LANDFILL INVESTIGATION AND WASTE CHARACTERIZATION, TROY MILLS LANDFILL, TROY, NEW HAMPSHIRE

Prepared for

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R-457

April 1984

TABLE OF CONTENTS

		PAGE
	FIGURES	ii
	TABLES	ii
	ABBREVIATIONS AND SYMBOLS	iv
	PLATES	v
1.0	INTRODUCTION	1
2.0	SAFETY PLAN	3
3.0	MAGNETIC SURVEY	4
4.0	TEST PIT EXCAVATION	6
	4.1 WORK PLAN	6
	4.2 FIELD WORK	8
5.0	RESULTS	10
	5.1 GENERAL	10
	5.2 OBSERVED QUANTITY AND CHARACTER OF DRUMS	14
	5.3 CHARACTER OF WASTES	16
6.0	DISCUSSION	22
	6.1 EXISTING SITUATION	22
	6.2 SITE HYDROLOGY	22
	6.3 GEOLOGIC CONDITIONS	22
	6.4 POTENTIAL FOR GROUND WATER CONTAMINATION	34
7.0	CONCLUSIONS	40
8.0	RECOMMENDED PLAN	41

APPENDICES

APPENDIX A. Site Safety Plan
APPENDIX B. Work Plan
APPENDIX C. Magnetic Survey Report
APPENDIX D. Laboratory Analyses
APPENDIX E. Plates

FIGURES

		PAGE
3.0-1	Delineated area of magnetic source material, Troy Mills Landfill, Troy, New Hampshire.	5
6.2-1	Ground water elevation, Troy Mills Landfill and vicinity, Troy, New Hampshire	33

TABLES

4.1-1	Randomly selected excavation sites.	7
5.2-1	Drum log for excavations on November 17, 21, and 23, 1983.	12
5.2-2	Contents and condition of excavated drums	15
5.3-1	Sample log, for waste samples obtained on November 17, 21, and 23, 1983.	17
5.3-2	Summary of analytical results for waste samples obtained on November 17, 21, and 23, 1983	19
6.1-1	Analyses of Water Samples Collected from Monitor Well M1	23
6.1-2	Analyses of Water Samples Collected from Monitor Well M2	24
6.1-3	Analyses of Water Samples Collected from Monitor Well M3	25
6.1-4	Analyses of Water Samples Collected from Monitor Well M4	26
6.1-5	Analyses of Water Samples Collected from Monitor Well M5 (upgradient well)	27
6.1-6	Analyses of Water Samples Collected from Monitor Well M6	28

Page

6.1-7	Analyses of Water Samples Collected from Monitor Well M7	29
6.1-8	Analyses of Water Samples Collected from Surface Water Station A (leachate seep)	30
6.1-9	Analyses of Water Samples Collected from Surface Water Station B (upstream).	31
6.1-10	Analyses of Water Samples Collected from Surface Water Station C (downstream).	32
6.4-1	Physical properties of phthalate esters	35
6.4-2	Physical properties of ethylbenzene and toluene . . .	39

ABBREVIATIONS AND SYMBOLS

BBP	benzyl butyl phthalate
°C	degrees celsius
Ca.	circa
D	volume occupied by one drum
DEHP	di (2-ethylhexyl) phthalate
DOP	di-n-octyl phthalate
E	east
e.g.	exempli gratia (for example)
EPA	U.S. Environmental Protection Agency
HNU	HNU Systems, Inc. photo-ionization detector
LEL	lower explosive limit
LPP	level of personnel protection
MCL	maximum contaminant level
mg/l	milligrams per liter
µg/l	micrograms per liter
MSA	Mine Safety Appliances, Inc.
N	north, also number of steel drums
NAI	Normandeau Associates, Inc.
OS	over sample
OVA	Foxboro Century Organic Vapor Analyzer
P	estimated packing density of drums
PPM	parts per million
RAI	Resource Analysts, Inc.
RCRA	Resource Conservation and Recovery Act
S	south
SCBA	Self contained breathing apparatus
SNARL	EPA suggested no adverse response level
T	trace
Troy	Troy Mills, Inc.
TVO	total volatile organics
V	estimated volume of drum burial area
VOC	volatile organic compounds
W	west
>	greater than
<	less than

PLATES

Plate 1.0-1.	Troy Mills Landfill with a backhoe excavation in progress in a former drum burial area.
Plate 2.0-1.	NAI field investigation team preparing for Level B activities during the drum excavation task, Troy Mills Landfill.
Plate 2.0-2.	NAI hot line and command post for drum excavation task, Troy Mills Landfill.
Plate 2.0-3.	NAI field investigation team member undergoing personal decontamination at the hot line, Troy Mills Landfill.
Plate 4.2-1.	Excavation 1 in progress, Troy Mills Landfill.
Plate 5.1-1.	Ends of two steel drums which appear to be in good condition in Excavation 5, Troy Mills Landfill.
Plate 5.2-1.	Six steel drums in various conditions in excavation 10, Troy Mills Landfill.
Plate 5.3-1.	Excavation 1 showing fabric scraps. Crushed steel drums were found in the bottom of the excavation, Troy Mills Landfill.
Plate 5.3-2.	Collecting a sample of liquid waste from a steel drum with a hollow glass tube, Excavation 6, Troy Mills Landfill.
Plate 5.3-3.	Pigment/sludge deposits interbedded with soil layers in Excavation 8A, Troy Mills Landfill.

1.0 INTRODUCTION

As a part of a phased program to investigate potential ground and surface water contamination associated with the Troy Mills, Inc. landfill, Normandeau Associates, Inc. (NAI) has completed a waste characterization at portions of the landfill that were formerly used for the disposal of steel drums containing wastes (See Plate 1.0-1 for site overview). The objectives of this phase of study included:

1. Delineation of the horizontal extent of the drum burial area,
2. Estimate of the number of drums,
3. Characterization of the physical condition of the drums,
4. Assessment of the contents of the drums, and
5. Assessment of potential for ground water contamination
6. Development of a remedial action plan for the site.

The work involved developing and implementing an extensive site safety program, conducting a magnetometer survey, digging a series of test pits on randomly selected sites, laboratory analyses of selected samples of soil and waste, and formulation of a remedial action plan for the site.

The Troy Mills landfill is roughly eight acres in total area and divided into two main sections. One section is currently being operated as a solid waste (non-hazardous) disposal area for fabric scraps and trimmings, as well as other non-hazardous materials such as wood and broken tools. The solid waste landfill covers about six acres of the site. An estimated three acres presently contain deposits of solid waste and about three acres are being prepared for future disposal. A closed, former steel drum burial area is the second section occupying about two acres of the site. The drum burial area is now covered with soil and a light cover crop of grasses. The drum burial area received wastes between 1968 and 1978. The disposed drums are

reported to have contained various materials including waste plasticisers, pigments, and organic solvents.

Previous site investigations by NAI have included site reconnaissance studies, test pitting, water quality analyses (NAI report of August 12, 1981), geophysical (seismic refraction and electrical resistivity) investigations (NAI report of December 1981), installation of a ground water monitoring system (4 wells), and sampling and analyses of ground and surface water samples (NAI report of July 1982). A water budget analysis was performed to assess the leachate generation potential of the site (NAI report of September 1982). Concurrent with the study of the drum burial area, additional seismic refraction lines were conducted and three additional ground water monitoring wells were installed to further assess leachates from the solid waste (non-hazardous) portion of the site.

Laboratory Analyses were conducted by Resource Analysts, Inc. (RAI). We also wish to acknowledge the assistance and cooperation provided by the management and personnel of Troy Mills, especially Messrs. Barrett Ripley and Carl Patten.

2.0 SAFETY PLAN

A Bureau of Hazardous Waste approved safety plan for on-site activities was developed for the waste characterization phase of work because of the potential for encountering hazardous materials. The safety plan is presented in Appendix A of this report. It assesses the overall degree of hazard, identifies specific potential hazardous situations and presents guidelines for personnel protection and action levels as required. The plan was made available to all field personnel during the field work.

The magnetic and topographic surveys were considered to be low hazard activities with a prescribed level of personnel protection (LPP) of C or D depending on the results of air monitoring. Level C protection involves wearing a full face respirator with organic vapor dust combo cartridge, Tyvek suit over work clothes, rubber safety boots, and gloves. Level D protection requires cotton coveralls or other work clothes, safety shoes, safety glasses, and possibly a Tyvek suit.

During the drum excavation and sampling task, which was determined to be moderately hazardous, Level B protection was prescribed. Level B protection requires that personnel wear SCBA (self contained breathing apparatus), chemical resistance Tyvek suit, steel-toed rubber boots, and gloves. Plate 2.0-1 shows NAI personnel on the site preparing for Level B activities. Plates 2.0-2 and 2.0-3 show personnel decontamination equipment and the "hot line" during the drum excavation task.

3.0 MAGNETIC SURVEY

To delineate the landfill area underlain by steel drums, a high resolution magnetic investigation was conducted by John F. Kick, Ph.D., consulting geophysicist. The magnetic method was chosen over other search methods because ferromagnetic substances (drums) were the target objects and the majority of Troy Mills' other wastes are non-magnetic (largely fabric scraps). Dr. Kick's report is presented in Appendix C.

Eighteen parallel rows of magnetic field measurements were made along north-south lines. The measurements were made at 10-foot intervals along the rows. This work resulted in a detailed contour plot of the magnetic anomaly (Figure 1 in Appendix C). The source materials which cause the magnetic anomalies do not usually directly underlie the peak of the anomaly. A shift is caused by the inclination of the earth's magnetic field and by dipolar effects. Figure 3.0-1 shows NAI's delineation of probable source areas for the magnetic anomaly and peripheral areas which may contain some magnetic source material. The plotted source area is, generally, the area between the peak of the magnetic anomaly northward to the zero anomaly contour. This is to compensate for a southward shift of the peak of the magnetic anomaly from the center of the source deposit. The complex geometry of the anomaly necessitated much interpolation between peaks and ridges.

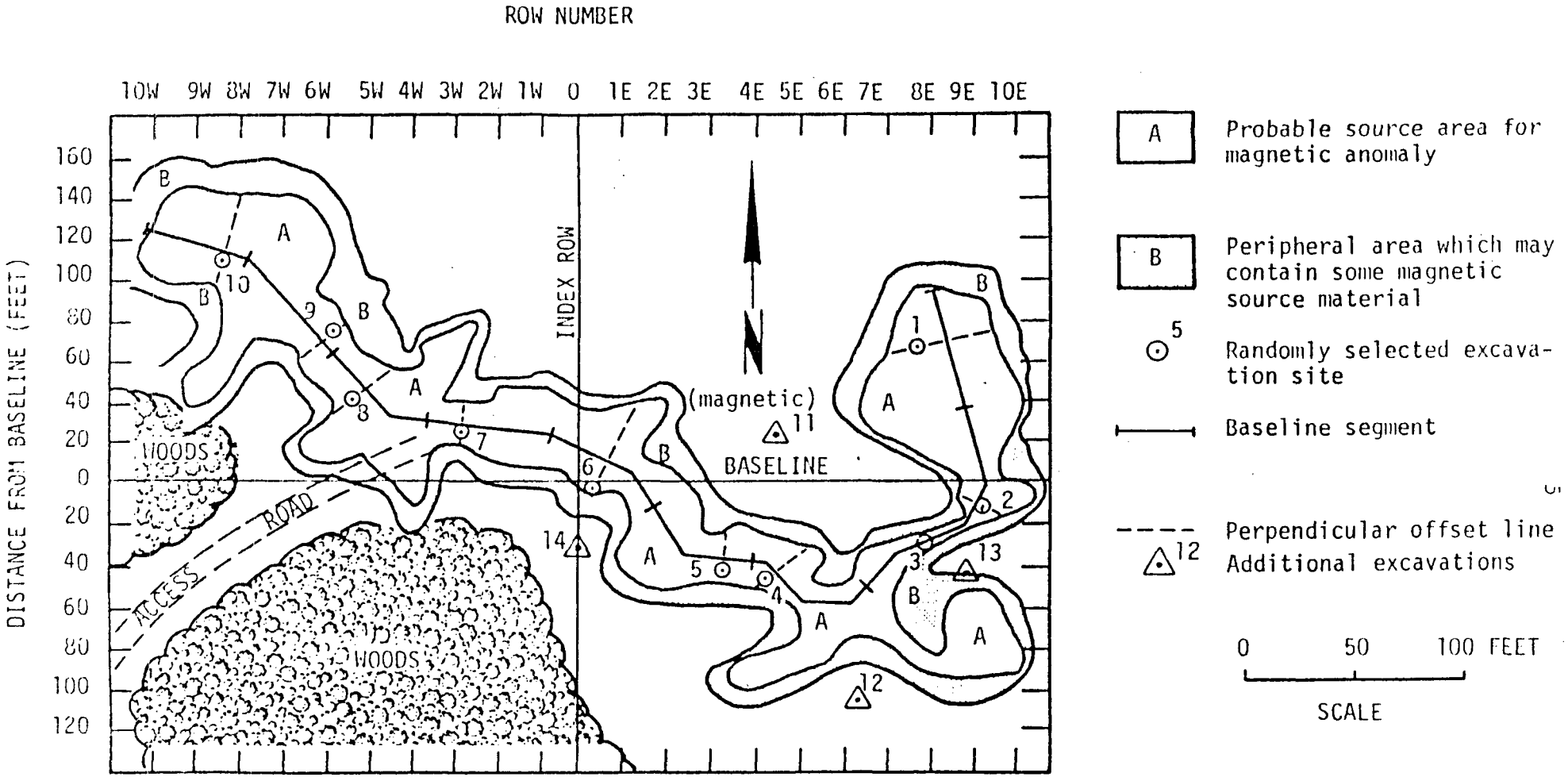


Figure 3.0-1 Delineated area of magnetic source material. Troy Mills Landfill, Troy, New Hampshire.

4.0 TEST PIT EXCAVATION

4.1 WORK PLAN

A series of test pits were excavated in the Troy landfill for observation and sampling. More specifically, the purpose of the excavation was to estimate the number and distribution of drums buried in the landfill, determine the condition of the drums (full, empty, crushed, rusted, leaking, etc.), identify types of buried and drummed waste, and verify the results of the magnetometer survey. A stratified random sampling method was used to choose 10 locations within the delineated area of magnetic source material. This insured that excavations were distributed randomly across the landfill and that the resulting data could be evaluated with a level of statistical reliability. Excavations were also selected in areas on either side of the anomaly which were considered free of buried magnetic material, and also where drums were visible at the landfill surface.

The following procedure was used in choosing the locations for the random excavations. The center of the delineated area of magnetic source material was used as a base line. The base line was drawn onto a map of the source material (Figure 3.0-1) and then divided into ten, 60-foot long segments. Using a random numbers table, a point-distance was located on each segment (designated the "random station"), and a line drawn at that point perpendicular to the base line segment. Again, using a random numbers table, a point-distance (designated the "random offset") measured along the perpendicular line, located the point of excavation. The grid coordinates for each excavation were graphically determined from the grid overlay and then field-located from the surveyed grid intersections. Grid coordinates and selection data are presented in Table 4.1-1.

It was judged that 10 excavations in the delineated area of magnetic source material and two excavations out of the area would be sufficient to characterize the site, would produce statistically valid

TABLE 4.1-1. RANDOMLY SELECTED EXCAVATION SITES.
TROY MILLS LANDFILL, TROY, NEW HAMPSHIRE.

EXCAVATION NUMBER	GRID COORDINATE	BASELINE SEGMENT (FEET)	RANDOM STATION (FEET)	RANDOM OFFSET (FEET)
1	7E+15,65N	0-60	26	16
2	9E+5, 13S	60-120	110	9
3	8E+0, 31S	120-180	140	7
4	4E+5, 48S	180-240	230	26
5	3E+8, 45S	240-300	254	20
6	0E+8, 45S	300-360	394	50
7	2W+15,24N	360-420	465	14
8	5W+6, 42N	420-480	518	20
9	6W+14,74N	480-540	548	7
10	8W+5,110N	540-600	611	31

Locations are plotted on Map in Figure 3.0-1.

data, and could be expected to be completed within a scheduled 2-3 day work period.

4.2 FIELD WORK

Test pit excavation was conducted in two phases. On the first day each of the 10 random locations (Excavation 1 through 10, Figure 3.0-1) was probed to a depth of 2 feet using hand shovels. On the second and third days, excavation was conducted using a combination of hand shovelling and power backhoe. The NAI field investigation team consisted of six members. Four of the team members were equipped to work at Level B for work in and near the actual test pit excavation (See Plate 4.2-1). The other two team members spent much of their time with personnel and equipment decontamination, and refilling compressed air bottles at the "hot line". Mr. Timothy W. Drew, an engineer of the New Hampshire Bureau of Hazardous Waste Management was present during most probing and excavation work. Mr. Robert Lynch, an experienced Level B equipment operator of Jet-Line Services, Inc., operated a power backhoe which was provided by Troy Mills, Inc.

An average excavation size using the backhoe was approximately 7-feet wide and 10-feet long. Excavation continued downward until drums were encountered or to a minimum depth of five feet. Drums were carefully uncovered and fully described. A total of 17 samples were obtained from uncontainerized wastes (solids, dried sludges, pigments, stained soil) and where possible, from drums, using EPA sampling methods and protocols. All of the excavations were backfilled upon completion of this task.

Each sample consisted of one, filled, 8-ounce glass jar sealed with a Teflon-lined lid. Samples were submitted to Resource Analysts, Inc. (RAI) Laboratory in Hampton Falls, NH, for priority pollutant analysis.

Air monitoring was conducted during each excavation using a Foxboro Century Flame Ionization Organic Vapor Analyzer (OVA), an HNU Systems photo-ionization detector (HNU), and an MSA combined oxygen and explosimeter. High explosimeter measurements were considered cause for an immediate halt in exploratory work in the interest of personnel safety.

5.0 RESULTS

5.1 GENERAL

On November 17, 1983 Excavations 1 through 10 were initiated using hand shovels, to a depth of approximately two feet. A total of two buried drums were discovered. Excavation 13 was completed and a third, partially buried drum, uncovered. On November 21, 1983 Excavations 1 through 9 were completed and on November 23, 1983 Excavations 7A, 8A, 10, 11, 12, and 14 were completed. An additional 42 drums were uncovered on the last two days of excavation.

Excavation Locations. Seventeen test pit excavations were completed at locations which are shown on Figure 3.0-1. Two pits were excavated at three of the locations. Noteworthy aspects of the excavation operation are:

- Excavations 1 through 10 were randomly located in the area of delineated magnetic source material (on-anomaly).
- One excavation connected Excavations 4 and 5. This was done because of the proximity of Excavations 4 and 5.
- Excavation 7A was located immediately adjacent to Excavation 7. Excavation 7 was located on the boundary line of the anomaly and proceeded in a southerly direction, off the area of delineated magnetic source material (off-anomaly). Excavation 7A was initiated in the opposite direction (north, on-anomaly).
- Excavation 8A was initiated one foot north of Excavation 8 after the latter was abandoned due to the detection of a potentially explosive drum.
- Excavations 11 and 12 were selected off-anomaly, to the north and south (respectively), in areas considered to be free of buried magnetic material (drums).
- Excavation 13 involved minor hand shovelling necessary to uncover a partially buried drum located on the periphery of the anomaly at the east end of the landfill.

- Excavation 14 was a surface scrape which extended from an exposed drum found to the south of the magnetic anomaly northward toward the anomaly.

The details of each excavation are presented in Table 5.2-1.

Drum Locations. The excavation results support the interpretation of the magnetometer survey with buried drums as the source of the magnetic anomaly. With the exception of a few strands of wire found in Excavation 1, ferromagnetic materials other than drums were not encountered during the test pit excavations.

Drums were found in 9 of the 10 excavations located in the area of delineated magnetic source material (See Plate 5.1-1). No drums were found in Excavations 11 and 12 located out of the area of delineated magnetic source materials. The location point for Excavation 7 was on the boundary of the anomaly. Excavation 7 which proceeded south away from the area of source materials, was free of drums. Excavation 7A, proceeding north, toward the area of magnetic source materials, uncovered 6 drums. Excavation 14, located just out of the delineated area to the south, produced unexpected results. Five drums were uncovered just under the surface in an area with low positive to slightly negative total magnetic field values. It is possible that Excavation 14 was improperly located in the field. If adjusted just 20 feet to the east, it would be well into the delineated area. It is also possible that a negative dipole derived from the mass of material to the southeast is cancelling positive readings at this location.

Fill Material and Vegetation. Cover and fill material was predominantly fine to medium sand with an occasional boulder. Till with a silt/clay component was also used as a cover, particularly at Excavations 6 and 7A. This material was densely compacted and difficult to dig through. Excavations 7, 11 and 12, each extending to a minimum depth of 5 feet, were characterized by uniform silt and fine to medium sand, and traces of dark discoloration. Excavation 12 was located in

TABLE 5.2-1. DRUM LOG FOR EXCAVATIONS ON NOVEMBER 17, 21 AND 23, 1983. TROY MILLS LANDFILL, TROY, NEW HAMPSHIRE.

EXCAVATION NUMBER	EXCAVATION SIZE (FEET)	DEPTH TO DRUM(S)	TOTAL DRUMS	CONDITION	DRUM SAMPLE NUMBER	INSTRUMENT READINGS OVA(PPM)	HNU(PPM)	EXPLOSIMETER (% LEL)	NOTES
1	8x10x9	4	2	1 1 F, D, Cl	1B 1A	10 ID 200-300 ID	7 ID 30-50 ID	0 ID 0 ID	Sandy cover material, dense layer of carpet waste from 2 to 4 foot depth.
2	7x8x3	2	2	Cr, E	-	100-200 OD	50 OD	-	Sandy cover material.
3	10x12x3	2	3	1 Cl, I, F/S 2 PCr, R, F?	- -	200 ID	175 ID	-	Drum filled with refuse and waste rags. Sample 3A from uncontainerized waste.
4	10x4x3	2	4	1 PCr,R,Cl,F/L 2 Cr, E, R 1 I,Cl?,F?	4A	50-100 ID	80 ID	0 ID	Sandy cover material. Fiberboard drum.
5	9x5x4	3	2	1 I,Cl,F/L 1 I,Cl?,F?	5A	<1000 ID	180 ID	-	Clay, sand, till-cover material compact.
4-5 connection	12x8x2	.5	6	2 Cr, E, R 1 O,E,R 3 D,PCr,R,Cl?,F?	-	40-50 OD	40 OD	-	Clay, till cover material. Connects Ex 4 with Ex 5, providing one large area for characterization.
6	10x4x3	2	3	1 PCr,D,F/L,Cl 2 PCr,D,F?,Cl?	6B	<1000 ID	100 ID	20 ID	Clay, till cover material. Sample 6A from uncontainerized waste.
7	10x3x5	-	-	-	-	-	-	-	Uniform fine sand. The EL was on the edge of the anomaly and the excavation proceeded away from the anomaly.
7A	10x8x1	.5	6	1PCr,PF/L,Cl	-	230 OS	-	-	Drum leaking clear fluid, not enough to sample. Sample 7A-A from uncontainerized waste.
				5 Cr,E,R	-	85 OD	150 OD	0	Excavate in direction of anomaly.
8	7x6x1	1	1	PCr,R,F/L,Cl	-	-	-	100 ID	Clear liquid. Explosive conditions, excavation abandoned. Sample 8A from uncontainerized waste.

TABLE 5.2-1. (Continued)

EXCAVATION NUMBER	EXCAVATION SIZE (FEET)	DEPTH TO DRUM(S)	TOTAL DRUMS	CONDITION	DRUM SAMPLE NUMBER	INSTRUMENT READINGS OVA(PPM)	HNU(PPM)	EXPLOSIMETER (% LEL)	
8A	12x6x5	1	4	Cr,E	-	14 OD	-	0 OD	Samples 8A-A, 8A-B, 8A-C, 8A-D from uncontainerized wastes.
9	8x4x6	-	-	-	-	-	-	-	Sand. Sample 9A from uncontainerized waste.
10	10x12x7	3	6	2 PCr,Rd,F?,Cl?					
				1 PCr,Rd,O,F/S	10B	0	0	0	Silt and sand cover material.
				1 D,Rd,Cl,F/L	10A	<1000 ID	200+ID	10 ID	Drum appeared new.
				2 I,Cl?,F?					
11	8x12x5	-	-	-	-	0 IH,OS	0 IH,OS	-	Off anomaly. Sand and silt.
12	6x4x6	-	-	-	-	0 IH,OS	1 IH	-	Off anomaly. Silt and sand.
13	3x3x1	0, Drum Exposed	1	PCr,Cl?,PF/S?	-	60-70 OD	30-50 OD	-	Sample 13A from uncontainerized waste, possibly spilled from drum.
14	10x2x1	.5	5	PCr,Cr,D,R,E?,Cl?	-	-	-	-	Off anomaly. Surface scrape extending from exposed drum toward axis of anomaly.

NOTES:
1. Excavation Size - maximum for each dimension (length x width x depth) as estimated at the top of each excavation.
2. Condition:
   - Cr - crushed flat
   - PCr - partially crushed
   - D - dented
   - I - intact, drum relatively new and in good shape.
   - Cl - closed
   - O - open
   - R - rusty, light surface rust
   - Rd - rusted, decomposition of metal, becoming unsound
   - ? - "possible" or "unknown if"
   - E - empty
   - PF - partially full; PF/SL - partially full sludge
   - F/L - full-liquid; F/S - full-solids
3. OVA-PPM Methane equivalent
   HNU-PPM Benzene equivalent
   - ID - probe inserted in the drum
   - OD - ambient air over the drum
   - IH - ambient air in the excavation hole
   - OS - oversand, excavated material

what appeared to be natural materials, although its location on the cleared, and leveled landfill tend to contradict this possibility.

Most of the landfill is vegetated by a thin layer of grasses, sedges, mosses and annual herbaceous species. The northeast corner of the landfill is unvegetated and cover material appears to have been more recently applied. This section is elevated 4 to 6 feet above the rest of the landfill and appears to have received a second, newer, layer of waste. A 4-foot thick layer of carpet waste was encountered in Excavation 1, but not in other excavations. This section is adjacent to the newer, active landfill. The landfill area just west of the access road crossing, (near Excavations 7A, 8 and 8A) was also unvegetated, due to relatively recent grading operations.

Ground Water. The landfill appears well drained as ground water was not encountered during any of the excavations. Excavated overburden was damp from the recent heavy rain, but intergranular, macro pore spaces were free of water.

5.2 OBSERVED QUANTITY AND CHARACTER OF DRUMS

A total of 45 drums were observed buried in the landfill. Table 5.2-1 presents a drum log, describing each excavation and the observed drums. Data on the contents and condition of drums is summarized in Table 5.2-2.

Of the total drums observed, 15 (33%) were crushed flat. Although these could possibly still contain small amounts of waste, they are probably considered empty under RCRA guidelines. Thirty (67%) of the total drums discovered were uncrushed and capable of containing waste. Seven (88%) of the 8 drums sampled contained liquid or sludge waste material. Thus, at least 7 (23%) of the uncrushed drums contained some liquid or sludge waste.

TABLE 5.2-2. SUMMARY OF DRUMS OBSERVED DURING THE EXCAVATIONS ON NOVEMBER 17, 21 AND 23, 1983. TROY MILLS LANDFILL, TROY, NEW HAMPSHIRE.

NUMBER OF DRUMS	PERCENT	DESCRIPTION
A. DRUM BREAKDOWN-AS A PERCENTAGE OF THE TOTAL NUMBER OF DRUMS OBSERVED		
16	36	Dented, rusted, or partially crushed - capable of holding waste - contents unknown
4	9	Intact - capable of holding waste - contents unknown
subtotal 20	45	Capable of holding waste, contents unknown.
7	16	Intact, partially crushed or dented - full or partially full of liquid/sludge waste.
1	2	Partially crushed, open - filled with solid (possibly hazardous) waste.
subtotal 8	18	Full or partially full of waste.
1	2	Open, intact - empty.
1	2	Intact sealed - filled with refuse (non-hazardous).
subtotal 2	4	
SUBTOTAL 30	67	Uncrushed and capable of containing waste.
15	33	Crushed flat - empty.
TOTAL 45	100	
B. DRUM BREAKDOWN AS A PERCENTAGE OF THE 30 UNCRUSHED DRUMS.		
7	23	Intact, partially crushed or dented - full or partially full of liquid/sludge waste.
1	3	Intact, open - filled with solid waste (possibly hazardous).
subtotal 8	26	Filled with waste.
1	3	Intact, sealed - filled with refuse (non-hazardous).
1	3	Open - empty.
subtotal 2	6	
SUBTOTAL 10	33	Contents determinable.
16	53	Dented, rusted or partially crushed - capable of holding waste - contents unknown.
4	13	Intact - capable of holding waste - contents unknown.
SUBTOTAL 20	66	Contents unknown - capable of holding waste.
TOTAL 30	98	

The condition of the uncrushed drums was highly variable with only 4 (13%) rusted and decomposed to the point of structural weakness. These drums were found in Excavation 10, at the far west end of the landfill, which is believed to be the oldest section (See Plate 5.2-1). Interestingly, two almost new looking drums were also found in Excavation 10, at a greater depth than the four rusted drums. The remaining 26 drums were observed to be generally intact and structurally sound. Some were dented, partially crushed or rusty.

5.3 CHARACTER OF WASTES

Air Monitoring. An OVA and HNU were used to monitor the air for concentrations of organic vapors, during each excavation. Above background instrument readings, indicative of contamination, were regularly recorded when monitoring the air just above or inside of drums. A general contamination of the ambient air in the workspace was noted only during Excavation 8A, where above background readings of +13 in the excavation pit and of +6 above the excavation pit were recorded. Explosimeter readings were obtained from three drums -- 10% lower explosive limit (LEL) from drum sample 10A, 20% LEL from drum sample 6B and 100% LEL from a drum in Excavation 8. Instrument readings are presented in Table 5.2-1 and Table 5.3-1.

Visual Observations. The following types of waste were observed during the excavations:

- fabric waste (carpet waste)
- crushed drums
- drummed waste - liquid, sludge and solid
- uncontainerized dried sludges and pigments
- stained soils.

Fabric waste, scraps of synthetic non-woven fabrics, heavy carpet-like fabric and backing material, were found only in Excavation

TABLE 5.3-1. SAMPLE LOG, FOR SAMPLES OBTAINED ON NOVEMBER 17, 21 AND 23, 1983. TROY MILLS LANDFILL, TROY, NEW HAMPSHIRE.

SAMPLE NUMBER	EXCAVATION NUMBER	DATE	INSTRUMENT READINGS			SAMPLE DESCRIPTION	NOTES
			OVA (PPM)	HNU (PPM)	EXPLOSIMETER (% LEL)		
1A*	1	11/21	200-300 ID	30-50 ID	0 ID	Purple-gray, thick opaque liquid.	From 3/4 full, intact, dented drum.
1B*	1	11/21	10 ID	7 ID	0 ID	Red sludge. Pigment.	From a crushed, open drum.
3A	3	11/17	0 OS	0 OS	0 OS	Solid red waste/pigment.	Small patch of uncontainerized waste at ca. 1 foot depth.
4A*	4	11/21	50-100 ID	80 ID	0 ID	Translucent red liquid.	From hole in a partially crushed, rusty drum. Sample initially two phase: clear liquid/red sludge. Homogenized during sampling.
5A*	5	11/21	>1000 ID	180 ID	-	Clear liquid/purple grey sludge.	From uncrushed, sealed drum. Opened for sampling.
6A	6	11/17	10 HS	3-4 HS	0 OS	Solid Red, green and maroon waste/pigment/ stained soil.	From uncontainerized waste and stained soil at .5 to 1 foot depth.
6B*	6	11/21	>1000 ID	100 ID	20 ID	Clear liquid and pink sludge/pigment.	From hole in partially crushed, closed drum.
7A-A	7A	11/23	100 HS	90 HS	-	Solid, grey sludge/ stained soil.	Extensive layer of uncontainerized waste and stained soil.
8A	8	11/21	-	-	-	Solid, grey sludge/ stained soil.	Some soil, several inches thick.
8A-A	8A	11/23	18 HS	0 HS	-	Green stained soil.	. Layer of stained sand, several inches thick, running the length of the excavation, at Ca. 8 inches depth.
8A-B	8A	11/23	18 HS	18 HS	-	Red stained soil.	Small patches of red stained sand.

TABLE 5.3-1. (Continued)

SAMPLE NUMBER	EXCAVATION NUMBER	DATE	INSTRUMENT READINGS			SAMPLE DESCRIPTION	NOTES
			OVA (PPM)	HNU (PPM)	EXPLOSIMETER (% LEL)		
8A-C	8A	11/23	54 HS	153 HS	-	Purple stained soil and powdery waste.	Uncontainerized, chalky, waste from piece of cloth, and intermixed with soil.
8A-D	8A	11/23	110 HS	97 HS	-	Solid red and white waste/pigment.	Small patch of uncontainerized clay-like material, at ca. 1 foot depth.
9A	9	11/17	0 OS	-	-	Solid blue pigment/ waste.	Small patch of uncontainerized waste at ca. 8 inches depth.
10A*	10	11/23	>1000	200+	10	Purple liquid.	From hole in full, closed, rusted, dented drum.
10B*	10	11/23	-	-	-	Black stained sand.	From open, rusted, crushed drum, and around drum.
13A	13	11/17	60-70	30-50	-	Screen pigment/waste.	Uncontainerized waste which appeared to have come from a crushed drum.

Notes:

*Drum sample
OVA - PPM in Methane equivalent - no reading taken
HNU - PPM in benzene equivalent
ID - In drum
OS - Over sample
HS - Headspace probe inserted in partially filled sample lot.

TABLE 5.3-2. SUMMARY OF ANALYTICAL RESULTS FOR WASTE SAMPLES, COLLECTED ON NOVEMBER 17, 21 AND 23, 1983. TROY MILLS LANDFILL, TROY, NEW HAMPSHIRE.

PARAMETER (PPM)

	BASE/NEUTRAL COMPOUNDS				VOLATILE ORGANIC COMPOUNDS								METALS		
SAMPLE NUMBER	Napthalene	bis (2-ethylhexyl) phthalate	benzyl butyl-phthalate	di-n-octyl phthalate	trichloroethylene	1,1-dichloroethane	benzene	xylenes	1,1,1-trichloroethane	toluene	methylene chloride	ethylbenzene	zinc	chromium	cadmium
1A*		8,200								12,000			130	2.0	.30
1B*		32,000	200	200					T	9	T	T	130	4.1	.22
4A*	1200	110,000	12,000	6,200				1,800		670		1,300	5,700	2.5	2200
5A*	T	59,000		6,000			100	19,000		5,700		5,300	21	52	7.1
6B*	100	100,000	13,000					1,200		640		1,400	150	2.1	53
8A		8,800	30	1,200						T	T		46	12	3.6
8A-A		570									.64		55	15	69
8A-C		12,000	2,800							1.4	1.3	0.07	100	34	24
8A-D		52,000	6,700										140	2.0	16
10A		69,000	890		T	2,000				300			170	20	130

Notes:

. Results are expressed in mg/l for liquids and ug/g for solids.
. T denotes a trace.
. No entry denotes "not detected".

*denotes drum sample; others from uncontainerized wastes.

. Samples were analyzed for 87 organic priority pollutants See Appendix D for laboratory data sheets.

1 (See Plate 5.3-1). This is the predominant waste material currently being disposed of in the active landfill.

Crushed drums were distributed throughout the original landfill and were found in Excavations 2, 4, 4-5, 7A, 8A and 14. Some drums, such as those found under the road in Excavation 7A, may have been crushed by heavy equipment operating in the landfill. Others, like those found at depth in sandy fill in Excavation 2, appear to have been crushed before burial. Drummed liquid and sludge wastes are also distributed throughout the landfill (See Plate 5.3-2). They were found in Excavations 1, 4, 5, 6, 8 and 10. These wastes are discussed below. One sealed drum was opened and found filled with refuse -- paper cups, towels, paint covered rags, etc. One open and partially crushed drum contained a dark granular solid waste. This material was sampled (Sample 10B) and found to be nonhazardous.

Small deposits of dried pigment/sludge were found in Excavations 3, 4, 6, 9 and 13. Discernible layers of pigment/sludge and stained soils were present in Excavations 7A, 8 and 8A (See Plate 5.3-3). Of particular note was a 2 to 4-inch thick layer of grey-colored dried sludge found at Excavations 7A and 8. All of these wastes were sampled and the results are discussed below.

Laboratory Analyses

Laboratory analyses were performed on 10 selected samples obtained from both containerized (drummed) and uncontainerized wastes. Samples were analysed for 3 metals and 87 priority pollutants including 11 acid compounds, 45 base/neutral compounds, and 31 volatile organic compounds. Table 5-4 summarizes the analytical results, and the laboratory data sheets are presented in Appendix D.

Of the 45 priority pollutant base/neutral compounds, only 4 were identified in the samples that were analyzed. Base/neutral

compounds, and particularly phthalates, were the most prevalent chemicals and also were reported in the greatest concentrations. The highest levels of naphthalene (1200 ppm), bis (2-ethylhexyl) phthalate (110,000 ppm), and di-n-octyl phthalate (6,200 ppm) were found in sample 4A, a translucent red liquid obtained from a drum. The highest concentration of benzyl butyl phthalate (13,000 ppm) was found in sample 6B, a clear liquid and pink sludge/pigment obtained from a drum.

A total of 8 volatile organic compounds were identified. The highest levels of benzene (100 ppm), xylenes (19,000 ppm), and ethylbenzene (5,300 ppm) were found in sample 5A, a clear liquid/ purple-grey sludge obtained from a drum. Toluene was found in highest concentration (12,000 ppm) in sample 1A, a purple-grey thick opaque liquid obtained from a drum. Methylene chloride (1.3 ppm) was identified in greatest concentration in sample 8A-C, a purple stained soil and powdery waste. Sample 10A, a purple liquid obtained from a drum, was the only sample found to contain 1-1 dichloroethane (2,000 ppm). Finally, trace levels of trichloroethylene (sample 10A) and 1,1,1-trichloroethane (sample 1B) were also reported.

Samples were tested for three metals - cadmium, zinc and chromium. The highest concentrations of cadmium (2,200 ppm) and zinc (5,700 ppm) were found in sample 4A, a translucent red liquid obtained from a drum. The highest level of chromium (52 ppm) was reported in sample 5A, a clear liquid/purple-grey sludge obtained from a drum.

6.0 DISCUSSION

6.1 EXISTING SITUATION

Under existing conditions relatively small quantities of volatile organic compounds (VOC) are indicated to be leaking from wastes buried on the landfill site. To date ground and surface water monitoring results indicate relatively low concentrations of VOC in the ground water and below detection limits in the adjacent brook (See Tables 6.1-1 to 6.1-10). The results indicate that no potential health risks from VOC and other constituents currently under observation are being caused by the landfill operation to down stream surface water users. It would be prudent for Troy Mills to continue to monitor the quality of Rockwood Brook upstream and downstream for VOC, and, on the basis of waste analyses (previous section), to monitor ground and surface water points for toxic metals and base/neutral compounds.

6.2 SITE HYDROLOGY

An analysis of the hydrology of the landfill site was performed in 1982 (NAI report of September 1982). The subwatershed that contains the landfill site is (about 44 acres) a small fraction of the watershed area that contributes to Rockwood Brook above surface water sampling point C (about 1650 acres, see Figure 6.2-1). This indicates that most of the flow of the brook at point C (about 97%) is contributed by upstream watershed areas. Thus, leachate discharging into Rockwood Brook from the landfill site can be expected to be diluted by over 30 times its volume. This factor and the volatilization which naturally occurs results in parameters, detected in the Troy Mills monitoring wells, often becoming undetectable when they enter the brook.

6.3 GEOLOGIC CONDITIONS

Geologic conditions which were defined in the NAI report of July 1982 indicate that permeable deposits of sand and gravel overlie

TABLE 6.1-1. ANALYSES OF WATER SAMPLES COLLECTED FROM MONITOR WELL M1.

PARAMETER	DATE SAMPLED 5-11-82	7-29-82	3-9-83	5-16-83	11-22-83
Specific conductance[1]	92.	83.	107.	--	98.
pH[2]	6.5	6.2	6.2	5.3	--
Dissolved iron, mg/l	0.52	0.133	0.10	0.30	0.08
Dissolved manganese, mg/l	0.308	0.096	0.015	0.02	0.021
Chloride, mg/l	2.27	1.3	15	4.1	<2
Cyanide,mg/l	<0.02	--	--	--	--
Phenolics, mg/l	<0.050	<0.050	<0.050	<0.50	0.070
Chemical oxygen demand, mg/l	--	--	60	<5	--
Identified volatile organics:[3]					
methylene chloride	18.	ND	ND	ND	ND
1,1,1-trichloroethane	ND	trace	ND	ND	ND

[1] Measurement in micromhos/cm at 25°C.

[2] Field measurement

[3] Concentrations in micrograms/liter (µg/l).

TABLE 6.1-2. ANALYSES OF WATER SAMPLES COLLECTED FROM MONITOR WELL M2.

PARAMETER	DATE SAMPLED 5-11-82	7-29-82	3-9-83	5-16-83	11-22-83
Specific conductance[1]	540	517.	270.	--	250.
pH[2]	6.5	6.5	6.4	6.0	7.2
Dissolved iron, mg/l	91.6	123.	78.	110.	44.
Dissolved manganese, mg/l	10.7	13.5	9.2	9.6	6.2
Chloride, mg/l	2.14	4.1	7.4	3.1	3.
Cyanide, mg/l	<0.02	--	--	--	--
Phenolics, mg/l	1.3	0.096	<0.050	<0.050	0.057
Chemical oxygen demand, mg/l	--	--	54.	47.	--
Identified volatile organics:[3]					
methylene chloride	14.	ND	ND	ND	ND
1,2-dichloroethane	7.9	2.9	ND	ND	ND
trichloroethyene	trace	trace	ND	ND	ND
benzene	4.1	9.	ND	ND	trace
toluene	6.6	10.	ND	ND	trace
1,1-dichloroethane	ND	trace	ND	ND	ND
1,1,1-trichloroethane	ND	trace	ND	ND	ND
tetrachloroethylene	ND	trace	ND	ND	ND
ethylbenzene	28.	41.	39.	150.	26.
xylenes	--	--	--	--	present

[1] Measurement in micromhos/cm at 25°C.

[2] Field measurement

[3] Concentrations in micrograms/liter (µg/l).

TABLE 6.1-3. ANALYSES OF WATER SAMPLES COLLECTED FROM MONITOR WELL M3.

PARAMETER	DATE SAMPLED 5-11-82	7-29-82	3-9-83	5-16-83	11-22-83
Specific conductance[1]	156.	189.	230.	--	250.
pH[2]	5.5	5.7	6.1	5.1	--
Dissolved iron, mg/l	2.0	1.12	0.08	0.06	0.07
Dissolved manganese, mg/l	3.25	19.7	2.5	0.76	17.
Chloride, mg/l	1.64	11.4	7.4	11.	16.
Cyanide,mg/l	<0.02	--	--	--	--
Phenolics, mg/l	<0.050	<0.050	<0.050	<0.050	0.21
Chemical oxygen demand, mg/l	--	--	99.	14.	--
Identified volatile organics:[3]					
methylene chloride	6.7.	ND	ND	ND	ND
1,2-dichloroethane	3.2	11.	ND	ND	21.
1,1,1-trichloroethane	30.	66.	20.	>285.	39.
tetrachlorethylene	ND	trace	ND	ND	ND
toluene	ND	ND	ND	ND	trace
vinyl chloride	ND	ND	ND	ND	trace

[1] Measurement in micromhos/cm at 25°C.

[2] Field measurement

[3] Concentrations in micrograms/liter (µg/l). 1,1,1-trichloroethane saturated the instrument at a concentration of 285 µg/l (5-16-83).

TABLE 6.1-4. ANALYSES OF WATER SAMPLES COLLECTED FROM MONITOR WELL M4.

PARAMETER	DATE SAMPLED 5-11-82	7-29-82	3-9-83	5-16-83	11-22-83
Specific conductance[1]	37.	35.	47.5	--	D[4]
pH[2]	5.7	6.0	5.8	5.6	D
Dissolved iron, mg/l	0.414	0.015	0.05	0.04	D
Dissolved manganese, mg/l	0.023	0.014	0.014	0.1	D
Chloride, mg/l	7.64	1.5	7.4	7.2	D
Cyanide,mg/l	<0.02	--	--	--	D
Phenolics, mg/l	<0.050	<0.050	<0.050	<0.050	D
Chemical oxygen demand, mg/l	--	--	<5.0	<5.	D
Identified volatile organics:[3]					
methylene chloride	38.	ND	ND	ND	D
1,1,1-trichloroethane	5.2	24.	32.	28.	D

[1] Measurement in micromhos/cm at 25°C.

[2] Field measurement

[3] Concentrations in micrograms/liter (µg/l).

[4] Well was dry on this date.

TABLE 6.1-5. ANALYSES OF WATER SAMPLES COLLECTED FROM MONITOR WELL M5 (UPGRADIENT WELL).

Parameter	Date Sampled 11-22-83
Specific conductance[1]	237.
pH[2]	8.1
Dissolved iron, mg/l	0.36
Dissolved manganese, mg/l	0.10
Chloride, mg/l	10.
Phenolics, mg/l	0.23
Identified volatile organics:[3]	
None identified	ND

[1]Measurement in micromhos/cm at 25°C.

[2]Field measurement.

[3]Concentrations in micrograms/liter (µg/l).

TABLE 6.1-6. ANALYSES OF WATER SAMPLES COLLECTED FROM MONITOR WELL M6.

Parameter	Date Sampled 11-22-83
Specific conductance[1]	152.
pH[2]	--
Dissolved iron, mg/l	<0.02
Dissolved manganese, mg/l	2.9
Chloride, mg/l	6.
Phenolics, mg/l	0.002
Identified volatile organics:[3]	
1,1-dichloroethane	27.
tetrachloroethylene	trace
1,1,1-trichloroethane	140.

[1]Measurement in micromhos/cm at 25°C.

[2]Field measurement.

[3]Concentrations in micrograms/liter (µg/l).

TABLE 6.1-7. ANALYSES OF WATER SAMPLES COLLECTED FROM MONITOR WELL M7.

Parameter	Date Sampled 11-22-83
Specific conductance[1]	47.
pH[2]	6.2
Dissolved iron, mg/l	0.02
Dissolved manganese, mg/l	0.026
Chloride, mg/l	>2.
Phenolics, mg/l	0.070
Identified volatile organics:[3]	
1,1,1-trichloroethane	5.

[1]Measurement in micromhos/cm at 25°C.
[2]Field measurement.
[3]Concentrations in micrograms/liter (µg/l).

TABLE 6.1-8. ANALYSES OF WATER SAMPLES COLLECTED FROM SURFACE WATER STATION A (LEACHATE SEEP).

PARAMETER	DATE SAMPLED 5-4-81	5-11-82	7-29-82	3-9-83	5-16-83	11-22-83
Specific conductance[1]	368.	330.	368.	335.	--	370.
pH[2]	6.24	6.5	6.7	6.4	6.1	7.1
Chemical oxygen demand, mg/l	113.	130.	--	52.	10.	20.
Dissolved iron, mg/l	--	88.8	37.4	23.	79.	9.2
Dissolved manganese, mg/l	--	14.9	9.10	16.	14.	16.
Total alkalinity, mg/l (as CaCO3)	166.	--	--	--	--	--
Chloride, mg/l	--	--	--	7.4	13.	9.
Identified volatile organics:[2]						
None identified	--	--	--	ND	--	--

[1] Measurement in micromhos/cm at 25°C.

[2] Concentrations in micrograms/liter (µg/l).

TABLE 6.1-9. ANALYSES OF WATER SAMPLES COLLECTED FROM SURFACE WATER STATION B (UPSTREAM).

PARAMETER	DATE SAMPLED 5-4-81	5-11-82	7-29-82	3-9-83	5-16-83	11-22-83
Specific conductance[1]	31.	33.	28.	34.5	--	36.
pH[2]	5.90	5.5	5.8	5.2	4.5	6.1
Chemical oxygen demand, mg/l	14.4	11.	--	22.	10.	20.
Dissolved iron, mg/l	--	0.561	0.188	0.08	0.07	0.27
Dissolved manganese, mg/l	--	0.113	0.065	0.056	0.05	0.071
Total alkalinity, mg/l (as CaCO3)	<0.1	--	--	--	--	--
Chloride, mg/l	--	--	--	7.4	6.2	5.
Identified volatile organics:[2]						
None identified	--	--	--	ND	--	--

[1] Measurement in micromhos/cm at 25°C.

[2] Concentrations in micrograms/liter (µg/l).

TABLE 6.1-10. ANALYSES OF WATER SAMPLES COLLECTED FROM SURFACE WATER STATION C (DOWNSTREAM).

PARAMETER	DATE SAMPLED 5-4-81	5-11-82	7-29-82	3-9-83	5-16-83	11-22-83
Specific conductance[1]	28.	28.	25.	31.5	--	34.
pH[2]	5.42	5.5	5.8	5.4	4.7	6.2
Chemical oxygen demand, mg/l	10.9	11.	--	16.	9.1	80.
Dissolved iron, mg/l	--	0.487	0.499	0.12	0.15	0.25
Dissolved manganese, mg/l	--	0.153	0.137	0.008	0.06	0.16
Total alkalinity, mg/l (as CaCO3)	0.2	--	--	--	--	--
Chloride, mg/l	--	--	--	7.4	6.2	4.
Identified volatile organics:[2]						
None identified	--	--	--	ND	--	--

[1] Measurement in micromhos/cm at 25°C.

[2] Concentrations in micrograms/liter (µg/l).

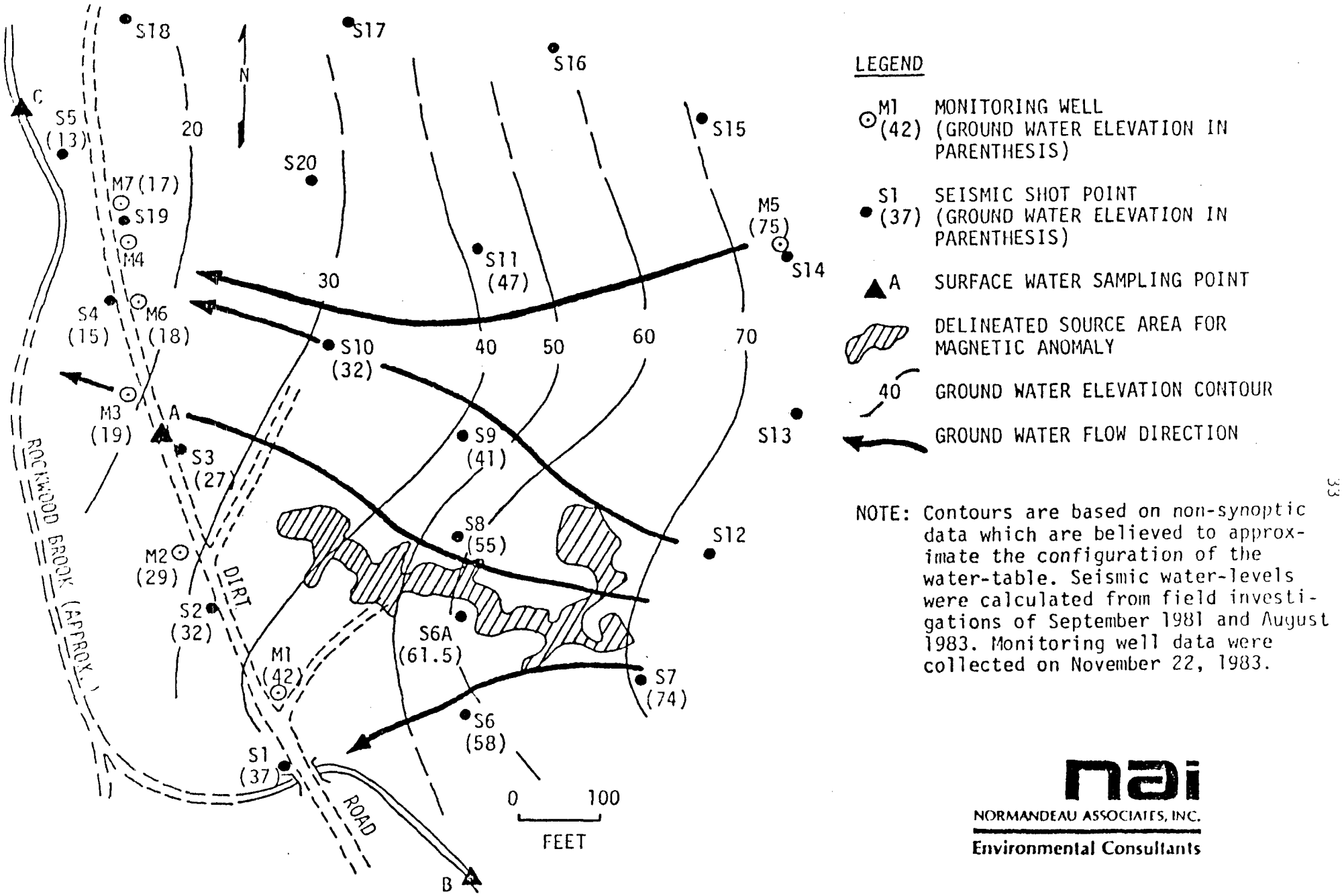


Figure 6.2-1. Ground water elevation, Troy Mills landfill and vicinity, Troy, New Hampshire.

glacial till and bedrock. The sand and gravel deposits form a permeable conduit through which leachate from the waste burial areas migrates. The permeable deposits lie in the area north of monitoring well M-1 (See Figure 6.2-1). In general, the water saturated thickness of the sand and gravel in the vicinity of the north-south access road is 6 to 12 feet.

6.4 POTENTIAL FOR GROUND WATER CONTAMINATION

6.4.1 Estimated Quantity of Drums

The test pit excavation and sampling in the drum burial area indicates a potential source of ground water contamination for the future. Many of the drums encountered were in fair to good condition and contained liquid wastes. An estimate of the number of drums in the deposit was made with the following assumptions:

1. The complex magnetic anomaly was simplified into a geometric solid 600 feet long, 40 feet wide and 10 feet deep with a volume (V) of 240,000 cubic feet.

2. Each steel drum (D) occupies 10.5 cubic feet (including voids).

3. The density of packing (P) was assumed to be 50% of the packing that can be achieved with perfect cubic packing.

THEN:

N = estimated number of steel drums

N = (V/D) (P)

N = (240,000/10.5) (0.5)

N = 11,429 drums

The results of the drum excavation work provides a basis for estimating the potential for specific types of chemical loading. In general, three main classes of chemical substances were identified in

the drums. The chemical substances included base/neutral extractable organic compounds (mostly phthalates and lesser amounts of naphthalene), volatile organic chemicals and metals.

6.4.2 Phthalates

The phthalate esters found in the drums include:

bis (2-ethylhexyl) phthalate U023
benzyl butyl phthalate
di-n-octyl phthalate U107

Bis (2-ethylhexyl) phthalate was found in the highest concentration at 110,000 ppm (11 percent). Benzyl butyl phthalate is at the second highest concentration, 13,000 ppm (1.3 percent). Characteristics of those phthalates found are presented in Table 6.4-1.

TABLE 6.4-1. PHYSICAL PROPERTIES OF PHTHALATE ESTERS*

ALTERNATE NAMES**	di-n-octyl DOP o-Benzenedi-carboxylic	bis(2-ethylhexyl) DEHP di(2-ethylhexyl) phthalate	butyl benzyl BBP benzyl butyl phthalate
Molecular Weight	391.0	391.0	312
Melting Point	-25°C	-50°C	-35°C
Boiling Point	220°C	386.9°C	377°C
Vapor Pressure***	<0.2 torr (150°C)	<0.01 torr (20°C)	
		$2x10^{-7}$ torr (20°C)	Not Available
Solubility	3 mg/ℓ (25°C)	0.4 mg/ℓ (25°C)	
5.8			
		1.3 mg/ℓ	4.8
Log octanol/water*** partition coefficient	9.2	8.73 5.3	5.8 4.8

*Versar, Inc. 1979, Water-Related Fate of 129 Priority Pollutants, Volume II. Prepared for U.S. Environmental Protection Agency, PB80-20438. December.
**Other names listed in Versar, 1979.
***More than one value has been calculated/reported.

Bis (2-ethylhexyl) phthalate is the most well-studied of the phthalate esters, though the information on phthalate esters as a group is limited. The three phthalates identified at the Troy Mills site have relatively low solubilities and are readily adsorbed onto suspended particulates. Microbial degradation is effective under aerobic conditions but is generally slower under anaerobic conditions (nonexistent for bis (2-ethylhexyl) phthalate).

The above characteristics are important for two reasons. One, the extent and nature of contaminant migration from the site are dependent upon the physical characteristics. Second, the treatment (clean-up) alternatives for contaminated ground water or soil can be estimated from the characteristics.

From the available information, it appears that the phthalates present at the Troy Mills site would be relatively immobile due to their low solubilities and high adsorption rates. The presence of toluene and methylene chloride at the site however may increase the phthalate's rate of migration.

It is important to note that none of the phthalates have been found to be present in the monitoring wells nor in the surface water sampled, probably due to the low solubility and high adsorption rate.

6.4.3 Napthalene

Naphthalene has also been found in significant quantities in the sampled drums. Naphthalene is a polycyclic aromatic hydrocarbon and has the following properties*.

Molecular Weight	128.19
Melting Point	80.55
Vapor Pressure (20°C)	0.0492 torr
Solubility in Water (25°C)	34.4 mg/ℓ
	31.7 mg/ℓ
Log octanol/water partition coefficient	3.37

*Versar, 1979.

Naphthalene has mid-range adsorption rates and solubility. It is, therefore inferred that there would be some adsorption to soils in a ground water environment. It is important to note that naphthalene has not been detected to date at the monitoring wells or the surface water sampling locations. This is expected to be a result of adsorption on the soils.

6.4.4 Volatile Organic Compounds

Volatile organic compounds tend to migrate readily within soils and ground water. They are, therefore, considered a threat to surrounding ground and surface waters if they are released in sufficient quantities.

Volatile organic compounds were detected in samples from six steel drums. The total volatile organic (TVO) concentrations in the

wastes ranged from 9 ppm to 30,100 ppm and averaged 8,570 ppm. In order to determine the potential for future contamination by volatile organic compounds, an estimate of waste quantity based on information from the drum excavation program was made. It was assumed that 7000 steel drums in the deposit are 60% full of liquid waste with an average TVO concentration of 8,570 ppm. The computed volume of liquid waste is 231,000 gallons with an average TVO concentration of 8,570 ppm. This is equivalent to about 1980 gallons of pure TVO.

Two of the volatile organic compounds that have been most prevalent in the existing ground water monitoring system are 1,1,1-trichloroethane and ethylbenzene. The EPA suggested no adverse response level (SNARL) for 1,1,1-trichloroethane is 330 µg/ℓ for 1 day of exposure and 35 µg/ℓ for exposure over a life-time in drinking water.

In general, ethylbenzene is a prevalent chemical in the environment. Sources include commercial (e.g. petroleum and petroleum by-products), motor vehicle exhaust, and cigarette smoke. An intake of 1.6 mg/day (1 mg/ℓ) has been calculated as an acceptable rate to protect from toxic effects. Carcinogenic effects have not been identified to date. The physical properties of ethylbenzene are presented in Table 6.4-2. The principal mechanism for removal of ethylbenzene from water is volatilization. In addition to volatilization, adsorption may also be an important removal mechanism based on the log octanol/water coefficient. This factor is important in evaluating the migration of ethylbenzene from the disposal site.

Toluene, which was also identified in waste and ground water samples, exhibits properties similar to ethylbenzene in that it volatilizes easily. Toluene, which is also referred to as methylbenzene is distinguished from benzene by the substitution of a methyl group for one hydrogen atom. Physical properties of it are presented in Table

6.4-2. The EPA suggested no adverse response level (SNARL) for toluene is 1 mg/ℓ in drinking water, with a maximum exposure time of ten days.

TABLE 6.4-2. PHYSICAL PROPERTIES OF ETHYLBENZENE AND TOLUENE

	ETHYLBENZENE	TOLUENE
Molecular Weight	106.16	92.13
Melting Point	-94.9°C	-95.0°C
Boiling Point	136.2°C	110.6°C
Vapor Pressure at 20°C	7 torr	28.7 torr
Solubility in water at 20°C	152 mg/ℓ	534.8 mg/ℓ
Log Octanol/Water Partition Coefficient	3.15	2.69

6.4.5 Metals

One liquid sample contained high concentrations of cadmium (2200 mg/ℓ) and zinc (5700 mg/ℓ), indicating that the waste deposit is also a potential source of certain toxic metals. Tests for these metals have not been made to-date in ground or surface water samples. It would be prudent to add toxic metals such as cadmium, chromium, lead and mercury to the list of parameters that are being monitored to further characterize the quality of adjacent ground and surface waters. U.S. EPA and New Hampshire drinking water standards for these metals are: cadmium, .01 mg/ℓ; chromium, .05 mg/ℓ; lead, .05 mg/ℓ; mercury, .002 mg/ℓ. Although zinc is not considered a highly toxic metal, the U.S. EPA has set a secondary drinking water maximum contaminant level of 5 mg/ℓ on this metal.

7.0 CONCLUSIONS

The following conclusions were drawn during this investigation.

1. A steep-gradient, irregular-shaped magnetic anomaly is present under closed and covered portions of the south part of the Troy Mills landfill.

2. The magnetic anomaly is caused mostly by an irregular-shaped accumulation of disposed steel drums.

3. In a randomly conducted sampling of drums in the source area for the magnetic anomaly, 16% of the drums contained liquid and/or sludge, 33% were crushed flat, and 51% were not sampled because there were no accessible openings.

4. Laboratory analyses indicate that the random waste sampling contained significant concentrations of several volatile organic chemicals, several base/neutral priority pollutants, and high levels of cadmium and zinc.

5. Observed concentrations of volatile organics at the monitoring wells are relatively low. Because of their potential for migration in the ground water, continued monitoring of volatile organics will be required.

6. Volatile organic chemicals have not been detected in Rockwood Brook to-date. Because of the presence of low levels of volatile organics in the ground water, they should be monitored in the brook on a regular basis to confirm the lack of impact.

7. The presence of high concentrations of cadmium and zinc in one of the waste samples indicates that trace metals should be monitored periodically.

8. The presence of base/neutral extractable compounds (phthalates and naphthalene) in all of the analyzed waste samples indicates that these compounds should be monitored periodically.

9. The phthalates are not expected to migrate freely because they have low solubilities and are readily adsorbed onto soil particles.

10. If elevated concentrations of volatile organic compounds, trace metals, or base/neutral extractable compounds should occur in the monitoring system (wells and brook) in the future, a need for site remedial actions to mitigate the potential for downgradient ground and surface water contamination could develop.

8.0 RECOMMENDED PLAN

Based on the preceding conclusions, it is recommended that the following plan be implemented by Troy Mills, Inc.

1. Continue monitoring ground and surface water quality at the Troy Mills, Inc. landfill, sampling on a quarterly basis with sample collections during April, July, October and January.

2. To confirm the absence of the landfill's impact on Rockwood Brook, test samples for volatile organic compounds by GC/MS from surface Stations B (upstream) and C (downstream) on the April and October samplings.

3. To determine if trace metals are present in downgradient ground waters, conduct analyses for cadmium, chromium, lead, mercury and zinc on samples from all monitoring points during the April sampling and on subsequent sampling rounds if necessary.

4. To confirm the continued absence of base/neutral extractable compounds in downgradient ground and surface waters, conduct analyses for base/neutral extractable compounds on samples from monitoring wells M 2 and 3, and surface Station C (downstream) on the April sampling and on subsequent sampling rounds if necessary.

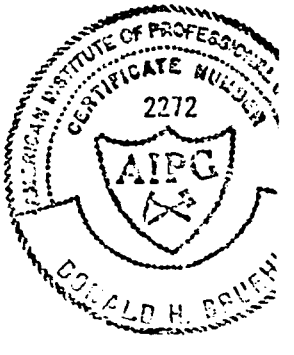
5. If a sudden rise in concentrations toward unacceptable levels should occur in the monitoring system (wells and brook), additional monitoring rounds at a monthly interval should be conducted to confirm the rise in concentrations.

6. If elevated concentrations persist and are verified by the additional monitoring, remedial alternatives will be defined to mitigate the potential for downgradient ground and surface water contamination.

Respectfully submitted,
NORMANDEAU ASSOCIATES, INC.

Dennis R. Sasseville
Project Manager

Donald H. Bruehl
Senior Hydrogeologist
AIPG Certificate No. 2272



APPENDIX A

SITE SAFETY PLAN

GENERAL SAFETY PLAN
FOR
TROY MILLS LANDFILL
TROY, NEW HAMPSHIRE

MAGNETOMETER AND TOPOGRAPHIC SURVEYS
EXCAVATION OF DRUMS

Prepared by

NORMANDEAU ASSOCIATES, INC.
Bedford, New Hampshire

R-457

November 1983

TABLE OF CONTENTS

		PAGE
SECTION 1:	BACKGROUND INFORMATION	2
	Identification	2
	Personnel	2
	Site Description	3
	Project Description	5
SECTION 2:	HAZARD EVALUATION	6
	Overall Degree of Hazard	6
	Specific Hazards	8
	Necessary LPP	8
SECTION 3:	FIRST AID FOR EXPOSURE	10
SECTION 4:	OPERATIONS SAFETY PLAN	11
	General Personnel Protection Guidelines/Action Levels	11
	Site Reconnaissance	13
	Task 1 - Magnetic Survey, Topographic Survey	14
	Task 2 - Drum excavation and Sampling	15
SECTION 5:	EMERGENCY INFORMATION	16
	Emergency Telephone Numbers	16
	Route to Hospital	16
	Contingency Plan	17
APPENDICES		18
	A - LEVELS OF PERSONNEL PROTECTION	18
	B - DECONTAMINATION PROCEDURES	23
	C - PERSONNEL AND RESPONSIBILITIES	25
	D - PERSONNEL CASUALTY	26
	E - GUIDELINES FOR SITE OPERATIONS	27

GENERAL SAFETY PLAN
FOR
TROY MILLS LANDFILL
TROY, NEW HAMPSHIRE

MAGNETOMETER AND TOPOGRAPHIC SURVEYS
EXCAVATION OF DRUMS

The following is a Safety Plan for on-site activities performed during the Investigation of the Troy Mills Landfill, being conducted by Normandeau Associates, Inc. (NAI) of Bedford, New Hampshire.

The document is intended to be an in house, working guideline for personnel trained and experienced in hazardous waste field work and not a treatise on safety. Familiarity with standard equipment and procedures is expected. Where possible non-site specific information has been appended.

All NAI employees, subcontractors and visitors will be required to follow this safety procedure plan and to report to either NAI's project manager (PM), on site coordinator (OSC) or safety officer (SO) on issues relating to safety.

SECTION 1

BACKGROUND INFORMATION

IDENTIFICATION

Site Name Troy Mills Landfill NAI-ID No. 457
Troy Mills Inc., Troy, NH 03465

Address/Location At the south end of the dirt road; about 1.5 miles south of Troy, N.H.; between Rockwood Brook and the old Boston and Maine Railroad grade.

County Cheshire Phone 603-242-7711

PERSONNEL

State Contact	Brook Dupee	- Bureau Hazardous Waste	603-271-4611
	John Regan	- Bureau Solid Waste	603-271-4586
	Dan Allen	- WSPCC	603-271-2755

EPA Contact

Other Contacts

Client Contacts Barrett F. Ripley (Vice President)

NAI Personnel - (472-5191)
Project Manager - Dennis Sasseville
On Site Coordinators - Alton Stone
Safety Officer - Elizabeth Gross (Phoenix Safety)
Technical Director - Don Bruehl
Other - Douglas DeNatale, Steve Ransom

SITE DESCRIPTION

Type of Facility Company (on-site) landfill

RCRA Status Generator, Disposer

Size About 1.5 acres Buildings/Structures None

Surrounding Land Use (one mile radius)
N - Forested
E - Abandoned Railroad, Forest, Rural/Residential
S - Forested
W - Forested Mountain side

Unusual Features or Terrain None

Site Activities - Troy Mills manufactures textiles, carpets and related products. Since 1968 waste materials, including drummed wastes, have been landfilled on company property. Drums most/many of which may be empty/crushed are buried in an inactive section of the landfill. The active section is currently accepting waste, which is considered to be non hazardous.

Specific Problems
- Improper disposal of hazardous waste.
- Leachate seep.
- Contamination of ground water.

Hazardous Wastes/Materials On-Site

Wastes
- Uncured foam rubber latex sludge
  SBR rubber, silicone defoamer, potassium oleate soap, calcium carbonate and feldspar filters, zinc oxide and sulpher salt cure system.
- Vinyl plastisol sludge
  PVC dispersion resin, DOP and DOA plasticiser, calcium carbonate filler, organic pigments, AZO

dicarbonamid blowing agent, zinc salts, expoxidized soybean oil, cadmium-barium-zinc stabilizer, Varsol.

- MEK prints and topcoats sludges
  PVC acrylic resins, organic and inorganic pigments, MEK solvent, toluene, silicate fillers.

- Industrial solvents and chemicals
  1,1-dichlorethane, 1,2-dichlorothane, 1,1,1-trichloroethane, trichlorethylene, tetrachlorethene, methylene chloride, toluene, benzene, ethylbenzene, benzidine, 3,3-dichlorobenzidine, acrolein, acrylonitrile, napthalene, benzoperylene, dibenzoanthrasene, idenopyrene.

- Pesticides
  There is a possibility for low levels of pesticides to be on site. These would include: Chlorodane, heptachlor expoxide, toxaphene, aldrin, alpha BHC, beta BHC, 4-4'-DDT, endosulphan 1, heptachlor.

PROJECT DESCRIPTION

Purpose: To characterize ground water conditions at the site and to characterize wastes buried on site.

Specific Tasks

- Site Reconnaisance
- Task 1 - Magnetometer Survey/Topographic Survey
- Task 2 - Excavation for inspection of drums.

SECTION 2

HAZARD EVALUATION

Overall Degree of Hazard - Moderate

Task	Hazard	Proposed LPP
Site Reconnaissance	Low	Level C
Task 1 Magnetometer/Topographic Surveys	Low	Level C/D
Task 2 Drum Excavation/Sampling	Moderate	Level B

- Company records have indicated that a variety of industrial and potentially hazardous wastes, including drummed wastes, were disposed of on site. Several of the subtances are trade name materials or industrial process materials, and it is difficult to determine the specific chemical composition. Hazard is dependent upon concentration of material, state of material (solid, sludge, drummed liquid) and degree of decomposition.

  - Many of the materials - SBR rubber, silicone defoamer, potassium oleate soap, calcium carbonate and feldspar fillers, zinc oxide and sulpher salts, plasticiser, calcium carbonate filler, organic/inorganic pigments, AZO dicarbonamid blowing agent, epoxidized soy bean oil, cadmium-barium-zinc stabilizer - probably do not represent a significant hazard to an inspection team if they are bound into a sludge or solid. Personnel are not likely to injest or come into a prolonged, high concentration contact with these materials. In powdered or dust conditions the materials are more hazardous due to the inhalation of contaminated particulates.

  - MEK (TLV-200ppm), toluene (TLV-100ppm) and Varsol (turpentine thinner, composition unknown) are volatile organics which require respiratory protection and contact protection.

- Depending upon state and decomposition, PVC resins could be a source of vinyl chloride monomer (VCM-a carcinogen) requiring respiratory protection. VCM is not adequately filtered by air purifying respirators.

- Results from ground water sampling showed low levels of industrial chemicals (PPB range). At these low concentrations, the chemicals do not represent a significant hazard. However the low concentrations in ground water indicate the possibility of higher concentrations in the waste materials.

  - Industrial chemicals - napthalene (TLV-10 ppm), perylene, anthrocene, and pyrene, which are hazardous through inhalation or absorbtion. Furthermore as double benzene ring chemicals they are potential carcinogens.

  - Results from ground water sampling indicated possible low levels (parts per trillion) of several pesticides - chlorodane, heptachlor epoxide, toxaphene, eldrin, Alpha BHC, Beta BHC, 4-4-DDT, endosulphan. These were tentatively identified during a first analytical run, but not confirmed during a second run. Laboratory review (GCA, Bedford, Mass.) determined that the material was actually a complex of highly degraded, heavy organics, derived from the industrial waste. The presence of pesticides in industrial textile waste is unlikely.

Specific Hazards

1) Inhalation of organic vapors
Excavation of buried material and sampling of drums could initiate high vapor concentrations.

2) Fire and explosion
Many of the solvents are flammable liquids and volatile. Excavation of material and sampling of drums should proceed cautiously in order to avoid rupturing, shocking, or sparking of drums and material.

3) Inhalation of contaminated dust/particulates
Excavation of buried material may result in a release of particulates.

4) Contact contamination.
Excavation and sampling of wastes could possibly result in contact with contaminated waste and soils, necessitating protective clothing.

Necessary LPP

Site Reconnaissance - Level C. The site has been visited on numerous occassions by the state and private personnel. Use of an HNU (10.2 ev probe) has not indicated significant vapor concentrations. Significant odors, during dry weather, or other hazards have not been noted. Sections of the landfill are currently active and adverse effects to personnel have not been noted. Level C - (tyveks, rubber safety boots, organic vapor cartridges) is sufficient.

Task 1 Magnetometer/Topographic Survey - Level C/D. LPP will depend upon the results of the Site Recon. Significant vapor concentrations, or likelihood of particulates will necessitate an upgrade in the LPP. Otherwise Level D (work clothes, safety boots, boot wash) is sufficient.

Task 2 Excavation and Sampling of Buried Drums - Level B. The potential for encountering significant concentrations of hazardous

materials during this task is moderately high. Full Level B - (SCBA, chemical resistant tyveks, hoods, rubber safety boots, rubber gloves) will provide necessary respiratory and contact/splash protection.

The use of the hooded, yellow tyveck and the taping of ankle/boots, wrists/gloves and face mask/hood junctions, will provide complete contact protection.

SECTION 3

FIRST AID FOR EXPOSURE

INHALATION OF VAPORS/PARTICULATES

Symptoms - eye/nose/throat irritation, nausea, dizziness, headache, weakness, fatigue, lightheadedness, drowsiness, loss of coordination, confusion, vomiting, cramps. (These symptoms are similar for most organic vapors, particularly solvents).

Treatment

Mild Exposure - Bring victim to fresh air. Rinse eyes and throat if irritated.

Heavy Exposure - (victim vomits, very dizzy, groggy, faints, etc.). Bring victim to fresh air. Evacuate to hospital. Prepare to administer CPR.

Victim should be monitored for 48 hours in case of a delayed reaction.

CONTACT EXPOSURE

Symptoms - Itching, burning, redness of skin. Severe contact exposure for certain solvents, will progress to CNS (central nervous system) symptoms similar to those for inhalation.

Treatment - Remove contaminated clothing, flush with water, dry and bandage. Monitor victim for CNS symptoms for at least 48 hours.

FIRST AID/SAFETY EQUIPMENT

The following equipment will be stationed at the Hotline or when appropriate, downrange.

- Fully equipped first aid kit
- Oxygen bottle/kit
- Nine (9) lb. chemical fire extinguisher
- Eyewash bottle or other pressurized water filled container.

SECTION 4

OPERATIONS SAFETY PLAN

This section outlines the specifics of safety procedures to be used during each phase of the operations. Safety procedures may be upgraded or downgraded during site activities, pending monitored changes in the working environment. All changes will be in line with the General Level of Personnel Protection Guidelines/Action Levels for the Troy Mills Landfill, On-Site Investigation as described below.

General Personnel Protection Guidelines/Action Levels.

An in depth review of levels of personnel protection (LPP) is presented in Appendix A.

Level B (SCBA, cotton coveralls or work clothes, yellow tyveks (chemical resistant), steel toed rubber boots, or work boots with disposible over boots, and gloves)

- Vapor concentrations (as measured on an OVA or HNU 11.7 EV Probe) greater than 5 ppm above background.
- Oxygen deficient atmospheres, less than 19.5%
- Specific actions (i.e. excavation/sampling of drums) which could initiate a sudden moderate or high concentration of vapor.

Level C (full face respirator, organic vapor dust combo cartridge, tyveks over work cloths/coveralls, rubber safety boots, gloves)

- Vapor concentrations above an established clean zone background level.
- During conditions (natural or personnel induced) which result in high levels of dust (visable above background atmospheric concentrations of particulates)
- Level C activities require continual air monitoring.

Level D (cotton coveralls or other work clothes, safety shoes, and safety glasses when down range. Tyveks may also be needed).

- Support areas and downrange areas where a higher LPP has not been deemed necessary.

- Continual air monitoring in downrange areas.

Explosive Atmospheres

- 20% LEL (lower explosive limit) as recorded by an explosimeter. Secure and evacuate the work area.

Oxygen Deficient Atmospheres

- Less than 19.5% (by volume) oxygen atmosphere requires upgrading the level of Personnel Protection to Level B.

Task Specific Safety Plans

Levels of Personnel Protection indicated for specific tasks below, are those which are anticipated to be used. Changes in site conditions, and results of air monitoring may indicate the upgrade/downgrade of the LPP.

Site Reconnaissance (SR) Date Sept. 21, 1983

Purpose: To review on-site conditions and determine LPP necessary for further tasks. To evaluate safety hazards. Preliminary planning of future tasks.

LPP - Initially Level C. Up/downgrade as necessary.

Equipment - OVA, HNU (10.2 ev probe).

Hotline - End of access road. Upwind if possible.

Command Post/First Aid - Behind Hotline.

Decontamination - Boot wash

Operations

- Three man team. Two persons advance in front with instruments. Third person at distance as backup.
- Team methodically sweeps (criss cross) the proposed work areas with instruments.
- Specific points of interest (leachate seeps, etc.) are closely checked.
- All information is logged/sketch mapped.
- Upgraded LPP as necessary.

Task 1 - Magnetic Survey, Topographic Survey — Date: Week of October 3, 1983

Purpose - Determine the location(s) and extent of buried drums. Provide topographic information for site base map.

LPP - Level C/D.

Hotline - End of access road. (upwind if possible)

Decontamination - Boot wash.

Operations - S.O. or other NAI personnel will perform a brief safety sweep of the work area.

- Work team will then proceed downrange at the appropriate LPP. Using the magnetometer the team will systematically criss cross the work area.

Task 2 - Drum Excavation and Sampling — Date: Week of November 14, 1983

Purpose - Excavation/sampling of buried drums in order to characterize the condition of the drums and the nature of the wastes contained in the drums and buried in the landfill.

Method - Backhoe and hand labor will be used to uncover the drums in specified locations. Samples will be obtained from spillage or leakage around the drums and of contaminated soil. Selected drums, which have accessible and openable bungs, may be opened and sampled. Drums will not be moved or staged. Clean drums will be available to receive any significant spillage during the opening and sampling.

Specific Hazards

- Inhalation of organic vapors.
- Fire and explosion of drummed waste.
- Contact with contaminated waste or soil.

LPP - Full Level B protection. Backhoe operator at Level B. Backhoe equipped with splash shield and without teeth on bucket.

Hotline - At the end of the access road. Upwind if possible.

Decontamination - Procedures will essentially follow those as outlined by the EPA for Level B work. Due to the inaccessibility of the site a field shower will not be available. See Appendix B.

Safety Equipment - OVA, HNU, eyewash, fire extinguisher, oxygen kit, first aid kit, metal detector, non sparking implements.

Operations

- The cover soil is very sandy and the drums appear to be buried close to the surface which should facilitate excavation.

- Minimum of 4 man team (exclusive of backhoe operator). Two or three man downrange team for digging and sampling. One or two men in support/backup at hotline.

- Personnel will hand dig several small holes to approximately one (1) foot depth in each Location area. If drums are not encountered, the backhoe will scrape off soil to that depth.

- Excavation will proceed, alternating hand and backhoe methods. At depths below four (4) feet, the sides of the pit must be angled back to less than 45°.

- Prior to opening a closed drum, the backhoe will nudge/bump the drum to check for shock sensitive material. An alternate method will be to attach a length of rope to the drum and from a distance, pull on the rope to jog the drum.

- Backhoe: The backhoe operator will work at Level B, utilizing air supplied from a large cylinder attached to the backhoe. The backhoe will also be equipped with a splash shield. A scraping bucket, without teeth will be used.

  Prior to backhoe excavation at each location, the area where the backhoe will be stationed, will be checked for drums, which could be ruptured by the backhoe feet.

  Excavation areas will be checked for drums utilizing hand excavations or a metal detector, prior to removing material by machine.

SECTION 5

EMERGENCY INFORMATION

Emergency Telephone Numbers

If calling one of these numbers, please state NAME, LOCATION, and type of PROBLEM.

Local Emergency Support

Fire Department (Troy 242-7759) For all emergencies use:

Ambulance 352-1100 Mutual Aid (Keene) 352-1100

Police Department (Troy 242-7992)

Hospital 352-4111 (Cheshire Hospital in Keene)

Town Clerk 242-3845

State Agencies

N.H. Bureau of Hazardous Waste Management	271-4608
N.H. Water Supply and Pollution Control Commission	271-3503
N.H. Fire Marshall Office	271-3336
N.H. State Police (24-Hour Dispatch)	1-800-852-3411

Other

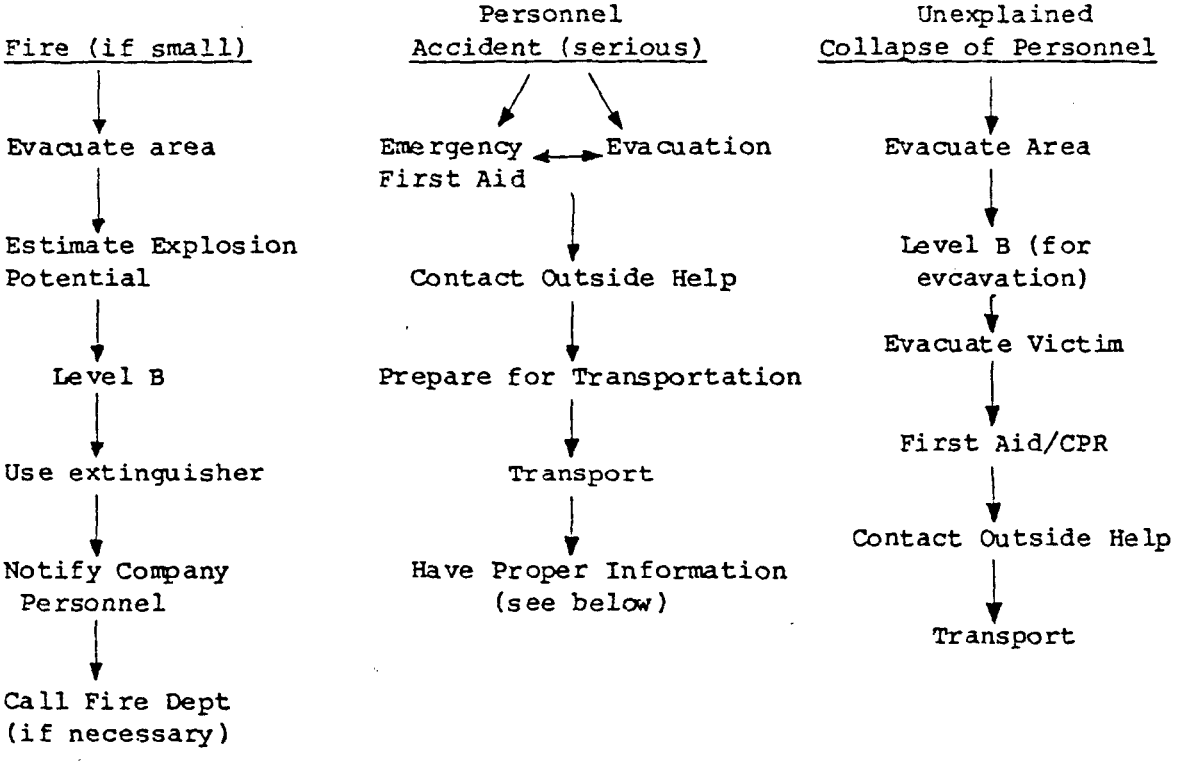
U.S. E.P.A. (24-Hour Hotline)	617-223-7265
Poison Center, Mary Hitchcock Hospital	1-800-562-8236

Route to Hospital

- Follow dirt access road to Bowkerville Road
- Left on Bowkerville Road to Rt 12
- Left (north) on Rt 12 through Troy to Keene, NH
- At major junction of Rts 9, 10, 101 and 12 go straight through into Keene
- At common go half-way around and go right on Court Street
- Hospital is at 580 Court Street

Contingency Plan

Signal - five (5) one second blasts of auto or air horn.
Action - All personnel immediately excavate downrange areas and report to Hotline for instructions.



For Hospital Victim

- Name and Phone of family physician

- Description of Incident: chemicals involved, symptoms, nature of injury, proposed treatment and plan of transportation.

APPENDIX A

LEVELS OF PERSONNEL PROTECTION

Because of the possible dangers of exposure to toxic or harmful chemicals protective equipment must be worn during work on hazardous waste sites. Levels of Personnel Protection (LPP) describe respiratory, clothing and other equipment necessary for protecting personnel against expected hazards.

The descriptions below are for full dress at a given LPP, where hazards are expected to be at a maximum for which the given LPP is considered adequate. Depending on site conditions and work activities, the clothing and dress requirements of a given LPP are commonly modified.

LEVEL A

1. Personal Protection Equipment

   - Positive Pressure SCBA (MSHA/NIOSH approved) Operated in the positive pressure mode.
   - Totally Encapsulating Suit (boots and gloves attached).
   - Gloves - Inner (tight fitting and chemical resistant).
   - Boots - Chemical - protective, steel toe and shank. Depending on suit boot construction; worn over suit boot.
   - Gloves - Outer, chemical-resistant. Depending on suit construction worn over suit gloves. May be replaced with tight-fitting, chemical-resistant gloves worn inside suit gloves.
   - Underwear - Cotton, long-john type*
   - Hard Hat* (under suit)
   - Disposable protective suit, gloves, and boots. (Worn under or over encapsulating suit)*
   - Coveralls* (under suit)
   - 2-way Radio Communications

*Optional

2. Criteria for Use

   A. The type and concentration of toxic substances are known and require the highest level of combined protection to the respiratory tract, skin, and eyes. These conditions would be:

      1. Atmospheres which are "immediately dangerous to life and health" (IDLH)

         a. IDLH's can be found in the NIOSH/OSHA's "Pocket Guide to Chemical Hazards" andor other references.

      2. Known atmospheres or potential situations that would effect the skin or eyes, or could be absorbed into the body through these surfaces in toxic quantities.

         a. Potential situations are those where vapors may be generated or splashing may occur through site activities.

         b. Standard reference books should be consulted to obtain concentrations hazardous to skin, eyes or mucous membranes.

      3. Oxygen deficient atmospheres with above conditions.

   B. At sites where the type and/or potential concentration of toxic substances are unknown.

      1. Unless circumstances strongly indicate otherwise, the site should be presumed to present hazards to the respiratory system, skin, and eyes. Level A protection would provide the highest level of protection for the initial entry team.

         a. Such circumstances might be:

            1. Environmental measurements contiguous to the site.

            2. Reliable, accurate historical data.

            3. Open, unconfined areas.

            4. Minimal probability of vapor's presence or splashing with cutaneous effecting substances.

      2. Enclosed areas such as buildings, railroad cars, ships holds, etc.

LEVEL B

1. Personal Protective Equipment

   - Positive Pressure SCBA (MSHA/NIOSH approved), operated in the positive pressure mode.
   - Hooded, chemical-resistant suit.
   - Gloves - Outer, chemical-protective.
   - Gloves - Inner, tight-fitting, chemical-resistant.
   - Boots - Outer (chemical-protective, heavy rubber disposables).
   - Boots - Inner (chemical-protective, steel toe and shank).
   - 2-way Radio Communications.
   - Hard Hat.
   - Face Shield*

2. Criteria for Use

   A. The type and concentration of hazardous substances are known and require the highest degree of respiratory protective; but a lower level of skin protection.

      1. Atmospheres which are "immediately dangerous to life and health" (IDLH). Type and concentration of vapors in air do not present a hazard to the small, unprotected areas of the body.

      2. Atmospheres with concentrations of known substances greater than protection factors associated with full-face, air-purifying respirators with appropriate cartridges.

      3. Atmospheres with less than 19.5% oxygen.

   B. When a determination is made that potential exposure to the body parts not protected by a fully encapsulated suit (primarily neck, ears, etc.) is highly unlikely.

      1. Known absence of cutaneous or percutaneous hazards.

      2. Activities performed preclude splashing of individuals.

   C. Level B protection is recommended as the lowest level of protection for initial entries until the hazards have been further identified and defined by monitoring, sampling, and other reliable methods of analysis, and personnel protection equipment commensurate with these findings utilized.

LEVEL C

1. Personal Protective Equipment

   - Full-face or half-face, air purifying respirator (MSHA/NIOSH approved).
   - Chemical-resistant clothing.
   - Gloves - Outer (chemical-protective).
   - Gloves - Inner (tight-fitting, chemical-resistant type (or woven liners).
   - Hard Hat (face shield, optional).
   - Boots - Outer (chemical-protective heavy rubber throw aways).
   - Boots - Inner (chemical-protective, steel toe and shank).
   - 2-way radio communications.
   - Safety glasses required with half-face respirator.

2. Criteria for Use

   A. Site known to contain potentially hazardous materials exceeding:

      1. Air concentrations requiring a protection factor no greater than that afforded by a full-face mask.

      2. Harmful levels to unprotected body areas (face, neck, etc.).

   B. Well-documented, reliable history of site and patterns of prior entry.

   C. No evidence to suspect acute or chronic toxicity to exposed personnel.

   D. Continuous air or personnel monitoring should occur while wearing Level C protection.

LEVEL D

1. Person Protective Equipment

   - Chemical resistant aprons.
   - Boots/Shoes - Safety or chemical-resistant steel toed boots.
   - Boots - Outer (chemical-protective heavy rubber throw-away).
   - Half-face respirators immediately available.
   - Safety glasses or safety goggles.
   - Gloves

2. Criteria for Use

   a. No indication of airborne health hazards present.

   b. No gross indications above background on the photoionizer and/or organic vapor analyzer.

   c. Continuous air or personnel monitoring should occur while wearing Level D protection.

APPENDIX B

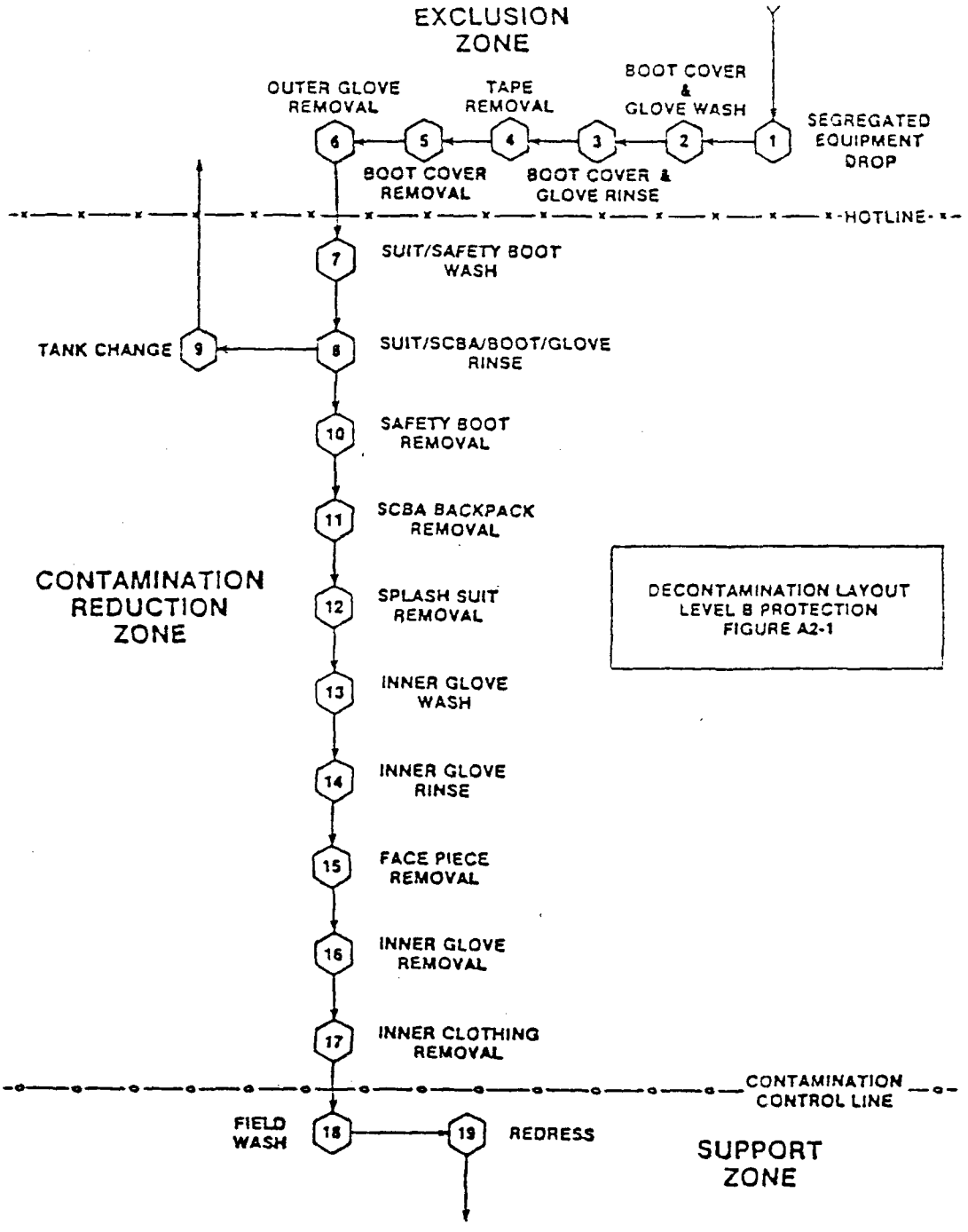
DECONTAMINATION PROCEDURES

Depending upon activities and location on site it may be necessary for personnel to decontaminate prior to leaving the contaminated zone. Procedures described below are typical for Level C operations.

Upon exiting downrange (contaminated) areas all personnel are required to decontaminate by means of the following procedure.

1. Place equipment in the Drop Zone at the Hotline.
2. Enter the Decontamination Station.
   - Boot Wash: Walk through wash tub and scrub boots, then rinse boots in second tube.
   - Glove Wash: In two pan wash, scrub over gloves, rinse, set out to dry.
2. Remove tyvek - if leaving the contamination reduction zone (CRZ) and proceed to clean zones.
3. Dispose of heavily contaminated clothing and under gloves.
4. Remove respirator.
5. Use disposable gloves to clean equipment.
6. Use a two bucket (wash/rinse) to decon respirators at the end of the working day or if they become heavily contaminated.

The procedures for a typical Level B Decontamination are outlined on the following page.



DECONTAMINATION LAYOUT
LEVEL B PROTECTION
FIGURE A2-1

APPENDIX C

PERSONNEL AND RESPONSIBILITIES

Project Manager (PM)

Overall responsibility for all Project activites: budget, schedule, investigative operations, safety, personnel.

On Site Coordinator (OSC)

Responsibility for activities at the site. Primary responsibilities include:

1) Interfacing with the client, state, EPA, media or other groups.

2) Reviewing technical operations.

3) Reviewing site safety, in particular information supplied by the Site Safety Officer.

4) Enforcing site safety and compliance with the Safety Plan.

5) Directing Emergency Contingency operations.

Safety Officer (SO)

Responsibility for directing the safety of operations and implementing the Safety Plan. Specific responsibilities include:

1. Assuring that appropriate personnel protective equipment is available and properly utilized by all site personnel.

2. Assuring that personnel are aware of the provisions of this plan, are instructed in the work practices necessary to ensure safety, and in planned procedures for dealing with emergencies.

3. Assuring that personnel are aware of the potential hazards associated with site operations.

4. Supervising the monitoring of safety performance by all personnel to ensure that required work practices are employed.

APPENDIX D

PERSONNEL CASUALTY

Personnel casualty would most likely result from either chemical contamination, heat-related problems, physical injury from accidents (i.e. falling, lacerations, etc.) in performing the work, or a combination of one or more of the above. The appropriate action depends on the type of injury involved, with the priority being to assist the casualty as soon as possible without endangering other personnel.

Physical and heat-related injuries can and should be treated immediately with appropriate first-aid measures and follow-up medical attention if necessary. The injured worker(s) shall immediately move out of the hot zone or, if necessary, be moved out by fellow workers as soon as possible. The OSC and Safety Officer shall be notified immediately and shall recommend further measures as needed.

Chemical-related injuries require a much more cautious approach so as to keep casualties to a minimum. If a worker injured by chemical exposure is able he shall notify the nearest co-worker and leave the hot zone immediately. The co-worker shall ensure that the OSC and Safety Officer are immediately informed and shall accompany the casualty from the hot zone to the decontamination zone. The OSC and Safety Officer shall determine the appropriate measure.

APPENDIX E

GUIDELINES FOR SITE OPERATIONS

In order to deal with the potential dangers of exposure and contamination of a hazardous waste site, three zones are delineated according to the degree of hazard. The three zones are: 1) Downrange or Contamination Zone 2) Contamination Reduction Zone (CRZ) 3) Support or Clean Zone.

Downrange or Contamination Zone

The Contamination Zone is the active work area of the site which encompasses the areas where there is a potential for exposure and in which investigative activities will occur (drilling, sampling, etc.). Within the Contamination Zone the designated "level of hazard" will be established, necessitating the utilization of personnel protective equipment.

Hot spots are those areas Downrange where observations, instrument readings or specific activities indicate a high probability of exposure or contamination and may require an upgrade in the LPP in the vicinity of the Hot Spot.

Contamination Reduction Zone

The CRZ is an area between the Downrange and Support Zones where decontamination of equipment and personnel occurs.

Personnel entering the CRZ shall wear protective clothing and carry the respiratory protection required for entry within the Contamination Zone.

Personnel working within the CRZ shall remain cognizant of the CRZ in order to be prepared for any need to increase their level of protection within the CRZ.

A decontamination station will be located at the outer perimeter of the CRZ. All personnel who have been within the Hot Line shall pass through a decontamination procedure prior to re-entering the Support Zone.

Support or Clean Zone

The Support Zone is the outer area and may be considered to be clear of contamination potential. The command post will be located within the Support Zone.

a) The Command Post will serve as the OSC's headquarters and will be equipped with:

    1. Communications

    2. Safety Plans

    3. First Aid Supplies

    4. Analytical Equipment

    5. Safety Equipment.

APPENDIX B

WORK PLAN

WORK PLAN
FOR
TROY MILLS LANDFILL
TROY, NEW HAMPSHIRE

DRUM EXCAVATION AND SAMPLING

Prepared by

NORMANDEAU ASSOCIATES, INC.
25 Nashua Road
Bedford, New Hampshire 03102

R-457

November 1983

WORK PLAN
FOR
TROY MILLS LANDFILL
TROY, NEW HAMPSHIRE

DRUM EXCAVATION AND SAMPLING

DATE November 16-18, 1983

PURPOSE

To determine the condition of drums (i.e. empty or full, crushed, rusted, leaking etc.) buried in the Troy Mills Landfill. To obtain representative samples toward identifying the types of materials buried in the landfill. This information will be used in the determination of the level of remedial action needed at the site.

METHOD

Using the results of the magnetometer survey, the (10) points have been randomly chosen, across the area where the buried drums are expected to be found. Each point is central to an Excavation Location -- an area four (4) to six (6) feet in diameter which will be excavated in order to characterize the condition of the drums and to obtain waste samples.

Preliminary observations have indicated that many of the drums may be buried within 1-2 feet of the surface. Therefore, the investigation will proceed in two phases.

Phase 1 -- Hand Excavation: By digging several small holes in each Location, personnel will determine if drums are located within about one to two feet of the surface. If drums are encountered, the

excavation will proceed by hand, uncovering the drums for evaluation and sampling. Where drums are not encountered near the surface, excavation at this location will be postponed until Phase 2.

Phase 2 -- Hand/Backhoe Excavation: After all Locations have been attempted during Phase 1, those Locations in which drums were not encountered will be further excavated using a combination of hand/backhoe digging.

It is expected that one to two days will be necessary to complete each phase. Depending upon the results of Phase 1, it may not be necessary to implement Phase 2.

Spare drums will be on hand for containerizing any significant spillage resulting from sampling efforts. Excavation locations will be identified with marked stakes and the holes will be backfilled at the conclusion of the investigation.

SPECIFICS

Excavation Locations ("Holes")

- Number of proposed excavations is ten (10).
- Locations of excavations are presented in Appendix A.
- Hole Size -- It is expected that a hole from four (4) feet to six (6) feet in diameter at the bottom (depth at which drums are encountered), will be sufficient to characterize the drums at each Location. Deeper excavations will require increasingly large "top" diameters.
- Hole Depth -- Holes will be excavated to a maximum depth of six (6) feet. Due to the sandy cover material the excavation of deeper holes is probably impractical from both safety and efficiency stand points.

If, after attempting excavation at each of the 10 proposed Locations, drums are not encountered within six (6) feet of the surface,

in enough locations to characterize the site, excavations may be attempted to depths greater than six (6) feet if soil stability permits or a new set of sampling locations may be chosen.

(Excavations to depths greater than six (6) feet require a significant increase in work. The sides of the hole must be graded back to less than 45° in order to insure the safety of investigatory/sampling personnel. It may also be necessary to employ bracing, bulkheads, etc. for trench support.)

Excavation Identification

Proposed excavation Locations have been consecutively numbered from 1 to 10, beginning at the east end of the landfill. They will be marked with numbered stakes.

Excavation Methods

Phase 1 -- Within each Location personnel will dig a number of small holes - about one (1) foot in depth - to probe for drums. If drums are encountered, they will continue to excavate until the drums are sufficiently uncovered for characterization.

Phase 2 -- After hand probing the Location with small holes, the backhoe will remove cover material to the one (1) foot depth. The Location will then be probed to a two (2) foot depth, before removing further material. Excavation will proceed alternating hand/probing and backhoe excavation until drums are encountered or the maximum six (6) foot depth is reached.

If excavations to depths greater than six (6) feet are undertaken, they will proceed using the above method.

Samples

- Due to the effort involved in excavating, and because concentrated waste samples are not expected to undergo rapid degredation, it is considered expedient to obtain all, readily available samples (exclusive of closed drum samples -- see below). These can then be submitted for laboratory characterization as determined by need and budget restrictions.

- An attempt will be made to secure at least one sample from each excavation in order to help characterize the distribution of waste materials across the site. An attempt will also be made to secure samples of observably different materials.

- Sample Types and Mediums - Solid, liquid and sludge samples are possible. Samples will be obtained from, in order of preference -- 1) leakage, uncontainerized waste or contaminated soil, 2) waste contained in open containers - drum already has a hole or no top or other access point, 3) sealed containers.

- The opening of closed containers will be considered if it is decided that it has not been possible to obtain a sufficient number of representative samples from the other mediums.

- Each sample will consist of two (2) 8-oz jars, (with teflon lids) filled about 2/3 full. One jar will be for organic analysis and the other for inorganic analysis.

- Sample Identification - Samples will be identified with a number corresponding to the Excavation Location and a letter. Example: if three samples were obtained from Location 2 they would be samples 2A, 2B, and 2C and Samples 2Ad, 2Bd, and 2Cd for duplicates.

- Sampling Methods and Volumes - 11 mm hollow glass tubing, trowels, disposable scoops will be available to obtain samples. Samples tools will be disposed of or decontaminated between each sample.

- Drum Samples - If necessary an attempt will be made to obtain samples from sealed drums. Only sound, non-rusted drums will be considered. Bungs must be in suitable condition so that the drum can be opened without causing damage and can be resealed to prevent leakage.

There will be no staging or movement of drums in order to facilitate sampling. Only drums with accessible bungs will be considered for sampling.

Procedure for Drum Sampling

1) Excavate around top of drum.

2) Monitor air in the adjacent area.

3) Check for shock sensitive - Loop rope around top of drum, stand at a distance, give drum several hard jogs by pulling on the rope. An alternative method is to lightly jog the drum with the backhoe bucket.

4) If the drum is not upright, place a catch basin under the bung.

5) Open drum with bung wrench.

6) Monitor the air at/in bung.

7) Sample drum -- liquids: insert glass tube the full length, into the drum, in order to obtain a "column" of the materials in the drum. Solids: use scoop to dig out material through the bung or use a sampling trowel.

8) Reseal the drum.

Spill Control

The possibility exists during the sampling and excavation for a drum to be ruptured or otherwise have spillage. Clean drums will be on hand to receive significant spillage, resulting from sampling or excavation. They will not be used for clean up of widespread uncontainerized waste or existing leakage.

Personnel

The work team will require four (4) persons (exclusive of the backhoe operator). The downrange team will consist of three (3) persons -- two (2) for digging and sampling and one (1) for logging, air moni-

toring, and photographing. One (1) person will be at the hotline in support -- as safety backup person, to fill air bottles, to decontaminate samples, to assist in decontamination of personnel.

Documentation, Logging

The following information will be recorded at each location: number of drums uncovered and the condition (crushed, empty, rusted, sealed, etc.) of each drum, evidence of spillage or contaminated soil, labels on uncovered drums, samples (time, drum I.D., type, description), periodic air monitoring information, depth at which specific events occur or drums are buried, soil condition, presence of ground water.

In addition, photographs will be taken of specific events or items of importance during each excavation and of each sampling incident. The time, description of subject, photographer, excavation location and photo number will be logged for each photograph.

Analytical Laboratories and Schedule

- RAI, Hampton, NH
- Initial schedule:

  Ten samples for GC/ms for organic priority pollutants. Samples may also be submitted for inorganic anlaysis or volatile organic analysis, depending upon waste materials observed during the excavation.

APPENDIX A

TABLE A-1. EXCAVATION LOCATIONS

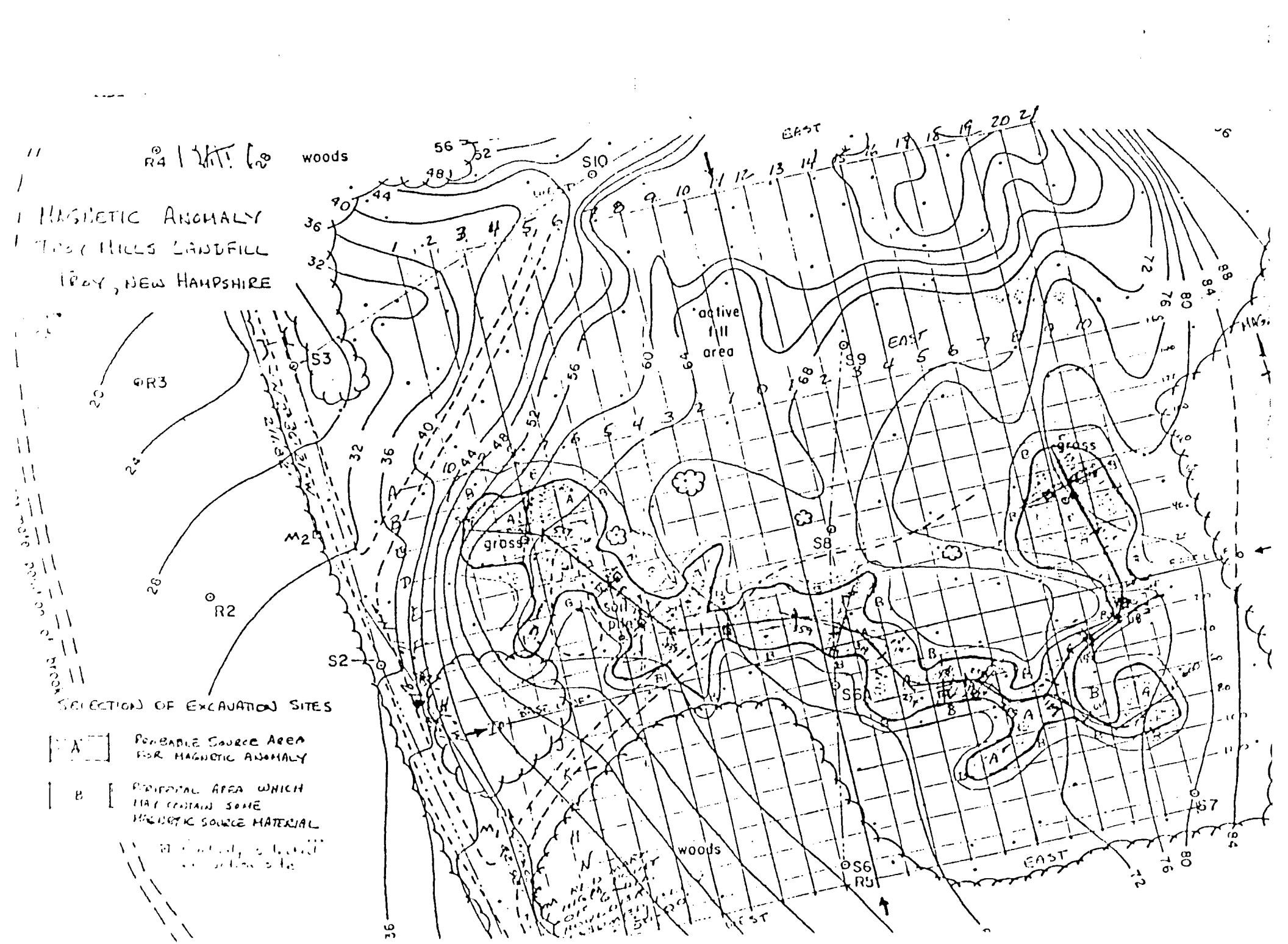
EXCAVATION NUMBER	GRID COORD	BASELINE SEGMENT	RANDOM STATION	RANDOM OFFSET
1	7E+15,65N	0- 60	26 (26)	16
2	9E+5, 13S	60-120	50 (110)	9
3	8E+0, 31S	120-180	20 (140)	7
4	4E+5, 48S	180-240	50 (230)	26
5	3E+8, 45S	240-300	14 (254)	20
6	0E+6, 5S	300-360	34 (394)	50
7	2W+15,24N	360-420	45 (465)	14
8	5W+6, 42N	420-480	38 (518)	20
9	6W+14,74N	480-540	8 (548)	7
10	8W+5,110N	540-600	11 (611)	31

Locations are plotted on Map A-1.

Method of Choice: A stratified, random sampling method was used to choose 10 Excavation Locations within the magnetic anomaly.

The axis of the magnetic anomaly was used as a base line, and divided into ten, 60 foot long segments. Using a random numbers table, a distance along each segment was chosen (Random Station) and a line drawn at that point, perpendicular to the base line. Again, using a random numbers table, a distance was located along each perpendicular line, by measuring inward from the line denoting the edge of Area A (Random Offset). The Grid Coordinates for each of the Excavation Locations, were graphically determined from the grid overlay (this overlay has been surveyed and intersections field located).

It was judged that 10 excavation locations within the magnetic zone and two outside of the zone, would be sufficient to characterize the area, would produce statistically valid data, and could be expected to be completed within 2-3 days work period.



Proposed excavation locations.

APPENDIX C

MAGNETIC INVESTIGATION
TROY MILLS, INC. LANDFILL SITE
TROY, NEW HAMPSHIRE

For

NORMANDEAU ASSOCIATES, INC.
25 Nashua Road
Bedford, New Hampshire 03102

By

JOHN F. KICK, Ph.D.
GEOPHYSICIST
Box 6
Dunstable, Massachusetts 01827
(617) 649-6650

November 1983

MAGNETIC INVESTIGATION
TROY MILLS, INC. LANDFILL SITE
TROY, NEW HAMPSHIRE

INTRODUCTION

A high resolution magnetic investigation was completed on the Troy Mills, Inc. landfill site in Troy, New Hampshire by John F. Kick, Consulting Geophysicist. The purpose of the investigation was to delineate the extent of buried steel drums under closed portions of the Troy Mills landfill. The information is needed as a part of a study of the landfill that is being conducted by Normandeau Associates, Inc.

FIELDWORK

Magnetometer measurements of total field intensity were made over an area that was reported to contain buried steel drums and adjacent landfilled areas that contained unknown waste materials. The area of investigation included capped and grassed closed areas along the south margin of the landfill site and adjacent areas. The fieldwork was performed during October of 1983.

Eighteen parallel rows of measurements were conducted along north-south lines (using magnetic compass directions). A spacing of 20-feet was used between rows and magnetometer measurements were made at 10-foot intervals along the rows. Greater intervals between measurements were used at the ends of the rows and in periferal areas with low magnetic

field gradients.

A series of magnetic field measurements were made at an adjacent base station throughout the survey to form the basis for a daily variation curve. The base station was located at a site with typical low-gradient "background" magnetic field intensity measurements.

MAGNETIC SEARCH METHOD

Theory. Magnetic search methods involve the detection and measurement of anomalies in the Earth's magnetic field caused by the presence of materials with contrasting magnetic susceptibility. Iron and steel objects generally have very high magnetic susceptibility contrasts with usual surrounding materials, and therefore produce magnetic anomalies. The amplitude, shape and detectable distance of the anomaly depend mostly on the particular susceptibility contrast and size of the object. Magnetic anomalies are measured in units called gammas. The "normal" magnetic field in this area is over 50,000 gammas. A 5-inch screwdriver will produce an anomaly of 5 to 10 gammas at a depth of 5 feet and an anomaly of 1 gamma at a depth of 10 feet. A 1 ton automobile will produce an anomaly of 40 gammas at a depth of 30 feet and an anomaly of 1 gamma at a depth of 100 feet. The magnitude of an anomaly caused by a single steel drum will vary with its condition (new, heavily rusted, etc.). Tests using a single light weight (somewhat rusted) drum on the surface with the magnetic detector at a height of of 12 feet produced an anomaly in the range of 40 to 50 gammas.

Total magnetic intensity disturbances or anomalies are almost always asymmetrical, sometimes appear complex even from simple sources, and usually exhibit the combined magnetic effects of several sources which can produce a given anomaly. The apparent complexity of such anomalies is a result of several relatively simple functions of magnetic dipole

behavior. Reasonable assumptions about the geology and buried source combined with an understanding of magnetic dipole behavior can usually lead to a satisfactory qualitative interpretation. More detailed interpretations may require modeling studies.

Instrumentation. Field equipment on this project included a EG&G Geometrics Memory-Mag G-856 proton precession magnetometer. The instrument has a resolution of ±0.1 gamma. The magnetic field detector is separate from the rest of the instrument and is mounted on an 8-foot staff to provide measurements that are a constant height above land surface.

Magnetic Data Analysis. For the purposes of data reduction and anomaly delineation, it was assumed that base station total field intensity measurements were typical "background" values for the site. Measurements made at frequent intervals at the base station were used to prepare a diurnal variation curve for the site. Anomaly values were obtained by subtracting background values from the base station curve from measurements collected in the area of investigation.

RESULTS

The reduced results are presented in the form of a magnetic anomaly contour map (Figure 1) and two profiles across the area of investigation (Figures 2 and 3). The map and profiles show that very steep magnetic field gradients and large departures form background occur in an irregular shaped band that is about 460 feet long and ranges from about 30 to about 200 feet in width. The magnitude of the anomaly is such that a significant deposit of ferromagnetic materials (such as steel drums) is indicated.

In using the plotted magnetic results it should be noted that the greatest concentrations of ferromagnetic materials probably do not

directly underlie the peak magnetic anomalies. A shift is caused by the inclination of the Earth's magnetic field and by the dipolar nature of ferromagnetic deposits. The inclination of the Earth's field is about 76-degrees northward in the vicinity of Troy. The dipolar effect is induced by the Earth's field and results in negative anomalies immediately north of large positive anomalies.

Magnetic Anomaly Map. The magnetic anomaly map (Figure 1) indicates 10 positive peaks of varying size, shape and intensity. Associated negative anomalies of a broader and less intense nature lie immediately north of the belt of positive anomalies. The configuration of the anomalous area is indicative of lense-shaped and cigar-shaped bodies of ferromagnetic materials. Steep-sloped anomalies are indicative of very shallow source materials. The thickness of the ferromagnetic deposit cannot be easily determined on the basis of intensity and size of anomalous peaks because a small mass of iron or steel at the surface can duplicate the anomaly caused by a much larger mass at depth. The ferromagnetic source materials can generally be expected to lie north of the positive peak of anomalies and south of the adjacent negative anomaly. Modeling can provide the best approximations of the depth and density of the ferromagnetic source materials. The outer boundaries of the source materials can be expected to overlap the positive peak and negative anomaly somewhat, depending on the depth and configuration of the deposit.

For illustration purposes two north-south rows that were profiled are discussed below.

Magnetic Anomaly Along Row 9-East. Two strong positive magnetic anomalies (3645 and 2436 gammas) and adjacent negative anomalies were profiled along Row 9-East (Figure 2). The approximate centers of the ferromagnetic deposits are believed to underlie stations 50 north and 75 feet south of the base line. The rounded shape of the north positive

anomaly may indicate somewhat deeper burial of the ferromagnetic deposit.

Magnetic Anomaly Along Row 7-West. Figure 3 shows the most intense positive magnetic anomaly (4470 gammas) that was detected on this project. The steepeness of the slopes is indicative of very shallow source materials. An uneven burial pattern is suggested by the two-peaked positive anomaly. The negative anomaly south of the two peaks is unusual and may be related to another positive anomaly to the southeast (along Rows 5 and 6, 20 feet north of the base line). The centers of the sources of the positive anomalies are probably approximately 80 and 120 feet north of the base line along Row 7-West.

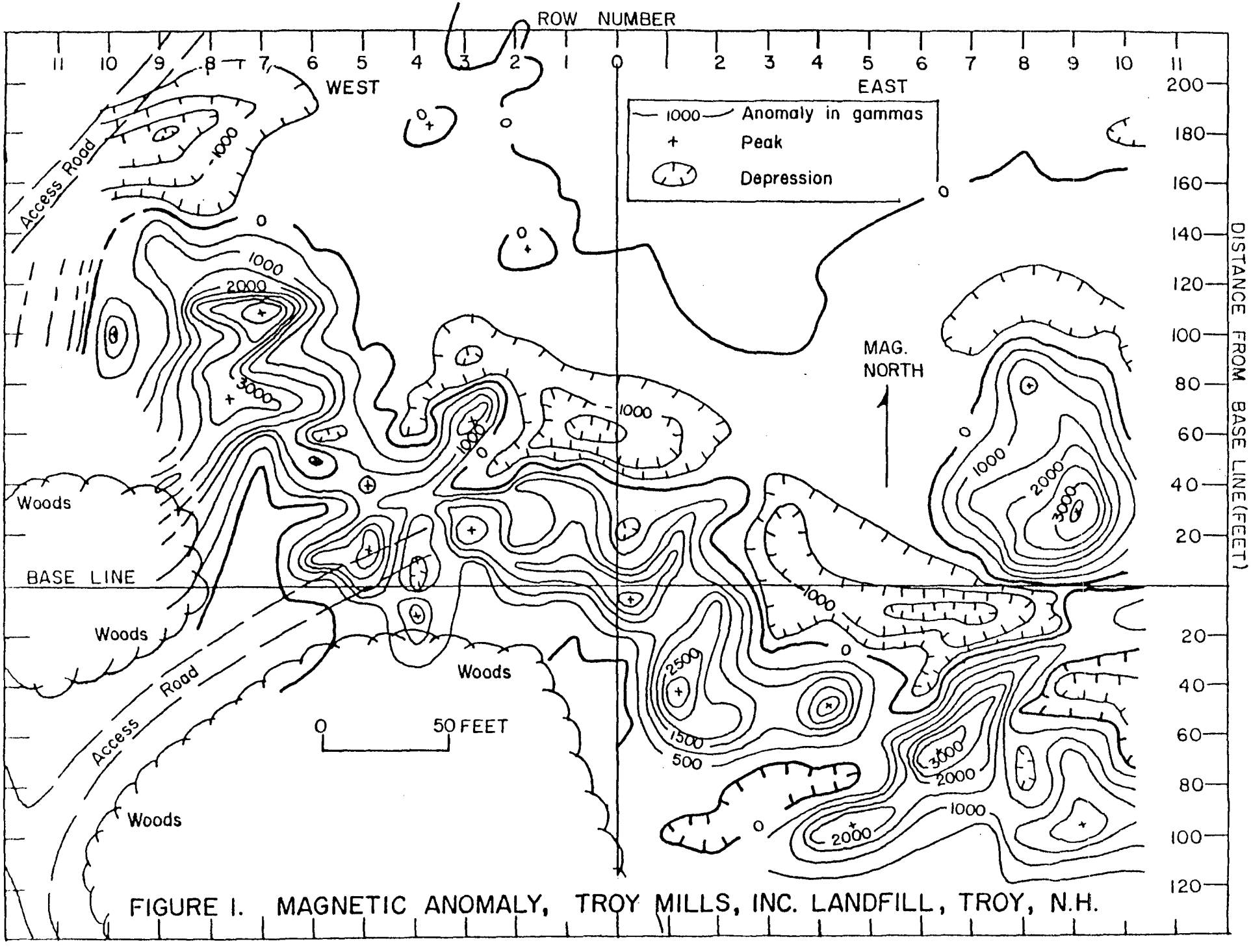


FIGURE I. MAGNETIC ANOMALY, TROY MILLS, INC. LANDFILL, TROY, N.H.

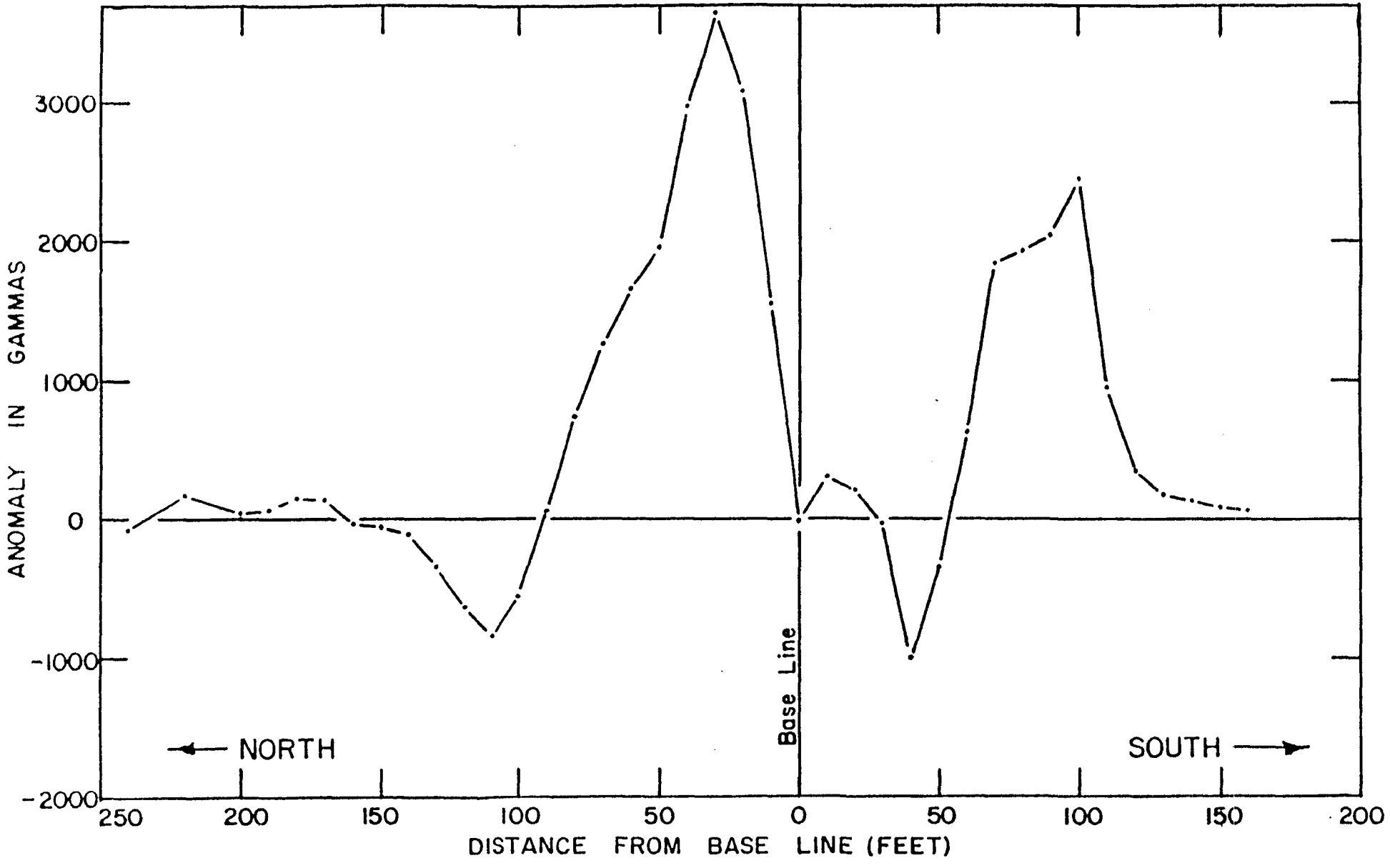


FIGURE 2. MAGNETIC ANOMALY ALONG ROW 9-EAST, TROY MILLS, INC LANDFILL, TROY, N.H.

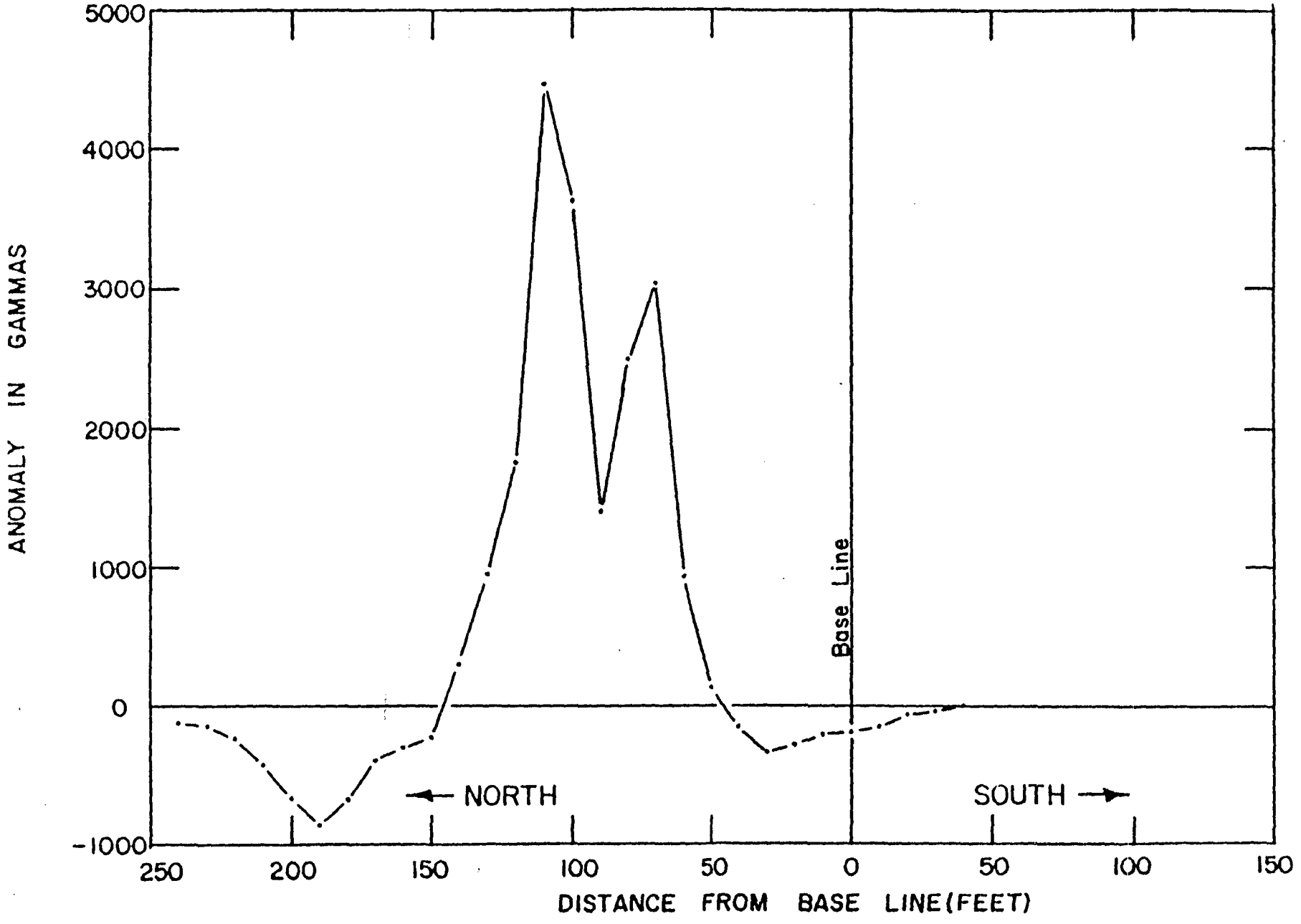


FIGURE 3. MAGNETIC ANOMALY ALONG ROW 7-WEST, TROY MILLS, IN LANDFILL TROY, N.H.

APPENDIX D

LABORATORY ANALYSES

RAI

Resource Analysts, Incorporated
Box 4778 Hampton, NH 03842
(603) 926-7777

TO:

Mr. Doug DeNatale
Normandeau Associates
25 Nashua Road
Bedford, NH 03102

PO # 830318

Date Received: 12-2-83

Lab Number: 2887

Date Reported: 1-3-84

IDENTIFICATION

PARAMETER	SAMPLE DESIGNATION

Volatile Organics Analyses by EPA Method 624.

Acid and Base/Neutral Extractable Compounds Analyzed by EPA Method 625.

Metals Analyzed by Standard Methods 303A.

Please see attachments for all results.

Results expressed in mg/L unless otherwise designated < = Less Than

Clarke/Foster/Van Kouwenberg
ANALYST

DIRECTOR

METHODS: "Standard Methods for the Examination of Water and Wastewater" 15th Edition or other EPA approved methodologies unless otherwise designated.

Lab ID No. 2887-10

Physical description of sample:

Client ID 1A:64223

Liquid/Sludge

Sample workup:

Volitile fraction Methanol Extraction (SW 846-5030)

Semivolatile fraction Sonication Extraction (SW 846-3540)

Inorganic fraction Acid Digestion (SW 846-3050)

ACID COMPOUNDS

PP #	CAS #		
(21A)	88-06-2	2,4,6- trichlorophenol	
(22A)	59-50-7	p-chloro-m-cresol	
(24A)	95-57-8	2- chlorophenol	
(31A)	120-83-2	2,4-dichlorophenol	
(34A)	105-67-9	2,4-dimethylphenol	
(37A)	88-75-5	2- nitrophenol	
(38A)	100-02-7	4-nitrophenol	
(39A)	51-28-5	2,4-dinitrophenol	
(60A)	534-52-1	4,6-dinitro-2-methylphenol	
(64A)	87-86-5	pentachlorophenol	
(65A)	108-95-2	phenol	

BASE/NEUTRAL COMPOUNDS

(1B)	83-32-9	acenaphthene	
(3B)	92-87-5	benzidine	
(8B)	120-82-1	1,2,4-trichlorobenzene	
(9B)	118-74-1	hexachlorobenzene	
(12B)	67-72-1	hexachloroethane	
(18B)	111-44-4	bis(2-chloroethyl)ether	
(20B)	91-58-7	2-chloronaphthalene	
(25B)	95-50-1	1,2-dichlorobenzene	
(26B)	541-73-1	1,3-dichlorobenzene	
(27B)	106-46-7	1,4-dichlorobenzene	
(28B)	91-94-1	3,3'-dichlorobenzidine	
(35B)	121-14-2	2,4-dinitrotoluene	
(36B)	606-20-2	2,6-dinitrotoluene	
(37B)	122-66-7	1,2-diphenylhydrazine	
(39B)	206-44-0	fluoranthene	
(40B)	7005-72-3	4-chlorophenyl phenyl ether	
(41B)	101-55-3	4-bromophenyl phenyl ether	
(42B)	39638-32-9	bis (2-chloroisopropyl) ether	
(43B)	111-91-1	bis (2-chloroethoxy) methane	
(52B)	87-68-3	hexachlorobutadiene	
(53B)	77-47-4	hexachlorocyclopentadiene	
(54B)	78-59-1	isophorone	
(55B)	91-20-3	naphthalene	
(56B)	98-95-3	nitrobenzene	
(62B)	86-30-6	N-nitrosodiphenylamine	
(63B)	621-64-7	N-nitrosodipropylamine	
(66B)	117-81-7	bis (2-ethylhexyl) phthalate	8200
(67B)	85-68-7	benzyl butyl phthalate	
(68B)	84-74-2	di-n-butyl phthalate	
(69B)	117-84-0	di-n-octyl phthalate	
(70B)	84-66-2	diethyl phthalate	
(71B)	131-11-3	dimethyl phthalate	
(72B)	56-55-3	benzo(a)anthracene	

BASE/NEUTRAL COMPOUNDS

PP #	CAS #		
(73B)	50-32-8	benzo(a)pyrene	
(74B)	205-99-2	benzo(b)fluoranthene	
(75B)	207-08-9	benzo(k)fluoranthene	
(76B)	218-01-9	chrysene	
(77B)	208-96-8	acenaphthylene	
(78B)	120-12-7	anthracene	
(79B)	191-24-2	benzo(ghi)perylene	
(80B)	86-73-7	fluorene	
(81B)	85-01-8	phenanthrene	
(82B)	53-70-3	dibenzo(a,h)anthracene	
(83B)	193-39-5	indeno(1,2,3-cd)pyrene	
(84B)	129-00-0	pyrene	

VOLATILES

(2V)	107-02-8	acrolein	
(3V)	107-13-1	acrylonitrile	
(4V)	71-43-2	benzene	
(6V)	56-23-5	carbon tetrachloride	
(7V)	108-90-7	chlorobenzene	
(10V)	107-06-2	1,2-dichloroethane	
(11V)	71-55-6	1,1,1-trichloroethane	
(13V)	75-34-3	1,1-dichloroethane	
(14V)	79-00-5	1,1,2-trichloroethane	
(15V)	79-34-5	1,1,2,2-tetrachloroethane	
(16V)	75-00-3	chloroethane	
(19V)	110-75-8	2-chloroethylvinyl ether	
(23V)	67-66-3	chloroform	
(29V)	75-35-4	1,1-dichloroethene	
(30V)	156-60-5	trans-1,2-dichloroethene	
(32V)	78-87-5	1,2-dichloropropane	
(33V)	10061-02-6	trans-1,3-dichloropropene	
	10061-01-05	cis-1,3-dichloropropene	
(38V)	100-41-4	ethylbenzene	
(44V)	75-09-2	methylene chloride	
(45V)	74-87-3	chloromethane	
(46V)	74-83-9	bromomethane	
(47V)	75-25-2	bromoform	
(48V)	75-27-4	bromodichloromethane	
(49V)	75-69-4	fluorotrichloromethane	
(50V)	75-71-8	dichlorodifluoromethane	
(51V)	124-48-1	chlorodibromomethane	
(85V)	127-18-4	tetrachloroethene	
(86V)	108-88-3	toluene	12,000
(87V)	79-01-6	trichloroethene	
(88V)	75-01-4	vinyl chloride	

Cadmium 0.30 Chromium 2.0 ZINC ~~130~~

All results are expressed as ug/g weight as received. No entry denotes " not

Lab ID No. 2887-1

Physical description of sample: Client ID 1B:57468

Soil/Sludge

Sample workup:

Volitile fraction PEG Extraction (SW 846-5030)

Semivolatile fraction Soxhlet Extraction (SW846-3540)

Inorganic fraction Acid Digestion (SW 846-3050)

ACID COMPOUNDS

PP #	CAS #		
(21A)	88-06-2	2,4,6- trichlorophenol	
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(34A)	105-67-9	2,4-dimethylphenol	
(57A)	88-75-5	2- nitrophenol	
(58A)	100-02-7	4-nitrophenol	
(59A)	51-28-5	2,4-dinitrophenol	
(60A)	534-52-1	4,6-dinitro-2-methylphenol	
(64A)	87-86-5	pentachlorophenol	
(65A)	108-95-2	phenol	

BASE/NEUTRAL COMPOUNDS

(1B)	83-32-9	acenaphthene	
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(9B)	118-74-1	hexachlorobenzene	
(12B)	67-72-1	hexachloroethane	
(18B)	111-44-4	bis(2-chloroethyl)ether	
(20B)	91-58-7	2-chloronaphthalene	
(25B)	95-50-1	1,2-dichlorobenzene	
(26B)	541-73-1	1,3-dichlorobenzene	
(27B)	106-46-7	1,4-dichlorobenzene	
(28B)	91-94-1	3,3'-dichlorobenzidine	
(35B)	121-14-2	2,4-dinitrotoluene	
(36B)	606-20-2	2,6-dinitrotoluene	
(37B)	122-66-7	1,2-diphenylhydrazine	
(39B)	206-44-0	fluoranthene	
(40B)	7005-72-3	4-chlorophenyl phenyl ether	
(41B)	101-55-3	4-bromophenyl phenyl ether	
(42B)	39638-32-9	bis (2-chloroisopropyl) ether	
(43B)	111-91-1	bis (2-chloroethoxy) methane	
(52B)	87-68-3	hexachlorobutadiene	
(53B)	77-47-4	hexachlorocyclopentadiene	
(54B)	78-59-1	isophorone	
(55B)	91-20-3	naphthalene	
(56B)	98-95-3	nitrobenzene	
(62B)	86-30-6	N-nitrosodiphenylamine	
(63B)	621-64-7	N-nitrosodipropylamine	
(66B)	117-81-7	bis (2-ethylhexyl) phthalate	32,000
(67B)	85-68-7	benzyl butyl phthalate	200
(68B)	84-74-2	di-n-butyl phthalate	
(69B)	117-84-0	di-n-octyl phthalate	200
(70B)	84-66-2	diethyl phthalate	
(71B)	131-11-3	dimethyl phthalate	
(72B)	56-55-3	benzo(a)anthracene	

BASE/NEUTRAL COMPOUNDS

PP #	CAS #		
(73B)	50-32-8	benzo(a)pyrene	
(74B)	205-99-2	benzo(b)fluoranthene	
(75B)	207-08-9	benzo(k)fluoranthene	
(76B)	218-01-9	chrysene	
(77B)	208-96-8	acenaphthylene	
(78B)	120-12-7	anthracene	
(79B)	191-24-2	benzo(ghi)perylene	
(80B)	86-73-7	fluorene	
(81B)	85-01-8	phenanthrene	
(82B)	53-70-3	dibenzo(a,h)anthracene	
(83B)	193-39-5	indeno(1,2,3-cd)pyrene	
(84B)	129-00-0	pyrene	

VOLATILES

(2V)	107-02-8	acrolein	
(3V)	107-13-1	acrylonitrile	
(4V)	71-43-2	benzene	
(6V)	56-23-5	carbon tetrachloride	
(7V)	108-90-7	chlorobenzene	
(10V)	107-06-2	1,2-dichloroethane	
(11V)	71-55-6	1,1,1-trichloroethane	Trace
(13V)	75-34-3	1,1-dichloroethane	
(14V)	79-00-5	1,1,2-trichloroethane	
(15V)	79-34-5	1,1,2,2-tetrachloroethane	
(16V)	75-00-3	chloroethane	
(19V)	110-75-8	2-chloroethylvinyl ether	
(23V)	67-66-3	chloroform	
(29V)	75-35-4	1,1-dichloroethene	
(30V)	156-60-5	trans-1,2-dichloroethene	
(32V)	78-87-5	1,2-dichloropropane	
(33V)	10061-02-6	trans-1,3-dichloropropene	
	10061-01-05	cis-1,3-dichloropropene	
(38V)	100-41-4	ethylbenzene	Tarce
(44V)	75-09-2	methylene chloride	Trace
(45V)	74-87-3	chloromethane	
(46V)	74-83-9	bromomethane	
(47V)	75-25-2	bromoform	
(48V)	75-27-4	bromodichloromethane	
(49V)	75-69-4	fluorotrichloromethane	
(50V)	75-71-8	dichlorodifluoromethane	
(51V)	124-48-1	chlorodibromomethane	
(85V)	127-18-4	tetrachloroethene	
(86V)	108-88-3	toluene	9
(87V)	79-01-6	trichloroethene	
(88V)	75-01-4	vinyl chloride	

Cadmium 0.22 Chromium 4.1 ZINC 130

All results are expressed as ug/g weight as received. No entry denotes "not detected

Lab ID No. 2887-4

Physical description of sample:

Client ID 4A:57620

Liquid

Sample was predominantly a hydrocarbon blend

Sample workup:

Volitile fraction PEG Extraction (SW 846-5030)

Semivolatile fraction Sonication Extraction (SW 846-3550)

Inorganic fraction Acid Digestion (SW 846-3050)

ACID COMPOUNDS

PP #	CAS #		
(21A)	88-06-2	2,4,6-trichlorophenol	
(22A)	59-50-7	p-chloro-m-cresol	
(24A)	95-57-8	2-chlorophenol	
(31A)	120-83-2	2,4-dichlorophenol	
(34A)	105-67-9	2,4-dimethylphenol	
(57A)	88-75-5	2-nitrophenol	
(58A)	100-02-7	4-nitrophenol	
(59A)	51-28-5	2,4-dinitrophenol	
(60A)	534-52-1	4,6-dinitro-2-methylphenol	
(64A)	87-86-5	pentachlorophenol	
(65A)	108-95-2	phenol	

BASE/NEUTRAL COMPOUNDS

(1B)	83-32-9	acenaphthene	
(5B)	92-87-5	benzidine	
(8B)	120-82-1	1,2,4-trichlorobenzene	
(9B)	118-74-1	hexachlorobenzene	
(12B)	67-72-1	hexachloroethane	
(18B)	111-44-4	bis(2-chloroethyl)ether	
(20B)	91-58-7	2-chloronaphthalene	
(25B)	95-50-1	1,2-dichlorobenzene	
(26B)	541-73-1	1,3-dichlorobenzene	
(27B)	106-46-7	1,4-dichlorobenzene	
(28B)	91-94-1	3,3'-dichlorobenzidine	
(35B)	121-14-2	2,4-dinitrotoluene	
(36B)	606-20-2	2,6-dinitrotoluene	
(37B)	122-66-7	1,2-diphenylhydrazine	
(39B)	206-44-0	fluoranthene	
(40B)	7005-72-3	4-chlorophenyl phenyl ether	
(41B)	101-55-3	4-bromophenyl phenyl ether	
(42B)	39638-32-9	bis (2-chloroisopropyl) ether	
(43B)	111-91-1	bis (2-chloroethoxy) methane	
(52B)	87-68-3	hexachlorobutadiene	
(53B)	77-47-4	hexachlorocyclopentadiene	
(54B)	78-59-1	isophorone	
(55B)	91-20-3	naphthalene	1200
(56B)	98-95-3	nitrobenzene	
(62B)	86-30-6	N-nitrosodiphenylamine	
(63B)	621-64-7	N-nitrosodipropylamine	
(66B)	117-81-7	bis (2-ethylhexyl) phthalate	110,000
(67B)	85-68-7	benzyl butyl phthalate	12,000
(68B)	84-74-2	di-n-butyl phthalate	
(69B)	117-84-0	di-n-octyl phthalate	6,200
(70B)	84-66-2	diethyl phthalate	
(71B)	131-11-3	dimethyl phthalate	
(72B)	56-55-3	benzo(a)anthracene	

BASE/NEUTRAL COMPOUNDS

PP #	CAS #		
(73B)	50-32-8	benzo(a)pyrene	
(74B)	205-99-2	benzo(b)fluoranthene	
(75B)	207-08-9	benzo(k)fluoranthene	
(76B)	218-01-9	chrysene	
(77B)	208-96-8	acenaphthylene	
(78B)	120-12-7	anthracene	
(79B)	191-24-2	benzo(ghi)perylene	
(80B)	86-73-7	fluorene	
(81B)	85-01-8	phenanthrene	
(82B)	53-70-3	dibenzo(a,h)anthracene	
(83B)	193-39-5	indeno(1,2,3-cd)pyrene	
(84B)	129-00-0	pyrene	

VOLATILES

(2V)	107-02-8	acrolein	
(3V)	107-13-1	acrylonitrile	
(4V)	71-43-2	benzene	
(6V)	56-23-5	carbon tetrachloride	
(7V)	108-90-7	chlorobenzene	
(10V)	107-06-2	1,2-dichloroethane	
(11V)	71-55-6	1,1,1-trichloroethane	
(13V)	75-34-3	1,1-dichloroethane	
(14V)	79-00-5	1,1,2-trichloroethane	
(15V)	79-34-5	1,1,2,2-tetrachloroethane	
(16V)	75-00-3	chloroethane	
(19V)	110-75-8	2-chloroethylvinyl ether	
(23V)	67-66-3	chloroform	
(29V)	75-35-4	1,1-dichloroethene	
(30V)	156-60-5	trans-1,2-dichloroethene	
(32V)	78-87-5	1,2-dichloropropane	
(33V)	10061-02-6	trans-1,3-dichloropropene	
	10061-01-05	cis-1,3-dichloropropene	
(38V)	100-41-4	ethylbenzene	1300
(44V)	75-09-2	methylene chloride	
(45V)	74-87-3	chloromethane	
(46V)	74-83-9	bromomethane	
(47V)	75-25-2	bromoform	
(48V)	75-27-4	bromodichloromethane	
(49V)	75-69-4	fluorotrichloromethane	
(50V)	75-71-8	dichlorodifluoromethane	
(51V)	124-48-1	chlorodibromomethane	
(85V)	127-18-4	tetrachloroethene	
(86V)	108-88-3	toluene	670
(87V)	79-01-6	trichloroethene	
(88V)	75-01-4	vinyl chloride	
		Xylenes	1800

Cadmium 2200 Chromium 2.5 ZINC 5700

All results are expressed as ug/g weight as received. No entry denotes "not detecte

Lab ID No. 2887-3

Client ID 5A:57709

Physical description of sample:

Liquid/Sludge

Liquid appeared to be a hydrocarbon blend

Sample workup:

Volitile fraction Methanol Extraction (SW 846-5030)

Semivolatile fraction Sonication Extraction (SW 846-3550)

Inorganic fraction Acid Digestion (SW 846-3050)

ACID COMPOUNDS

PP #	CAS #		
(21A)	88-06-2	2,4,6- trichlorophenol	
(22A)	59-50-7	p-chloro-m-cresol	
(24A)	95-57-8	2- chlorophenol	
(31A)	120-83-2	2,4-dichlorophenol	
(34A)	105-67-9	2,4-dimethylphenol	
(57A)	88-75-5	2- nitrophenol	
(58A)	100-02-7	4-nitrophenol	
(59A)	51-28-5	2,4-dinitrophenol	
(60A)	534-52-1	4,6-dinitro-2-methylphenol	
(64A)	87-86-5	pentachlorophenol	
(65A)	108-95-2	phenol	

BASE/NEUTRAL COMPOUNDS

(1B)	83-32-9	acenaphthene	
(5B)	92-87-5	benzidine	
(8B)	120-82-1	1,2,4-trichlorobenzene	
(9B)	118-74-1	hexachlorobenzene	
(12B)	67-72-1	hexachloroethane	
(18B)	111-44-4	bis(2-chloroethyl)ether	
(20B)	91-58-7	2-chloronaphthalene	
(25B)	95-50-1	1,2-dichlorobenzene	
(26B)	541-73-1	1,3-dichlorobenzene	
(27B)	106-46-7	1,4-dichlorobenzene	
(28B)	91-94-1	3,3'-dichlorobenzidine	
(35B)	121-14-2	2,4-dinitrotoluene	
(36B)	606-20-2	2,6-dinitrotoluene	
(37B)	122-66-7	1,2-diphenylhydrazine	
(39B)	206-44-0	fluoranthene	
(40B)	7005-72-3	4-chlorophenyl phenyl ether	
(41B)	101-55-3	4-bromophenyl phenyl ether	
(42B)	39638-32-9	bis (2-chloroisopropyl) ether	
(43B)	111-91-1	bis (2-chloroethoxy) methane	
(52B)	87-68-3	hexachlorobutadiene	
(53B)	77-47-4	hexachlorocyclopentadiene	
(54B)	78-59-1	isophorone	
(55B)	91-20-3	naphthalene	Trace
(56B)	98-95-3	nitrobenzene	
(62B)	86-30-6	N-nitrosodiphenylamine	
(63B)	621-64-7	N-nitrosodipropylamine	
(66B)	117-81-7	bis (2-ethylhexyl) phthalate	59000
(67B)	85-68-7	benzyl butyl phthalate	
(68B)	84-74-2	di-n-butyl phthalate	
(69B)	117-84-0	di-n-octyl phthalate	6000
(70B)	84-66-2	diethyl phthalate	
(71B)	131-11-3	dimethyl phthalate	
(72B)	56-55-3	benzo(a)anthracene	

BASE/NEUTRAL COMPOUNDS

PP #	CAS #		
(73B)	50-32-8	benzo(a)pyrene	
(74B)	205-99-2	benzo(b)fluoranthene	
(75B)	207-08-9	benzo(k)fluoranthene	
(76B)	218-01-9	chrysene	
(77B)	208-96-8	acenaphthylene	
(78B)	120-12-7	anthracene	
(79B)	191-24-2	benzo(ghi)perylene	
(80B)	86-73-7	fluorene	
(81B)	85-01-8	phenanthrene	
(82B)	53-70-3	dibenzo(a,h)anthracene	
(83B)	193-39-5	indeno(1,2,3-cd)pyrene	
(84B)	129-00-0	pyrene	

VOLATILES

(2V)	107-02-8	acrolein	
(3V)	107-13-1	acrylonitrile	
(4V)	71-43-2	benzene	100
(6V)	56-23-5	carbon tetrachloride	
(7V)	108-90-7	chlorobenzene	
(10V)	107-06-2	1,2-dichloroethane	
(11V)	71-55-6	1,1,1-trichloroethane	
(13V)	75-34-3	1,1-dichloroethane	
(14V)	79-00-5	1,1,2-trichloroethane	
(15V)	79-34-5	1,1,2,2-tetrachloroethane	
(16V)	75-00-3	chloroethane	
(19V)	110-75-8	2-chloroethylvinyl ether	
(23V)	67-66-3	chloroform	
(29V)	75-35-4	1,1-dichloroethene	
(30V)	156-60-5	trans-1,2-dichloroethene	
(32V)	78-87-5	1,2-dichloropropane	
(33V)	10061-02-6	trans-1,3-dichloropropene	
	10061-01-05	cis-1,3-dichloropropene	
(38V)	100-41-4	ethylbenzene	5300
(44V)	75-09-2	methylene chloride	
(45V)	74-87-3	chloromethane	
(46V)	74-83-9	bromomethane	
(47V)	75-25-2	bromoform	
(48V)	75-27-4	bromodichloromethane	
(49V)	75-69-4	fluorotrichloromethane	
(50V)	75-71-8	dichlorodifluoromethane	
(51V)	124-48-1	chlorodibromomethane	
(85V)	127-18-4	tetrachloroethene	
(86V)	108-88-3	toluene	5700
(87V)	79-01-6	trichloroethene	
(88V)	75-01-4	vinyl chloride	
		Xylenes	19000

Cadmium 7.1 Chromium 52 ZINC 21

All results are expressed as ug/g weight as received. No entry denotes "not

Lab ID No. 2887-5

Physical description of sample: Client ID 6B:57710

Liquid/Sludge

Sample workup:

Volitile fraction PEG Extraction (SW 846-5030)

Semivolatile fraction Sonication Extraction (SW 846-3550)

Inorganic fraction Acid Digestion (SW 846-3030)

ACID COMPOUNDS

PP #	CAS #		
(21A)	88-06-2	2,4,6-trichlorophenol	
(22A)	59-50-7	p-chloro-m-cresol	
(24A)	95-57-8	2-chlorophenol	
(31A)	120-83-2	2,4-dichlorophenol	
(34A)	105-67-9	2,4-dimethylphenol	
(37A)	88-75-5	2-nitrophenol	
(38A)	100-02-7	4-nitrophenol	
(39A)	51-28-5	2,4-dinitrophenol	
(60A)	534-52-1	4,6-dinitro-2-methylphenol	
(64A)	87-86-5	pentachlorophenol	
(65A)	108-95-2	phenol	

BASE/NEUTRAL COMPOUNDS

(1B)	83-32-9	acenaphthene	
(3B)	92-87-5	benzidine	
(8B)	120-82-1	1,2,4-trichlorobenzene	
(9B)	118-74-1	hexachlorobenzene	
(12B)	67-72-1	hexachloroethane	
(18B)	111-44-4	bis(2-chloroethyl)ether	
(20B)	91-58-7	2-chloronaphthalene	
(25B)	95-50-1	1,2-dichlorobenzene	
(26B)	541-73-1	1,3-dichlorobenzene	
(27B)	106-46-7	1,4-dichlorobenzene	
(28B)	91-94-1	3,3'-dichlorobenzidine	
(35B)	121-14-2	2,4-dinitrotoluene	
(36B)	606-20-2	2,6-dinitrotoluene	
(37B)	122-66-7	1,2-diphenylhydrazine	
(39B)	206-44-0	fluoranthene	
(40B)	7005-72-3	4-chlorophenyl phenyl ether	
(41B)	101-55-3	4-bromophenyl phenyl ether	
(42B)	39638-32-9	bis (2-chloroisopropyl) ether	
(43B)	111-91-1	bis (2-chloroethoxy) methane	
(52B)	87-68-3	hexachlorobutadiene	
(53B)	77-47-4	hexachlorocyclopentadiene	
(54B)	78-59-1	isophorone	
(55B)	91-20-3	naphthalene	100
(56B)	98-95-3	nitrobenzene	
(62B)	86-30-6	N-nitrosodiphenylamine	
(63B)	621-64-7	N-nitrosodipropylamine	
(66B)	117-81-7	bis (2-ethylhexyl) phthalate	100000
(67B)	85-68-7	benzyl butyl phthalate	13000
(68B)	84-74-2	di-n-butyl phthalate	
(69B)	117-84-0	di-n-octyl phthalate	
(70B)	84-66-2	diethyl phthalate	
(71B)	131-11-3	dimethyl phthalate	
(72B)	56-55-3	benzo(a)anthracene	

BASE/NEUTRAL COMPOUNDS

PP #	CAS #		
(73B)	50-32-8	benzo(a)pyrene	
(74B)	205-99-2	benzo(b)fluoranthene	
(75B)	207-08-9	benzo(k)fluoranthene	
(76B)	218-01-9	chrysene	
(77B)	208-96-8	acenaphthylene	
(78B)	120-12-7	anthracene	
(79B)	191-24-2	benzo(ghi)perylene	
(80B)	86-73-7	fluorene	
(81B)	85-01-8	phenanthrene	
(82B)	53-70-3	dibenzo(a,h)anthracene	
(83B)	193-39-5	indeno(1,2,3-cd)pyrene	
(84B)	129-00-0	pyrene	

VOLATILES

(2V)	107-02-8	acrolein	
(3V)	107-13-1	acrylonitrile	
(4V)	71-43-2	benzene	
(6V)	56-23-5	carbon tetrachloride	
(7V)	108-90-7	chlorobenzene	
(10V)	107-06-2	1,2-dichloroethane	
(11V)	71-55-6	1,1,1-trichloroethane	
(13V)	75-34-3	1,1-dichloroethane	
(14V)	79-00-5	1,1,2-trichloroethane	
(15V)	79-34-5	1,1,2,2-tetrachloroethane	
(16V)	75-00-3	chloroethane	
(19V)	110-75-8	2-chloroethylvinyl ether	
(23V)	67-66-3	chloroform	
(29V)	75-35-4	1,1-dichloroethene	
(30V)	156-60-5	trans-1,2-dichloroethene	
(32V)	78-87-5	1,2-dichloropropane	
(33V)	10061-02-6	trans-1,3-dichloropropene	
	10061-01-05	cis-1,3-dichloropropene	
(38V)	100-41-4	ethylbenzene	1400
(44V)	75-09-2	methylene chloride	
(45V)	74-87-3	chloromethane	
(46V)	74-83-9	bromomethane	
(47V)	75-25-2	bromoform	
(48V)	75-27-4	bromodichloromethane	
(49V)	75-69-4	fluorotrichloromethane	
(50V)	75-71-8	dichlorodifluoromethane	
(51V)	124-48-1	chlorodibromomethane	
(85V)	127-18-4	tetrachloroethene	
(86V)	108-88-3	toluene	640
(87V)	79-01-6	trichloroethene	
(88V)	75-01-4	vinyl chloride	
		Xylenes	1200

Cadmium 53 Chromium 2.1 ZINC 150

All results are expressed as ug/g weight as received. No entry denotes "not detecte

Lab ID No. 2887-2

Physical description of sample:

Client ID 8A:57461

Strained Soil

Sample workup:

Volitile fraction PEG Extraction (SW 846-5030)

Semivolatile fraction Soxhlet Extraction (SW 846-3540)

Inorganic fraction Acid Digestion (SW 846-3050)

ACID COMPOUNDS

PP #	CAS #		
(21A)	88-06-2	2,4,6-trichlorophenol	
(22A)	59-50-7	p-chloro-m-cresol	
(24A)	95-57-8	2-chlorophenol	
(31A)	120-83-2	2,4-dichlorophenol	
(34A)	105-67-9	2,4-dimethylphenol	
(57A)	88-75-5	2-nitrophenol	
(58A)	100-02-7	4-nitrophenol	
(59A)	51-28-5	2,4-dinitrophenol	
(60A)	534-52-1	4,6-dinitro-2-methylphenol	
(64A)	87-86-5	pentachlorophenol	
(65A)	108-95-2	phenol	

BASE/NEUTRAL COMPOUNDS

(1B)	83-32-9	acenaphthene	
(5B)	92-87-5	benzidine	
(8B)	120-82-1	1,2,4-trichlorobenzene	
(9B)	118-74-1	hexachlorobenzene	
(12B)	67-72-1	hexachloroethane	
(18B)	111-44-4	bis(2-chloroethyl)ether	
(20B)	91-58-7	2-chloronaphthalene	
(25B)	95-50-1	1,2-dichlorobenzene	
(26B)	541-73-1	1,3-dichlorobenzene	
(27B)	106-46-7	1,4-dichlorobenzene	
(28B)	91-94-1	3,3'-dichlorobenzidine	
(35B)	121-14-2	2,4-dinitrotoluene	
(36B)	606-20-2	2,6-dinitrotoluene	
(37B)	122-66-7	1,2-diphenylhydrazine	
(39B)	206-44-0	fluoranthene	
(40B)	7005-72-3	4-chlorophenyl phenyl ether	
(41B)	101-55-3	4-bromophenyl phenyl ether	
(42B)	39638-32-9	bis (2-chloroisopropyl) ether	
(43B)	111-91-1	bis (2-chloroethoxy) methane	
(52B)	87-68-3	hexachlorobutadiene	
(53B)	77-47-4	hexachlorocyclopentadiene	
(54B)	78-59-1	isophorone	
(55B)	91-20-3	naphthalene	
(56B)	98-95-3	nitrobenzene	
(62B)	86-30-6	N-nitrosodiphenylamine	
(63B)	621-64-7	N-nitrosodipropylamine	
(66B)	117-81-7	bis (2-ethylhexyl) phthalate	8800
(67B)	85-68-7	benzyl butyl phthalate	30
(68B)	84-74-2	di-n-butyl phthalate	
(69B)	117-84-0	di-n-octyl phthalate	1200
(70B)	84-66-2	diethyl phthalate	
(71B)	131-11-3	dimethyl phthalate	
(72B)	56-55-3	benzo(a)anthracene	

BASE/NEUTRAL COMPOUNDS

PP #	CAS #		
(73B)	50-32-8	benzo(a)pyrene	
(74B)	205-99-2	benzo(b)fluoranthene	
(75B)	207-08-9	benzo(k)fluoranthene	
(76B)	218-01-9	chrysene	
(77B)	208-96-8	acenaphthylene	
(78B)	120-12-7	anthracene	
(79B)	191-24-2	benzo(ghi)perylene	
(80B)	86-73-7	fluorene	
(81B)	85-01-8	phenanthrene	
(82B)	53-70-3	dibenzo(a,h)anthracene	
(83B)	193-39-5	indeno(1,2,3-cd)pyrene	
(84B)	129-00-0	pyrene	

VOLATILES

(2V)	107-02-8	acrolein	
(3V)	107-13-1	acrylonitrile	
(4V)	71-43-2	benzene	
(6V)	56-23-5	carbon tetrachloride	
(7V)	108-90-7	chlorobenzene	
(10V)	107-06-2	1,2-dichloroethane	
(11V)	71-55-6	1,1,1-trichloroethane	
(13V)	75-34-3	1,1-dichloroethane	
(14V)	79-00-5	1,1,2-trichloroethane	
(15V)	79-34-5	1,1,2,2-tetrachloroethane	
(16V)	75-00-3	chloroethane	
(19V)	110-75-8	2-chloroethylvinyl ether	
(23V)	67-66-3	chloroform	
(29V)	75-35-4	1,1-dichloroethene	
(30V)	156-60-5	trans-1,2-dichloroethene	
(32V)	78-87-5	1,2-dichloropropane	
(33V)	10061-02-6	trans-1,3-dichloropropene	
	10061-01-05	cis-1,3-dichloropropene	
(38V)	100-41-4	ethylbenzene	
(44V)	75-09-2	methylene chloride	Trace
(45V)	74-87-3	chloromethane	
(46V)	74-83-9	bromomethane	
(47V)	75-25-2	bromoform	
(48V)	75-27-4	bromodichloromethane	
(49V)	75-69-4	fluorotrichloromethane	
(50V)	75-71-8	dichlorodifluoromethane	
(51V)	124-48-1	chlorodibromomethane	
(85V)	127-18-4	tetrachloroethene	
(86V)	108-88-3	toluene	Trace
(87V)	79-01-6	trichloroethene	
(88V)	75-01-4	vinyl chloride	

Cadmium 3.6 Chromium 12 ZINC 46

All results are expressed as ug/g. No entry denotes "not detected"

Lab ID No. 2887-7

Physical description of sample: Client ID 8A-A:64220

Strained Soil

Sample workup:

Volitile fraction PEG Extraction (SW 846-5030)

Semivolatile fraction Soxhlet Extraction (SW 846-5340)

Inorganic fraction Acid Digestion (SW 846-3050)

ACID COMPOUNDS

PP #	CAS #		
(21A)	88-06-2	2,4,6-trichlorophenol	
(22A)	59-50-7	p-chloro-m-cresol	
(26A)	95-57-8	2-chlorophenol	
(31A)	120-83-2	2,4-dichlorophenol	
(34A)	105-67-9	2,4-dimethylphenol	
(57A)	88-75-5	2-nitrophenol	
(58A)	100-02-7	4-nitrophenol	
(59A)	51-28-5	2,4-dinitrophenol	
(60A)	534-52-1	4,6-dinitro-2-methylphenol	
(64A)	87-86-5	pentachlorophenol	
(65A)	108-95-2	phenol	

BASE/NEUTRAL COMPOUNDS

(1B)	83-32-9	acenaphthene	
(5B)	92-87-5	benzidine	
(8B)	120-82-1	1,2,4-trichlorobenzene	
(9B)	118-74-1	hexachlorobenzene	
(12B)	67-72-1	hexachloroethane	
(18B)	111-44-4	bis(2-chloroethyl)ether	
(20B)	91-58-7	2-chloronaphthalene	
(25B)	95-50-1	1,2-dichlorobenzene	
(26B)	541-73-1	1,3-dichlorobenzene	
(27B)	106-46-7	1,4-dichlorobenzene	
(28B)	91-94-1	3,3'-dichlorobenzidine	
(35B)	121-14-2	2,4-dinitrotoluene	
(36B)	606-20-2	2,6-dinitrotoluene	
(37B)	122-66-7	1,2-diphenylhydrazine	
(39B)	206-44-0	fluoranthene	
(40B)	7005-72-3	4-chlorophenyl phenyl ether	
(41B)	101-55-3	4-bromophenyl phenyl ether	
(42B)	39638-32-9	bis (2-chloroisopropyl) ether	
(43B)	111-91-1	bis (2-chloroethoxy) methane	
(52B)	87-68-3	hexachlorobutadiene	
(53B)	77-47-4	hexachlorocyclopentadiene	
(54B)	78-59-1	isophorone	
(55B)	91-20-3	naphthalene	
(56B)	98-95-3	nitrobenzene	
(62B)	86-30-6	N-nitrosodiphenylamine	
(63B)	621-64-7	N-nitrosodipropylamine	
(66B)	117-81-7	bis (2-ethylhexyl) phthalate	570
(67B)	85-68-7	benzyl butyl phthalate	
(68B)	84-74-2	di-n-butyl phthalate	
(69B)	117-84-0	di-n-octyl phthalate	
(70B)	84-66-2	diethyl phthalate	
(71B)	131-11-3	dimethyl phthalate	
(72B)	56-55-3	benzo(a)anthracene	

BASE/NEUTRAL COMPOUNDS

PP #	CAS #		
(73B)	50-32-8	benzo(a)pyrene	
(74B)	205-99-2	benzo(b)fluoranthene	
(75B)	207-08-9	benzo(k)fluoranthene	
(76B)	218-01-9	chrysene	
(77B)	208-96-8	acenaphthylene	
(78B)	120-12-7	anthracene	
(79B)	191-24-2	benzo(ghi)perylene	
(80B)	86-73-7	fluorene	
(81B)	85-01-8	phenanthrene	
(82B)	53-70-3	dibenzo(a,h)anthracene	
(83B)	193-39-5	indeno(1,2,3-cd)pyrene	
(84B)	129-00-0	pyrene	

VOLATILES

(2V)	107-02-8	acrolein	
(3V)	107-13-1	acrylonitrile	
(4V)	71-43-2	benzene	
(6V)	56-23-5	carbon tetrachloride	
(7V)	108-90-7	chlorobenzene	
(10V)	107-06-2	1,2-dichloroethane	
(11V)	71-55-6	1,1,1-trichloroethane	
(13V)	75-34-3	1,1-dichloroethane	
(14V)	79-00-5	1,1,2-trichloroethane	
(15V)	79-34-5	1,1,2,2-tetrachloroethane	
(16V)	75-00-3	chloroethane	
(19V)	110-75-8	2-chloroethylvinyl ether	
(23V)	67-66-3	chloroform	
(29V)	75-35-4	1,1-dichloroethene	
(30V)	156-60-5	trans-1,2-dichloroethene	
(32V)	78-87-5	1,2-dichloropropane	
(33V)	10061-02-6	trans-1,3-dichloropropene	
	10061-01-05	cis-1,3-dichloropropene	
(38V)	100-41-4	ethylbenzene	
(44V)	75-09-2	methylene chloride	0.64
(45V)	74-87-3	chloromethane	
(46V)	74-83-9	bromomethane	
(47V)	75-25-2	bromoform	
(48V)	75-27-4	bromodichloromethane	
(49V)	75-69-4	fluorotrichloromethane	
(50V)	75-71-8	dichlorodifluoromethane	
(51V)	124-48-1	chlorodibromomethane	
(85V)	127-18-4	tetrachloroethene	
(86V)	108-88-3	toluene	
(87V)	79-01-6	trichloroethene	
(88V)	75-01-4	vinyl chloride	

Cadmium 60 Chromium 15 ZINC 55

All results are expressed as ug/g weight as received. No entry denotes "not detecte

Lab ID No. 2887-8

Client ID 8A-C:64221

Physical description of sample:

Strained Soil

Sample workup:

Volitile fraction PEG Extraction (SW 846-5030)

Semivolatile fraction Soxhlet Extraction (SW 846-3540)

Inorganic fraction Acid Digestion (SW 846-3050)

ACID COMPOUNDS

PP #	CAS #		
(21A)	88-06-2	2,4,6- trichlorophenol	
(22A)	59-50-7	p-chloro-m-cresol	
(24A)	95-57-8	2- chlorophenol	
(31A)	120-83-2	2,4-dichlorophenol	
(34A)	105-67-9	2,4-dimethylphenol	
(57A)	88-75-5	2- nitrophenol	
(58A)	100-02-7	4-nitrophenol	
(59A)	51-28-5	2,4-dinitrophenol	
(60A)	534-52-1	4,6-dinitro-2-methylphenol	
(64A)	87-86-5	pentachlorophenol	
(63A)	108-95-2	phenol	

BASE/NEUTRAL COMPOUNDS

(1B)	83-32-9	acenaphthene	
(3B)	92-87-5	benzidine	
(8B)	120-82-1	1,2,4-trichlorobenzene	
(9B)	118-74-1	hexachlorobenzene	
(12B)	67-72-1	hexachloroethane	
(13B)	111-44-4	bis(2-chloroethyl)ether	
(20B)	91-58-7	2-chloronaphthalene	
(25B)	95-50-1	1,2-dichlorobenzene	
(26B)	541-73-1	1,3-dichlorobenzene	
(27B)	106-46-7	1,4-dichlorobenzene	
(28B)	91-94-1	3,3'-dichlorobenzidine	
(35B)	121-14-2	2,4-dinitrotoluene	
(36B)	606-20-2	2,6-dinitrotoluene	
(37B)	122-66-7	1,2-diphenylhydrazine	
(39B)	206-44-0	fluoranthene	
(40B)	7005-72-3	4-chlorophenyl phenyl ether	
(41B)	101-55-3	4-bromophenyl phenyl ether	
(42B)	39638-32-9	bis (2-chloroisopropyl) ether	
(43B)	111-91-1	bis (2-chloroethoxy) methane	
(52B)	87-68-3	hexachlorobutadiene	
(53B)	77-47-4	hexachlorocyclopentadiene	
(54B)	78-59-1	isophorone	
(55B)	91-20-3	naphthalene	
(56B)	98-95-3	nitrobenzene	
(62B)	86-30-6	N-nitrosodiphenylamine	
(63B)	621-64-7	N-nitrosodipropylamine	
(66B)	117-81-7	bis (2-ethylhexyl) phthalate	12,000
(67B)	85-68-7	benzyl butyl phthalate	2,800
(68B)	84-74-2	di-n-butyl phthalate	
(69B)	117-84-0	di-n-octyl phthalate	
(70B)	84-66-2	diethyl phthalate	
(71B)	131-11-3	dimethyl phthalate	
(72B)	56-55-3	benzo(a)anthracene	

BASE/NEUTRAL COMPOUNDS

PP #	CAS #		
(73B)	50-32-8	benzo(a)pyrene	
(74B)	205-99-2	benzo(b)fluoranthene	
(75B)	207-08-9	benzo(k)fluoranthene	
(76B)	218-01-9	chrysene	
(77B)	208-96-8	acenaphthylene	
(78B)	120-12-7	anthracene	
(79B)	191-24-2	benzo(ghi)perylene	
(80B)	86-73-7	fluorene	
(81B)	85-01-8	phenanthrene	
(82B)	53-70-3	dibenzo(a,h)anthracene	
(83B)	193-39-5	indeno(1,2,3-cd)pyrene	
(84B)	129-00-0	pyrene	

VOLATILES

(2V)	107-02-8	acrolein	
(3V)	107-13-1	acrylonitrile	
(4V)	71-43-2	benzene	
(6V)	56-23-5	carbon tetrachloride	
(7V)	108-90-7	chlorobenzene	
(10V)	107-06-2	1,2-dichloroethane	
(11V)	71-55-6	1,1,1-trichloroethane	
(13V)	75-34-3	1,1-dichloroethane	
(14V)	79-00-5	1,1,2-trichloroethane	
(15V)	79-34-5	1,1,2,2-tetrachloroethane	
(16V)	75-00-3	chloroethane	
(19V)	110-75-8	2-chloroethylvinyl ether	
(23V)	67-66-3	chloroform	
(29V)	75-35-4	1,1-dichloroethene	
(30V)	156-60-5	trans-1,2-dichloroethene	
(32V)	78-87-5	1,2-dichloropropane	
(33V)	10061-02-6	trans-1,3-dichloropropene	
	10061-01-05	cis-1,3-dichloropropene	
(38V)	100-41-4	ethylbenzene	0.07
(44V)	75-09-2	methylene chloride	1.3
(45V)	74-87-3	chloromethane	
(46V)	74-83-9	bromomethane	
(47V)	75-25-2	bromoform	
(48V)	75-27-4	bromodichloromethane	
(49V)	75-69-4	fluorotrichloromethane	
(50V)	75-71-8	dichlorodifluoromethane	
(51V)	124-48-1	chlorodibromomethane	
(85V)	127-18-4	tetrachloroethene	
(86V)	108-88-3	toluene	1.4
(87V)	79-01-6	trichloroethene	
(88V)	75-01-4	vinyl chloride	

Cadmium 24 Chromium 34 ZINC 100

All results are expressed as ug/g weight as received. No entry denotes "not detect

Lab ID No. 2887-6

Physical description of sample: Client ID 8A,D:64219

Soil/Cake

Sample workup:

Volitile fraction PEG Extraction (SW 846-5030)

Semivolatile fraction Soxhlet Extraction (SW 846-3540)

Inorganic fraction Acid Digestion (SW 846-3050)

ACID COMPOUNDS

PP #	CAS #		
(21A)	88-06-2	2,4,6- trichlorophenol	
(22A)	59-50-7	p-chloro-m-cresol	
(24A)	95-57-8	2- chlorophenol	
(31A)	120-83-2	2,4-dichlorophenol	
(34A)	105-67-9	2,4-dimethylphenol	
(37A)	88-75-5	2- nitrophenol	
(38A)	100-02-7	4-nitrophenol	
(39A)	51-28-5	2,4-dinitrophenol	
(60A)	534-52-1	4,6-dinitro-2-methylphenol	
(64A)	87-86-5	pentachlorophenol	
(65A)	108-95-2	phenol	

BASE/NEUTRAL COMPOUNDS

(1B)	83-32-9	acenaphthene	
(5B)	92-87-5	benzidine	
(8B)	120-82-1	1,2,4-trichlorobenzene	
(9B)	118-74-1	hexachlorobenzene	
(12B)	67-72-1	hexachloroethane	
(18B)	111-44-4	bis(2-chloroethyl)ether	
(20B)	91-58-7	2-chloronaphthalene	
(25B)	95-50-1	1,2-dichlorobenzene	
(26B)	541-73-1	1,3-dichlorobenzene	
(27B)	106-46-7	1,4-dichlorobenzene	
(28B)	91-94-1	3,3'-dichlorobenzidine	
(33B)	121-14-2	2,4-dinitrotoluene	
(36B)	606-20-2	2,6-dinitrotoluene	
(37B)	122-66-7	1,2-diphenylhydrazine	
(39B)	206-44-0	fluoranthene	
(40B)	7005-72-3	4-chlorophenyl phenyl ether	
(41B)	101-55-3	4-bromophenyl phenyl ether	
(42B)	39638-32-9	bis (2-chloroisopropyl) ether	
(43B)	111-91-1	bis (2-chloroethoxy) methane	
(52B)	87-68-3	hexachlorobutadiene	
(53B)	77-47-4	hexachlorocyclopentadiene	
(54B)	78-59-1	isophorone	
(55B)	91-20-3	naphthalene	
(56B)	98-95-3	nitrobenzene	
(62B)	86-30-6	N-nitrosodiphenylamine	
(63B)	621-64-7	N-nitrosodipropylamine	
(66B)	117-81-7	bis (2-ethylhexyl) phthalate	52000
(67B)	85-68-7	benzyl butyl phthalate	6700
(68B)	84-74-2	di-n-butyl phthalate	
(69B)	117-84-0	di-n-octyl phthalate	
(70B)	84-66-2	diethyl phthalate	
(71B)	131-11-3	dimethyl phthalate	
(72B)	56-55-3	benzo(a)anthracene	

BASE/NEUTRAL COMPOUNDS

PP #	CAS #	
(73B)	50-32-8	benzo(a)pyrene
(74B)	205-99-2	benzo(b)fluoranthene
(75B)	207-08-9	benzo(k)fluoranthene
(76B)	218-01-9	chrysene
(77B)	208-96-8	acenaphthylene
(78B)	120-12-7	anthracene
(79B)	191-24-2	benzo(ghi)perylene
(80B)	86-73-7	fluorene
(81B)	85-01-8	phenanthrene
(82B)	53-70-3	dibenzo(a,h)anthracene
(83B)	193-39-5	indeno(1,2,3-cd)pyrene
(84B)	129-00-0	pyrene

VOLATILES

(2V)	107-02-8	acrolein
(3V)	107-13-1	acrylonitrile
(4V)	71-43-2	benzene
(6V)	56-23-5	carbon tetrachloride
(7V)	108-90-7	chlorobenzene
(10V)	107-06-2	1,2-dichloroethane
(11V)	71-55-6	1,1,1-trichloroethane
(13V)	75-34-3	1,1-dichloroethane
(14V)	79-00-5	1,1,2-trichloroethane
(15V)	79-34-5	1,1,2,2-tetrachloroethane
(16V)	75-00-3	chloroethane
(19V)	110-75-8	2-chloroethylvinyl ether
(23V)	67-66-3	chloroform
(29V)	75-35-4	1,1-dichloroethene
(30V)	156-60-5	trans-1,2-dichloroethene
(32V)	78-87-5	1,2-dichloropropane
(33V)	10061-02-6	trans-1,3-dichloropropene
	10061-01-05	cis-1,3-dichloropropene
(38V)	100-41-4	ethylbenzene
(44V)	75-09-2	methylene chloride
(45V)	74-87-3	chloromethane
(46V)	74-83-9	bromomethane
(47V)	75-25-2	bromoform
(48V)	75-27-4	bromodichloromethane
(49V)	75-69-4	fluorotrichloromethane
(50V)	75-71-8	dichlorodifluoromethane
(51V)	124-48-1	chlorodibromomethane
(85V)	127-18-4	tetrachloroethene
(86V)	108-88-3	toluene
(87V)	79-01-6	trichloroethene
(88V)	75-01-4	vinyl chloride

Cadmium 16 Chromium 2.0 ZINC 140

All results are expressed as ug/g weight as received. No entry denotes "not detect

Lab ID No. 2887-9

Physical description of sample: Client ID 10A:64222

Liquid/Sludge

Sample workup:

Volitile fraction PEG Extraction (SW 846-5030)

Semivolatile fraction Sonication Extraction (SW 846-3540)

Inorganic fraction Acid Digestion (SW 846-3050)

ACID COMPOUNDS

PP #	CAS #		
(21A)	88-06-2	2,4,6- trichlorophenol	
(22A)	59-50-7	p-chloro-m-cresol	
(24A)	95-57-8	2- chlorophenol	
(31A)	120-83-2	2,4-dichlorophenol	
(34A)	105-67-9	2,4-dimethylphenol	
(37A)	88-75-5	2- nitrophenol	
(38A)	100-02-7	4-nitrophenol	
(39A)	51-28-5	2,4-dinitrophenol	
(60A)	534-52-1	4,6-dinitro-2-methylphenol	
(64A)	87-86-5	pentachlorophenol	
(65A)	108-95-2	phenol	

BASE/NEUTRAL COMPOUNDS

(1B)	83-32-9	acenaphthene	
(5B)	92-87-5	benzidine	
(8B)	120-82-1	1,2,4-trichlorobenzene	
(9B)	118-74-1	hexachlorobenzene	
(12B)	67-72-1	hexachloroethane	
(18B)	111-44-4	bis(2-chloroethyl)ether	
(20B)	91-58-7	2-chloronaphthalene	
(23B)	95-50-1	1,2-dichlorobenzene	
(26B)	541-73-1	1,3-dichlorobenzene	
(27B)	106-46-7	1,4-dichlorobenzene	
(28B)	91-94-1	3,3'-dichlorobenzidine	
(35B)	121-14-2	2,4-dinitrotoluene	
(36B)	606-20-2	2,6-dinitrotoluene	
(37B)	122-66-7	1,2-diphenylhydrazine	
(39B)	206-44-0	fluoranthene	
(40B)	7005-72-3	4-chlorophenyl phenyl ether	
(41B)	101-55-3	4-bromophenyl phenyl ether	
(42B)	39638-32-9	bis (2-chloroisopropyl) ether	
(43B)	111-91-1	bis (2-chloroethoxy) methane	
(52B)	87-68-3	hexachlorobutadiene	
(53B)	77-47-4	hexachlorocyclopentadiene	
(54B)	78-59-1	isophorone	
(55B)	91-20-3	naphthalene	
(56B)	98-95-3	nitrobenzene	
(62B)	86-30-6	N-nitrosodiphenylamine	
(63B)	621-64-7	N-nitrosodipropylamine	
(66B)	117-81-7	bis (2-ethylhexyl) phthalate	69,000
(67B)	85-68-7	benzyl butyl phthalate	890
(68B)	84-74-2	di-n-butyl phthalate	
(69B)	117-84-0	di-n-octyl phthalate	
(70B)	84-66-2	diethyl phthalate	
(71B)	131-11-3	dimethyl phthalate	
(72B)	56-55-3	benzo(a)anthracene	

BASE/NEUTRAL COMPOUNDS

PP #	CAS #		
(73B)	50-32-8	benzo(a)pyrene	
(74B)	205-99-2	benzo(b)fluoranthene	
(75B)	207-08-9	benzo(k)fluoranthene	
(76B)	218-01-9	chrysene	
(77B)	208-96-8	acenaphthylene	
(78B)	120-12-7	anthracene	
(79B)	191-24-2	benzo(ghi)perylene	
(80B)	86-73-7	fluorene	
(81B)	85-01-8	phenanthrene	
(82B)	53-70-3	dibenzo(a,h)anthracene	
(83B)	193-39-5	indeno(1,2,3-cd)pyrene	
(84B)	129-00-0	pyrene	

VOLATILES

(2V)	107-02-8	acrolein	
(3V)	107-13-1	acrylonitrile	
(4V)	71-43-2	benzene	
(6V)	56-23-5	carbon tetrachloride	
(7V)	108-90-7	chlorobenzene	
(10V)	107-06-2	1,2-dichloroethane	
(11V)	71-55-6	1,1,1-trichloroethane	
(13V)	75-34-3	1,1-dichloroethane	
(14V)	79-00-5	1,1,2-trichloroethane	
(15V)	79-34-5	1,1,2,2-tetrachloroethane	
(16V)	75-00-3	chloroethane	
(19V)	110-75-8	2-chloroethylvinyl ether	
(23V)	67-66-3	chloroform	
(29V)	75-35-4	1,1-dichloroethene	2000
(30V)	156-60-5	trans-1,2-dichloroethene	
(32V)	78-87-5	1,2-dichloropropane	
(33V)	10061-02-6	trans-1,3-dichloropropene	
	10061-01-05	cis-1,3-dichloroprooene	
(38V)	100-41-4	ethylbenzene	
(44V)	75-09-2	methylene chloride	
(45V)	74-87-3	chloromethane	
(46V)	74-83-9	bromomethane	
(47V)	75-25-2	bromoform	
(48V)	75-27-4	bromodichloromethane	
(49V)	75-69-4	fluorotrichloromethane	
(50V)	75-71-8	dichlorodifluoromethane	
(51V)	124-48-1	chlorodibromomethane	
(85V)	127-18-4	tetrachloroethene	
(86V)	108-88-3	toluene	300
(87V)	79-01-6	trichloroethene	Trace
(88V)	75-01-4	vinyl chloride	

Cadmium 130 Chromium 20 ZINC 170

All results are expressed as ug/g weight as received. No entry denotes "not detecte

APPENDIX E

PLATES

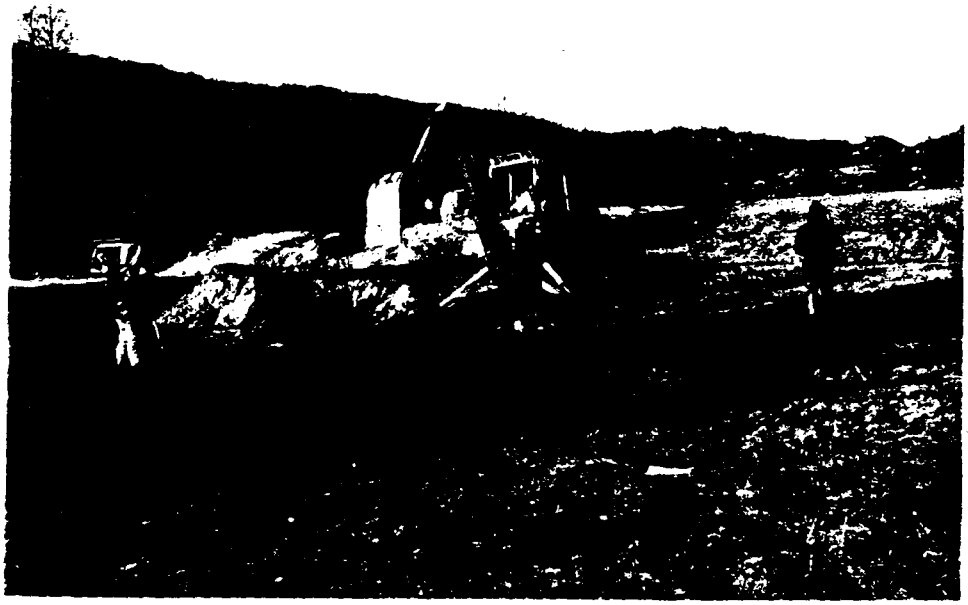

Plate 1.0-1. Troy Mills Landfill with a backhoe excavation in progress in a former drum burial area.

Plate 2.0-1. NAI field investigation team preparing for Level B activities during the drum excavation task, Troy Mills Landfill.

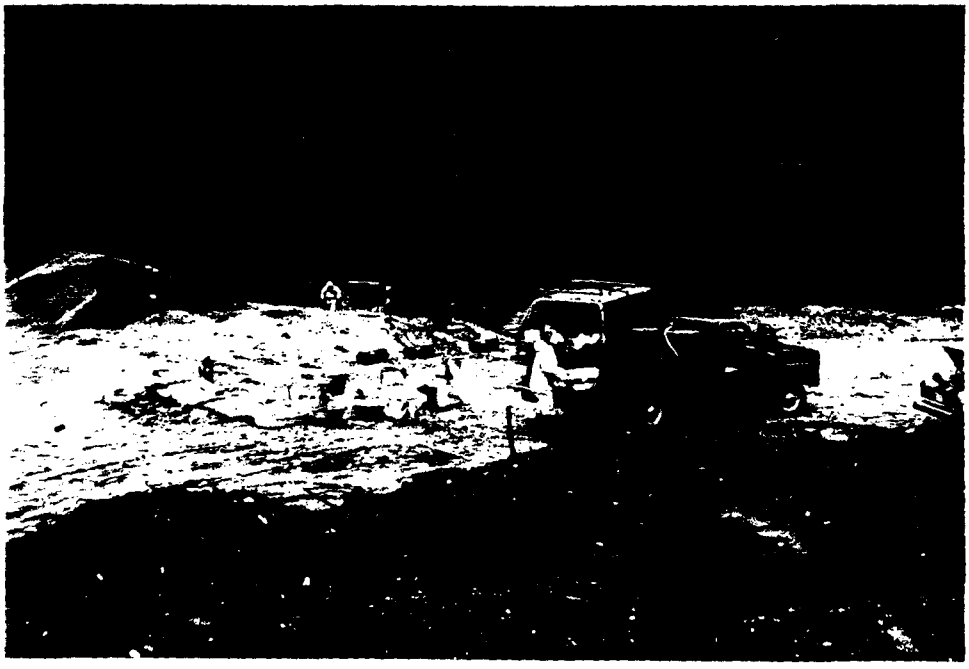

Plate 2.0-2. NAI hot line and command post for drum excavation task, Troy Mills Landfill.

Plate 2.0-3. NAI field investigation team member undergoing personal decontamination at the hot line, Troy Mills Landfill.

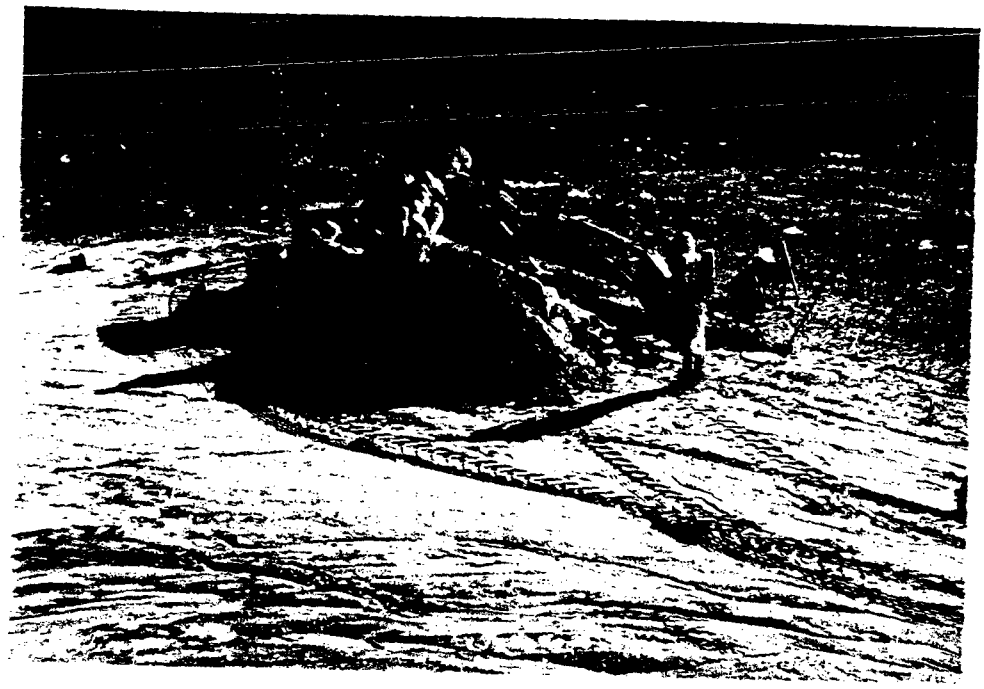

Plate 4.2-1. Excavation 1 in progress, Troy Mills Landfill.

Plate 5.1-1. Ends of two steel drums which appear to be in good condition in Excavation 5, Troy Mills Landfill.

Plate 5.2-1. Six steel drums in various conditions in excavation 10, Troy Mills Landfill.

Plate 5.3-1. Excavation 1 showing fabric scraps. Crushed steel drums were found in the bottom of the excavation, Troy Mills Landfill.

Plate 5.3-2. Collecting a sample of liquid waste from a steel drum with a hollow glass tube, Excavation 6, Troy Mills Landfill.

Plate 5.3-3. Pigment/sludge deposits interbedded with soil layers in Excavation 8A, Troy Mills Landfill.