	100
Lead, TCLP	99
Selenium, TCLP	103
Silver, TCLP	102

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE SPIKE ANALYSES

Laboratory Job Number: L9308454

Continued

Parameter	% Recovery
TCLP Semi-Volatile Organics - SPIKE for sample(s) 01	
Cresol, Total	56
2,4-Dinitrotoluene	101
Hexachlorobenzene	99
Hexachloro-1,3-butadiene	64
Hexachloroethane	53
Nitrobenzene	65
Pentachlorophenol	95
2,4,5-Trichlorophenol	74
2,4,6-Trichlorophenol	78
Pyridine	30
SURROGATE RECOVERY	
2-Fluorophenol	41
Phenol-d6	50
Nitrobenzene-d5	75
2-Fluorobiphenyl	68
2,4,6-Tribromophenol	93
4-Terphenyl-d14	93
TCLP Extraction Date	
TCLP Semi-Volatile Organics - SPIKE for sample(s) 01	
Cresol, Total	69
2,4-Dinitrotoluene	110
Hexachlorobenzene	106
Hexachloro-1,3-butadiene	75
Hexachloroethane	67
Nitrobenzene	79
Pentachlorophenol	103
2,4,5-Trichlorophenol	82
2,4,6-Trichlorophenol	86
Pyridine	89
SURROGATE RECOVERY	
2-Fluorophenol	72
Phenol-d6	74
Nitrobenzene-d5	91
2-Fluorobiphenyl	74
2,4,6-Tribromophenol	103
4-Terphenyl-d14	94
TCLP Extraction Date	

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE MS/MSD ANALYSIS

Laboratory Job Number: L9308454

Parameter	MS %	MSD %	RPD
Organochlorine Pesticides	MS/MSD for sample(s) 01		
Lindane	62	58	7
Heptachlor	64	60	6
Aldrin	59	56	5
Endrin	76	73	4
Dieldrin	66	65	2
4,4'-DDT	71	74	4
SURROGATE RECOVERY			
2,4,5,6-Tetrachloro-m-xylene	106	91	15
Decachlorobiphenyl	47	40	16
TCLP Volatile Organics	MS/MSD for sample(s) 01		
Benzene	92	99	7
Carbon tetrachloride	106	111	5
Chlorobenzene	99	104	5
Chloroform	91	94	3
1,4-Dichlorobenzene	111	114	3
1,2-Dichloroethane	89	92	3
1,1-Dichloroethene	104	111	7
Tetrachloroethene	114	115	1
Trichloroethene	101	107	6
Vinyl chloride	109	118	8
Methyl ethyl ketone	98	114	15
SURROGATE RECOVERY			
1,2-Dichloroethane-d4	85	88	3
Toluene-d8	88	89	1
4-Bromofluorobenzene	97	98	1
TCLP Pesticides	MS/MSD for sample(s) 01		
Endrin	64	35	59
Heptachlor	57	37	43
Heptachlor epoxide	71	46	43
Lindane	36	20	57
Methoxychlor	64	35	59
SURROGATE RECOVERY			
2,4,5,6-Tetrachloro-m-xylene	116	51	78
Decachlorobiphenyl	42	21	67
TCLP Herbicides	MS/MSD for sample(s) 01		
2,4-D	41	74	57
2,4,5-TP	12	32	91

1. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. 1986.

3. Standard Methods for Examination of Water and Waste Water. APHA-AWWA-WPCF. 17th Edition. 1989.

Ransom Environmental Consultants, Inc., Brown's Wharf
Newburyp Massachusetts 01950 508/465-1822

CHAIN OF CUSTODY (COC)

Page 1 of 1

Project: Mapsco Vernon
Address: RT 142 Vernon, VT
Project #: ~~937~~ 93142

Lab: Alpha Analytical
Lab Contact: Ellen Bailey
Lab Phone #: 508-898-9220

Chain of Custody # 93142-CC-01
Sampled By: TJH

Sample Identification	Date Sampled	Time Sampled	W-Water L-Liquid S-Solid	G-Grab C-Composite W-Wipe	Number of Containers	Field Preserve	Field Filter	Chemical Analyses Requested: TCLP Semi-Voc's 8270	TCLP HSL-Voc's 8240	TCLP metals (6 req'd)	TCLP Herbicides	PCB's/pest 8080 Pet. Hydrocarbons 8100 m Flashpoint	Reactivity / pH.	Comments
93142-SA-551	10-21-93	1530	S	C	6	Chill	NO	X	X	X	X	X	X	

Due 10/26/93
New England Power

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Thomas Hankins	10-22-93	1120			
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
	10/22/93	5:30P		10/22/93	11:20A.
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

Please include standard QA/QC Documentation: STD (Vermont)

Please send final report to: Tom Hankins