

November 20, 2000



Ernest R. P. Waterman
RCRA Corrective Action Section
EPA—Region I
One Congress Street
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Boston, Massachusetts 02114-2023

HoltraChem Mfg. Co.

HoltraChem Manufacturing Co.

P.O. Box 189, 99 Industrial Way, Orrington, ME 04474
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Stacy A. Ladner
Division of Oil and Hazardous Waste Facilities Regulation
Bureau of Remediation and Waste Management
Maine Department of Environmental Protection
17 State House Station
Augusta, Maine 04333-0017

Ref.: Results of Investigation of Landfill #2 at the HoltraChem Manufacturing Company
RCRA Corrective Action Site, Orrington, Maine.

Dear Mr. Waterman and Ms. Ladner:

In response to your request relating to concerns that leachate from Landfill #2 on the HoltraChem site is mixing with the waters of the Southerly Stream, and in accord with the agreement made among USEPA, Maine DEP and HoltraChem, please find attached the results of the investigation of the Landfill #2 area. This work was done in substantial agreement with the work plan submitted by HoltraChem on August 4, 2000.

This document has been prepared by Camp Dresser and McKee, Inc., on behalf of HoltraChem Manufacturing Company. Therefore, please refer any concerns or questions to Ernest Ashley at Camp Dresser and McKee, Inc., directly. This will provide for expeditious resolution of any items needing discussion. Should you not be able to reach Mr. Ashley with your questions, please call me at 207-825-3341.

Very truly yours,

Lawrence W. Brown
Environmental Manager

pc: James Grant
John S. Rudd, Esq.
Ernest Ashley, P.G., CHMM
William Ball

00796



October 31, 2000

Mr. Larry Brown
HoltraChem Manufacturing Company
P.O. Box 189
Orrington, Maine 04474

Subject: Landfill #2 Investigation Results
HoltraChem Manufacturing Site
Orrington, Maine

Dear Mr. Brown:

The purpose of this letter report is to provide the results of the Landfill #2 Investigation for the HoltraChem Manufacturing Company, Orrington, Maine. This investigation was conducted from August 15 through August 18, 2000, to assess groundwater conditions in the vicinity of Landfill #2.

The objectives of the investigation and sampling activities as outlined in the Landfill #2 Investigation Work Plan (CDM, July 28, 2000) were to:

- Evaluate groundwater levels surrounding Landfill #2;
- Determine the direction of groundwater flow in the vicinity of Landfill#2;
- Assess potential leachate breakout from Landfill #2; and
- Evaluate groundwater and surface water quality in the vicinity of Landfill #2.

Background

The area investigated is located in a valley area northeast of the plant (Figure 1). The landfill was operated from 1971 through 1973 and reportedly received approximately 1500 tons of brine sludge. Landfill #2 was covered with soil in 1973 and capped with clay in 1980. The landfill cover currently appears to be in good condition. There are no signs that the landfill has been modified since closure. There are no signs of erosion and the vegetative cover is well established with no observable signs of stress.

Site Investigation Status

The intent of the Landfill #2 investigation was to supplement existing site data collected as part of a facility-wide Site Investigation conducted by CDM between 1994 and 1998.

Comments addressing the December 1998 Site Investigation Report were received from MEDEP and EPA in a letter dated April 10, 2000. Among the comments was a request to

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investigate Landfill #2 to "see if it is leaking", specifically to determine if Landfill #2 is located within the groundwater table and leaking contaminants, and to assess the integrity of the cap. The investigation of Landfill #2 was discussed with MEDEP during a meeting on June 1 and by telephone on June 13, 2000. Faxed comments were received by CDM from MEDEP on June 6, 2000. The MEDEP requested that CDM install temporary drive points north of Landfill #2 and south of the Southerly Stream and sample the groundwater from the points and any obvious seeps from the landfill for specific conductance and total and dissolved mercury. In a June 27, 2000 meeting, CDM was requested to provide a work plan for the investigation of Landfill #2 by August 4, 2000.

Scope of Work and Methodology

Well Point Installation

To evaluate the groundwater conditions and potential for leachate breakout from Landfill #2, a series of Geoprobe driven well points and piezometers were installed. The locations of the well points and piezometers are shown on Figure 2. Geoprobe services were provided by Acheron Geoboring Services of Falmouth, Maine. Subsurface conditions were documented during the installation of the Landfill #2 perimeter wells.

The two piezometers (LF2-GP1 and LF2-GP2) were installed to 15 and 16 feet below ground surface, respectively. The piezometers were constructed of 3/4-inch diameter PVC well screen and riser. The piezometers were installed along the roadway, south of Landfill #2, on the upgradient side of the landfill. A total of ten shallow (approximately 4 feet below ground surface) and eleven deep (approximately 8 feet below ground surface) well points were installed along the perimeter of the landfill as shown on the figure. The well points were installed north and downgradient of Landfill #2, and south of the Southerly Stream. The well points were constructed of 1/2-inch diameter PVC well screen and riser. Well point and piezometer locations, ground surface, and top of inner casing elevations were surveyed by CDM personnel. Table 1 presents a summary of well point and piezometer construction details.

Development and Sampling

Five of the shallow well points installed failed to produce any measurable water during this investigation. Additionally, two shallow well points produced enough water to reflect groundwater elevation, but insufficient volume for sampling.

The fourteen well points containing a purgeable volume of water were developed to establish hydraulic communication between the wells and the formations screened so that water level measurements and groundwater samples would be representative of in situ conditions. Each well was purged using a peristaltic pump and field parameters (temperature, salinity, pH, turbidity, and specific conductance) were recorded.

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Groundwater samples were collected from the newly installed well points on August 8, 2000. A round of static water level measurements were collected from all of the well points with measurable water before purging to ensure that representative measurements were collected from each well. Groundwater sampling was conducted using a peristaltic pump and dedicated tubing. Prior to sampling, each well was either purged dry or of a minimum of three well volumes. Field parameters (temperature, salinity, pH, and specific conductance) were measured from each well that produced enough water to sample. Water levels were allowed to recover in wells that were pumped dry before sampling occurred.

Additional groundwater samples were collected from selected well points for laboratory analysis based on the results of the field measurements (particularly elevated salinity and specific conductance as an indicator of possible leachate breakout), as well as well point location, groundwater elevation, and inferred groundwater flow direction. The groundwater samples were analyzed total and dissolved mercury (EPA Method 7470A), sodium (EPA Method 6010B) and chloride (EPA Method 9251). The samples analyzed for dissolved mercury were filtered in the field using a 45-micron filter. Groundwater samples were analyzed by Alpha Analytical Labs of Westborough, Massachusetts.

Variations from the Proposed Work Plan

Field activities were completed in general accordance with the *Work Plan for the Investigation of Landfill #2* (CDM, July 28, 2000). Field conditions dictated that some modifications had to be implemented to certain elements due to conditions encountered in the field and/or to better achieve the objectives of the investigation.

Eight well points were added to the thirteen originally proposed. Four locations were added to provide a more comprehensive evaluation of conditions along the perimeter of the landfill. Following the installation of the first few well points, it was observed that the groundwater elevations were deeper than anticipated and five of the shallow wells failed to produce any water. Consequently, four additional deep well points were installed adjacent to the dry, shallow well points and the remaining well points were completed to a greater depth than proposed.

The streambed of this southerly stream was dry at the time fieldwork was performed and, therefore surface water samples could not be collected.

Investigation Results

Landfill Area

The visible footprint of Landfill #2 is approximately 30,800 ft². based on an aerial photograph and field reconnaissance. The landfill is bounded by the ephemeral Southerly Stream and bedrock ridge to the north and by wooded areas to the east, south, and west. An unpaved plant road borders the landfill on its southern side. The landfill surface is

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vegetated and no signs of erosion were observed. The perimeter of the landfill was inspected for signs of leachate breakout (springs, discolored water or soil, stressed vegetation, etc.) and none were observed.

Geologic and hydrogeologic data were combined to provide an interpretation of the factors that control groundwater flow. Well point and piezometer logs, with graphic representations of subsurface conditions are attached as Attachment A. Cross sections illustrating subsurface conditions from west to east along the northern perimeter of Landfill #2 were generated. The cross section locations are illustrated in Figure 3 and the cross sections are presented in Figures 4, 5 and 6.

The surficial soils along the perimeter of Landfill #2 consist of brown silt with little coarse to fine sand. The surficial soils are generally 0.5 feet to 1 foot thick. The overburden deposits can predominantly be characterized as silt. To the north and northeast, the silt deposits are overlain by a dark brown, soft, clay layer. The thickness of this layer is generally 0.5 to 1 foot thick and is encountered at approximately 1 to 2 feet below ground surface (BGS). To the northwest, sandier deposits are encountered below the silt at approximately 5 to 7 feet BGS. Based on boring logs for B-301, and the shallow borings advanced during this investigation, soils below the landfill consist of dense silt (glacial till).

Water Level Elevations and Hydraulic Gradients

Water level measurements were collected from all newly installed well points and piezometers on August 8. Groundwater elevations are reflective of the amount time wells were allowed to equilibrate following installation (between approximately 12 and 48 hours). Although wells with higher and lower head were observed adjacent to each other, there were no impermeable layers observed which would suggest that a perched water table exists here. Groundwater elevation data is summarized in Table 1. Geologic and hydrogeologic data were combined to provide an interpretation of groundwater flow direction. Figure 7 presents a groundwater contour map for Landfill #2.

The local topographic low is the Southerly Stream, along the northern perimeter of the landfill. The elevation of the streambed was recorded as approximately Elevation 64.5. During the Landfill #2 Investigation, the Southerly Stream was dry. However, the streambed was observed to be wet in June 2000.

In general, groundwater elevations are higher in the northern central portion of the landfill and lower in the northeastern and northwestern areas. Groundwater elevations range from approximately El. 61.19 at LF2-WP15 (northwest) to El. 62.85 at LF2-WP9 (central) to El. 61.53 LF2-WP2A (northeast). Hydraulic gradients indicate that groundwater generally flows to the northeast and northwest. The presence of the clay layer just above the water table along the northern central portion appears to restrict flow

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in this area. Seasonal fluctuations in groundwater and stream elevation may affect groundwater flow direction.

Groundwater Quality

A total of 14 well points and piezometers were sampled as part of the Landfill #2 Investigation. Additionally, one duplicate sample (LF2-WP19) was collected from LF2-WP12. Groundwater samples were collected from wells with sufficient water to evaluate in situ groundwater conditions. Well points were sampled for the following field parameters: salinity, specific conductance, and pH. The field sampling results are summarized in Table 2.

Salinity values ranged from 0.0% at LF2-WP4A to 0.14% at LF2-WP16. The four highest detected percentages, which ranged from 0.09% at LF2-WP9 and -WP13 to 0.14% at LF2-WP16, are all from wells located along the northwestern perimeter of the landfill.

Specific conductance values were recorded in landfill wells ranging from 0.24 millisiemens per centimeter (mS/cm) at LF2-WP4A to 2.93 mS/cm at LF2-WP16. The three highest readings were from wells LF2-WP14, -15, and -16, located adjacent to each other along the northwest portion of the landfill perimeter.

pH values ranged from 6.88 at LF2-WP2A to 7.78 at LF2-WP9. In general, the higher pH values were measured in wells along the northern central portion of the landfill perimeter.

Based on the results of the field parameter data, ten well points were identified for laboratory analysis. Ten additional groundwater samples were collected and analyzed for total/dissolved mercury, total sodium, and chloride. One duplicate sample (LF2-WP19) was collected from LF2-WP12. The analytical results are presented in Table 2 and the complete laboratory data is attached as Attachment B.

Total sodium was detected in all of the well points sampled, at concentrations ranging from 20 mg/L (LF2-WP4A) to 350 mg/L (LF2-WP16). In general, the highest sodium concentrations were detected in wells located along northwestern and northern central portions of the landfill perimeter.

Chloride was detected in all of the well points sampled, at concentrations ranging from 28 mg/L (LF2-WP4A) to 570 mg/L (LF2-WP16). The four highest chloride concentrations were observed in wells LF2-WP14, -15, -16, and -17.

Total mercury was detected in 3 of the well points sampled: LF2-WP10 (0.0016 mg/L), LF2-WP12/WP19 (0.0059 mg/L), and LF2-WP17 (0.0028 mg/L). Each of these wells is located along the northwestern perimeter of the landfill.

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Dissolved mercury was not detected in any of the well points sampled.

Findings


The Landfill #2 Investigation was conducted to assess groundwater conditions in the vicinity of the landfill and to determine if leachate breakout is occurring. The water level elevation data obtained during the investigation suggest that a portion of the fill material is saturated. As presented in the HoltraChem Manufacturing Site, Site Investigation Report (CDM, December 22, 1998), the base of fill is estimated to range from approximately El. 58.5 to El. 61.0, which is below the groundwater elevations recorded in the newly installed well points.

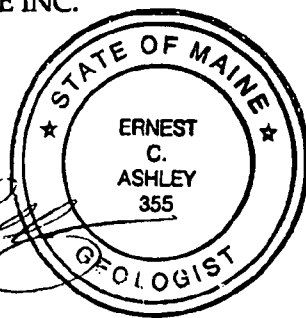
Hydraulic gradients indicate groundwater flows to the northeast and northwest of the landfill. Field parameters and analytical results were generally highest in well points located along the northwestern perimeter of the landfill. These elevated constituents indicate that groundwater in the northwestern portion of the landfill is impacted by sodium and chloride from the brine sludge fill material. Although total mercury was detected in three samples, none of the groundwater samples contained detectable concentrations of dissolved mercury. Due to the dry streambed, surface water samples were not collected with which to assess the impact on the observed groundwater conditions on the Southerly Stream. However, the absence of dissolved mercury in groundwater samples indicates that Landfill #2 is not an ongoing source of mercury to the Southerly Stream

If you have any questions regarding this letter report, please contact me at (617) 452-6416.

Very truly yours,

CAMP DRESSER & MCKEE INC.


Ernest Ashley, P.G.
Project Manager



cc: Jim Grant, Mallinckrodt
Walter Chaffee, CDM

Attachments

Table 1 & 2, Figures 1 through 7 and Well Point Construction Logs

Tables

00803

Table 1

HoltraChem Manufacturing Company
 Orrington, Maine
 Landfill #2 Investigation

Well Point Construction Summary

Monitoring Well Number	Well Location and ID		Ground Surface Elevation (ft.)	Depth of Hole (ft.)	Bottom of Hole Elevation (ft.)		Monitoring Well Construction				Groundwater		
	Northing	Eastng			Depth of Hole (ft.)	Elevation (ft.)	Top	Bottom	Screen Depth (ft.)	Screen Elevation (ft.)	Top of Casing Elevation (ft.)	Depth (ft.)	Elevation (ft.)
LF2-WP1	10304.65	21171.60	67.61	3.8	63.8	63.8	1.3	3.8	66.3	63.8	69.67	-	-
LF2-WP2A	10322.65	21169.60	66.68	8.0	58.7	58.7	3.0	8.0	63.7	58.7	68.81	7.28	61.53
LF2-WP2	10330.65	21174.60	66.36	4.0	62.4	62.4	1.5	4.0	64.9	62.4	68.42	-	-
LF2-WP4A	10357.65	21146.60	67.12	8.0	59.1	59.1	3.0	8.0	64.1	59.1	69.40	7.76	61.64
LF2-WP4	10357.65	21132.60	-	4.0	-	-	1.5	4.0	-	-	-	-	-
LF2-WP5	10363.80	21110.10	66.83	4.0	62.8	62.8	1.5	4.0	65.3	62.8	68.89	-	-
LF2-WP5A	10366.34	21101.10	67.43	8.0	59.4	59.4	3.0	8.0	64.4	59.4	69.56	7.61	61.95
LF2-WP6	10369.63	21084.60	66.56	4.0	62.6	62.6	1.5	4.0	65.1	62.6	68.88	6.29	62.59
LF2-WP6A	10371.26	21074.60	66.79	8.0	58.8	58.8	3.0	8.0	63.8	58.8	69.30	7.80	61.50
LF2-WP7	10375.06	21061.60	66.53	4.0	62.5	62.5	1.5	4.0	65.0	62.5	68.72	6.04	62.68
LF2-WP8	10378.65	21037.60	66.40	4.0	62.4	62.4	1.5	4.0	64.9	62.4	68.78	6.06	62.72
LF2-WP9	10380.65	21012.60	66.61	4.0	62.6	62.6	1.5	4.0	65.1	62.6	68.74	5.89	62.85
LF2-WP10	10382.65	20982.60	65.50	4.0	61.5	61.5	1.5	4.0	64.0	61.5	67.59	4.80	62.79
LF2-WP11	10383.15	20964.60	66.00	4.0	62.0	62.0	1.5	4.0	64.5	62.0	68.04	-	-
LF2-WP12	10373.65	20939.60	65.92	8.0	57.9	57.9	3.0	8.0	62.9	57.9	68.71	7.42	61.29
LF2-WP13	10365.65	20919.60	66.25	8.0	58.3	58.3	3.0	8.0	63.3	58.3	68.86	7.62	61.24
LF2-WP14	10362.65	20895.60	65.95	8.0	58.0	58.0	3.0	8.0	63.0	58.0	67.81	6.48	61.33
LF2-WP15	10357.65	20871.60	65.71	8.0	57.7	57.7	3.0	8.0	62.7	57.7	67.79	6.60	61.19
LF2-WP16	10357.65	20871.60	65.57	8.0	57.6	57.6	3.0	8.0	62.6	57.6	67.93	6.02	61.91
LF2-WP17	10347.65	20830.60	65.36	8.0	57.4	57.4	3.0	8.0	62.4	57.4	67.33	4.96	62.37
LF2-WP18	10324.65	20807.60	66.21	8.0	58.2	58.2	3.0	8.0	63.2	58.2	67.98	5.38	62.60
LF2-GP1	10262.65	20981.60	75.87	16.0	59.9	59.9	5.0	15.0	70.9	60.9	78.89	16.21	62.68
LF2-GP2	10243.23	21126.50	74.15	16.0	58.2	58.2	6.0	16.0	68.2	58.2	77.37	14.37	63.00

Notes:
 Groundwater elevations measured on 8/18/00.

Table 2

HoltraChem Manufacturing Company
 Orrington, Maine
 Landfill #2 Investigation

Groundwater Quality Evaluation

Parameter ID Units	Sample Date	Salinity (%)	Specific Conductance (mS/cm)	pH	Total Hg (mg/l)	Dissolved Hg (mg/l)	Total Sodium (mg/l)	Chloride (mg/l)
LF2-WP2A	08/18/2000	0.02	0.54	6.88	ND	ND	51	95
LF2-WP4A	08/18/2000	0.00	0.24	7.02	ND	ND	20	28
LF2-WP5A	08/18/2000	0.03	0.74	6.90	NA	NA	NA	NA
LF2-WP6A	08/18/2000	0.04	1.10	6.96	ND	ND	97	80
LF2-WP8	08/18/2000	0.06	1.51	7.73	NA	NA	NA	NA
LF2-WP9	08/18/2000	0.09	1.91	7.78	NA	NA	NA	NA
LF2-WP10	08/18/2000	0.05	1.23	7.48	0.0016	-	300	97
LF2-WP12	08/18/2000	0.07	1.63	7.08	0.0059	ND	140	220
LF2-WP13	08/18/2000	0.07	1.62	6.99	NA	NA	NA	NA
LF2-WP14	08/18/2000	0.09	2.05	7.05	ND	ND	180	280
LF2-WP15	08/18/2000	0.10	2.25	7.00	ND	ND	250	340
LF2-WP16	08/18/2000	0.14	2.93	7.05	ND	ND	350	570
LF2-WP17	08/18/2000	0.07	1.70	7.24	0.0028	ND	270	290
LF2-WP18	08/18/2000	0.03	0.75	7.65	ND	ND	130	60
LF2-WP19	08/18/2000	0.07	1.63	7.08	0.0059	ND	140	220

Notes:

1. LF2-WP19 is a duplicate sample of LF2-WP12.

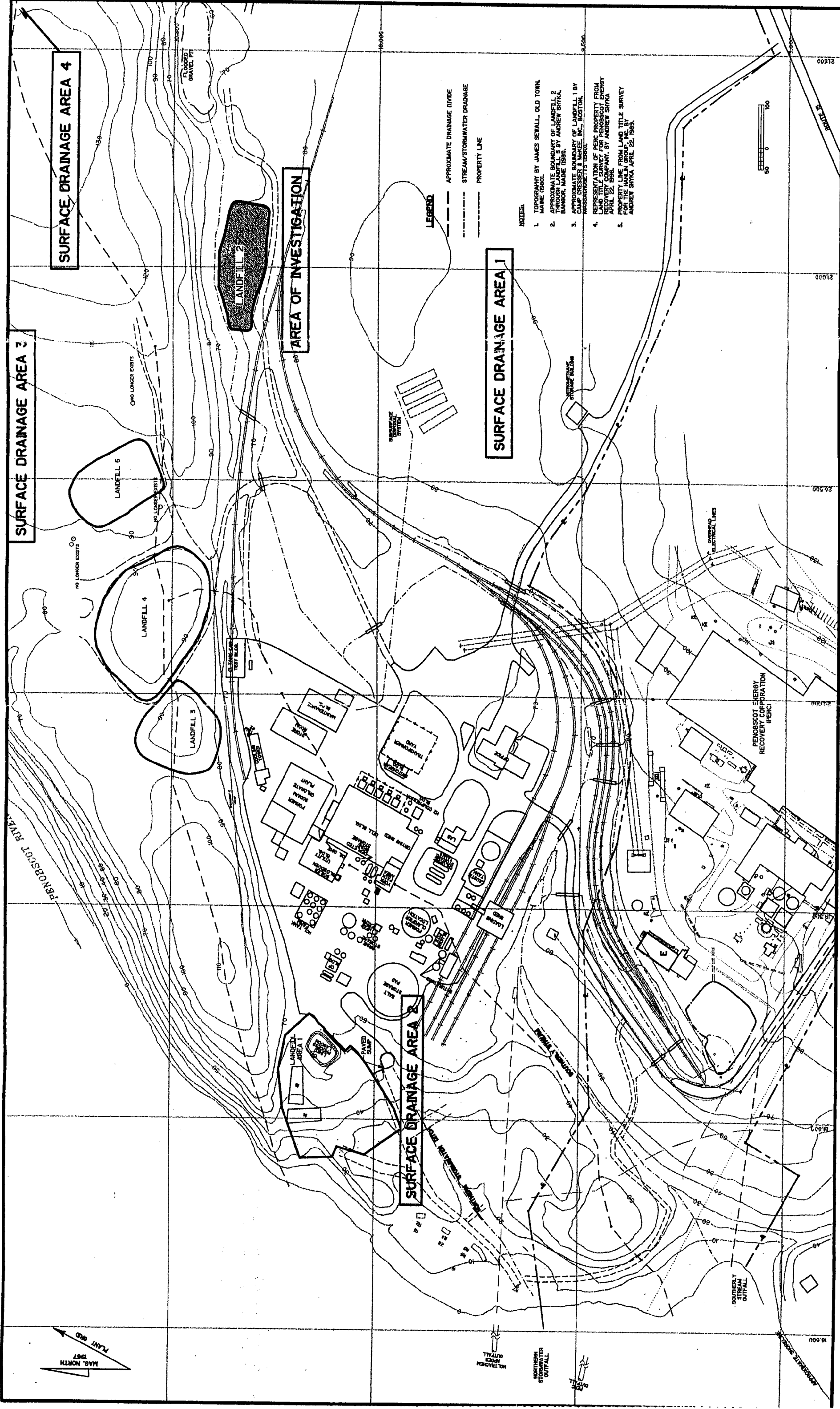
NA - Not Analyzed

ND - Not Detected

00805

Figures

00806



SURFACE DRAINAGE AREA 4

SURFACE DRAINAGE AREA 3

AREA OF INVESTIGATION

SURFACE DRAINAGE AREA 1

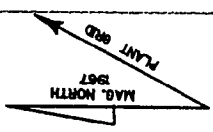
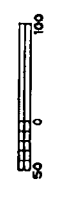
SURFACE DRAINAGE AREA 2

LEGEND

- APPROXIMATE DRAINAGE DIVIDE
- STREAM/STORMWATER DRAINAGE
- PROPERTY LINE

NOTES:

1. TOPOGRAPHY BY JAMES SEWALL, OLD TOWN, MAINE (1960).
2. APPROXIMATE BOUNDARY OF LANDFILL 2 THROUGH LANDFILL 6 BY ANDREW SHYKA, BANGOR, MAINE (1981).
3. APPROXIMATE BOUNDARY OF LANDFILL 1 BY CAMP DRESSER & MCKEE, INC., BOSTON, MASSACHUSETTS (1980).
4. REPRESENTATION OF PERC PROPERTY FROM LAND TITLE SURVEY FOR PENOBSCOT ENERGY RECOVERY CORPORATION, BY ANDREW SHYKA, APRIL 22, 1995.
5. PROPERTY LINE FROM LAND TITLE SURVEY FOR THE HANLIN GROUP, INC. BY ANDREW SHYKA, APRIL 22, 1989.



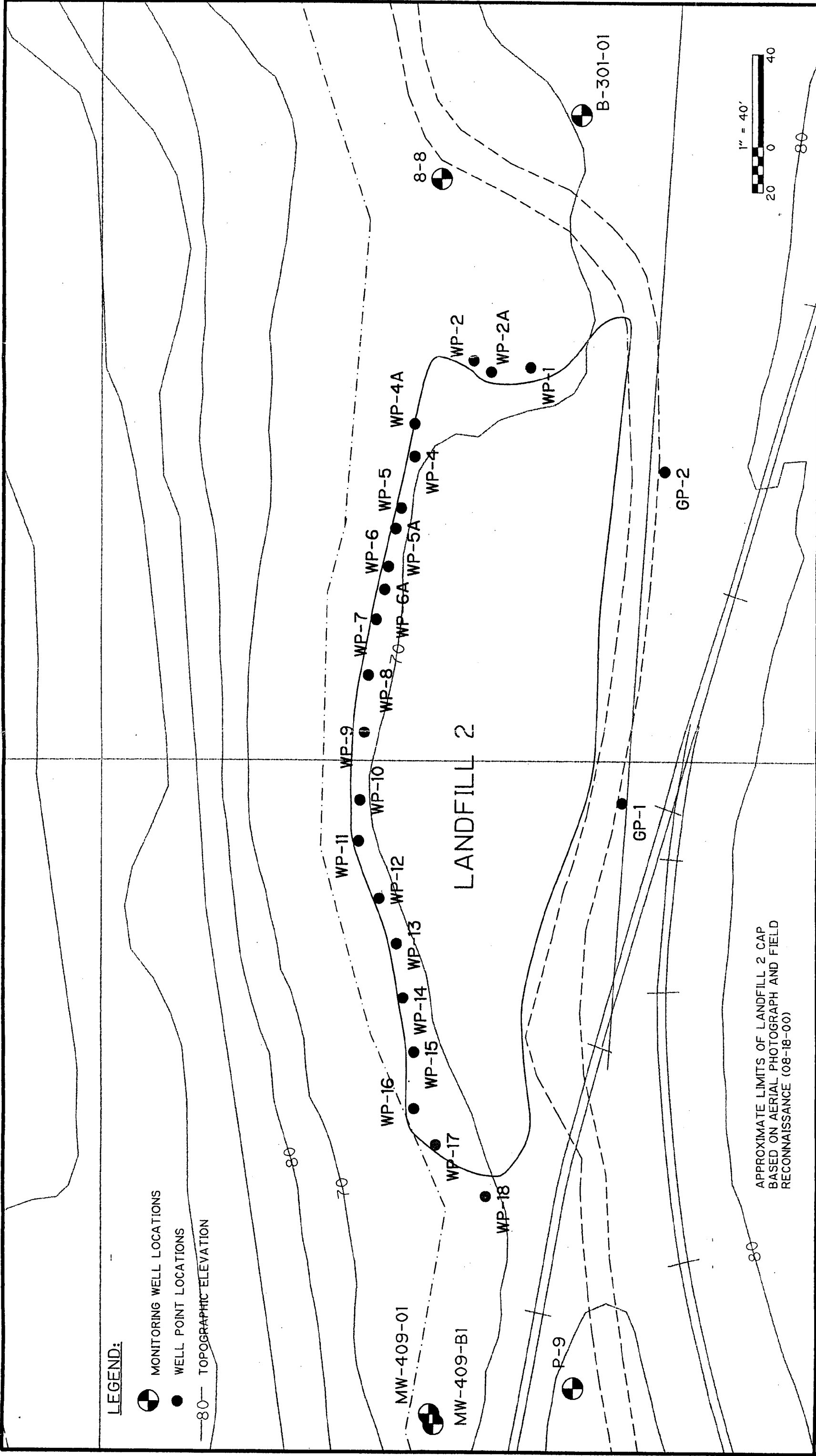
HOLTRACHEN MANUFACTURING
ORRINGTON, MAINE

SITE INVESTIGATION



00807

SITE PLAN



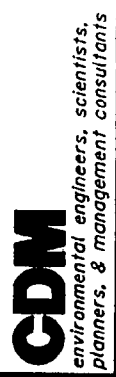
HOLTRACHEM MANUFACTURING
 ORRINGTON, MAINE

SITE INVESTIGATION



**WELL POINT LOCATIONS
 LANDFILL #2**

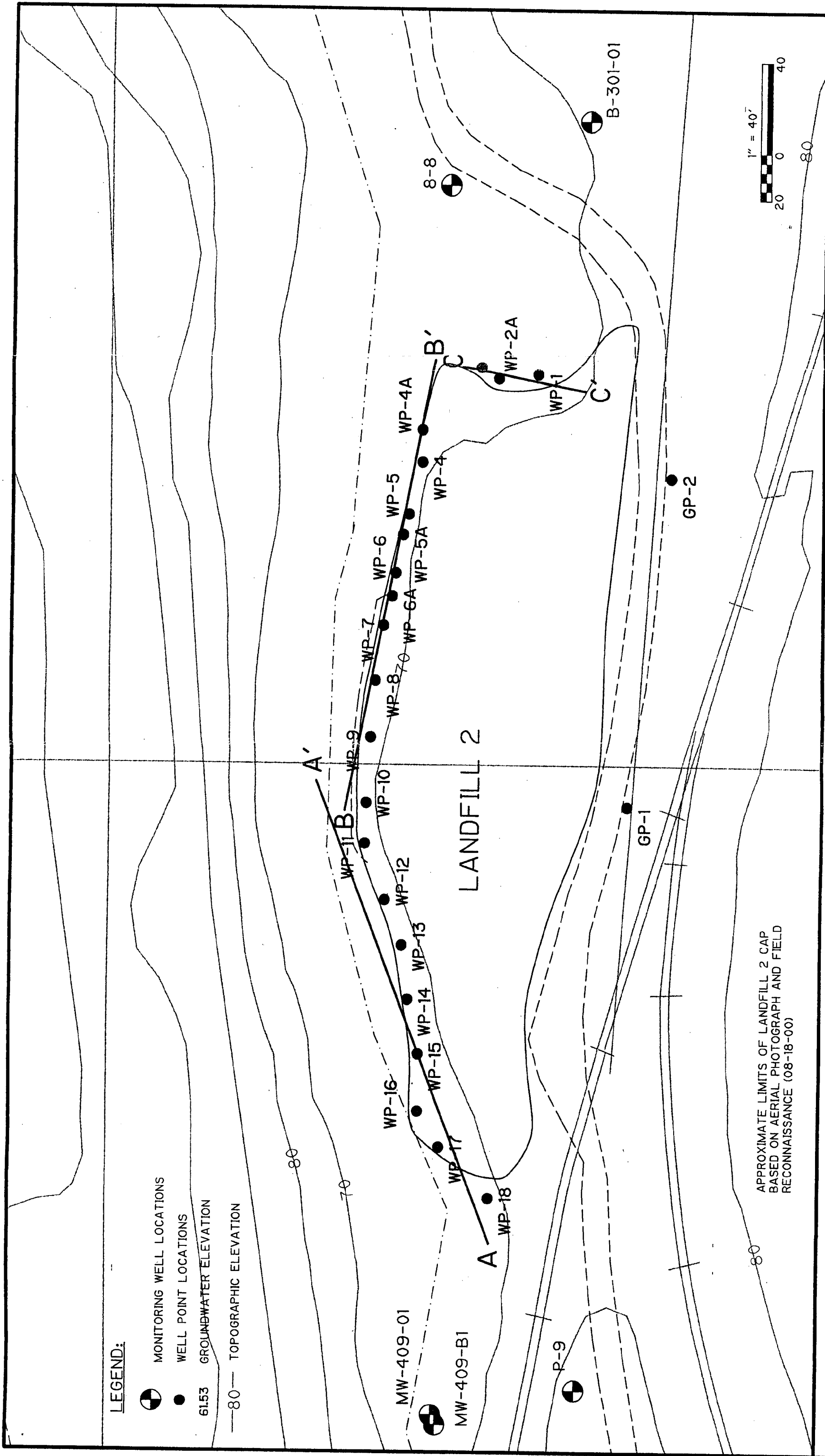
FIGURE 2

00808

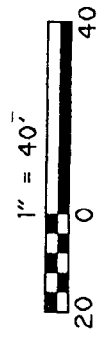


LEGEND:

-  MONITORING WELL LOCATIONS
-  WELL POINT LOCATIONS
- 61.53 GROUNDWATER ELEVATION
- 80— TOPOGRAPHIC ELEVATION



APPROXIMATE LIMITS OF LANDFILL 2 CAP
 BASED ON AERIAL PHOTOGRAPH AND FIELD
 RECONNAISSANCE (08-18-00)



HOLTRACHEM MANUFACTURING
 ORRINGTON, MAINE

CROSS SECTION LOCATIONS
 00809 LANDFILL #2

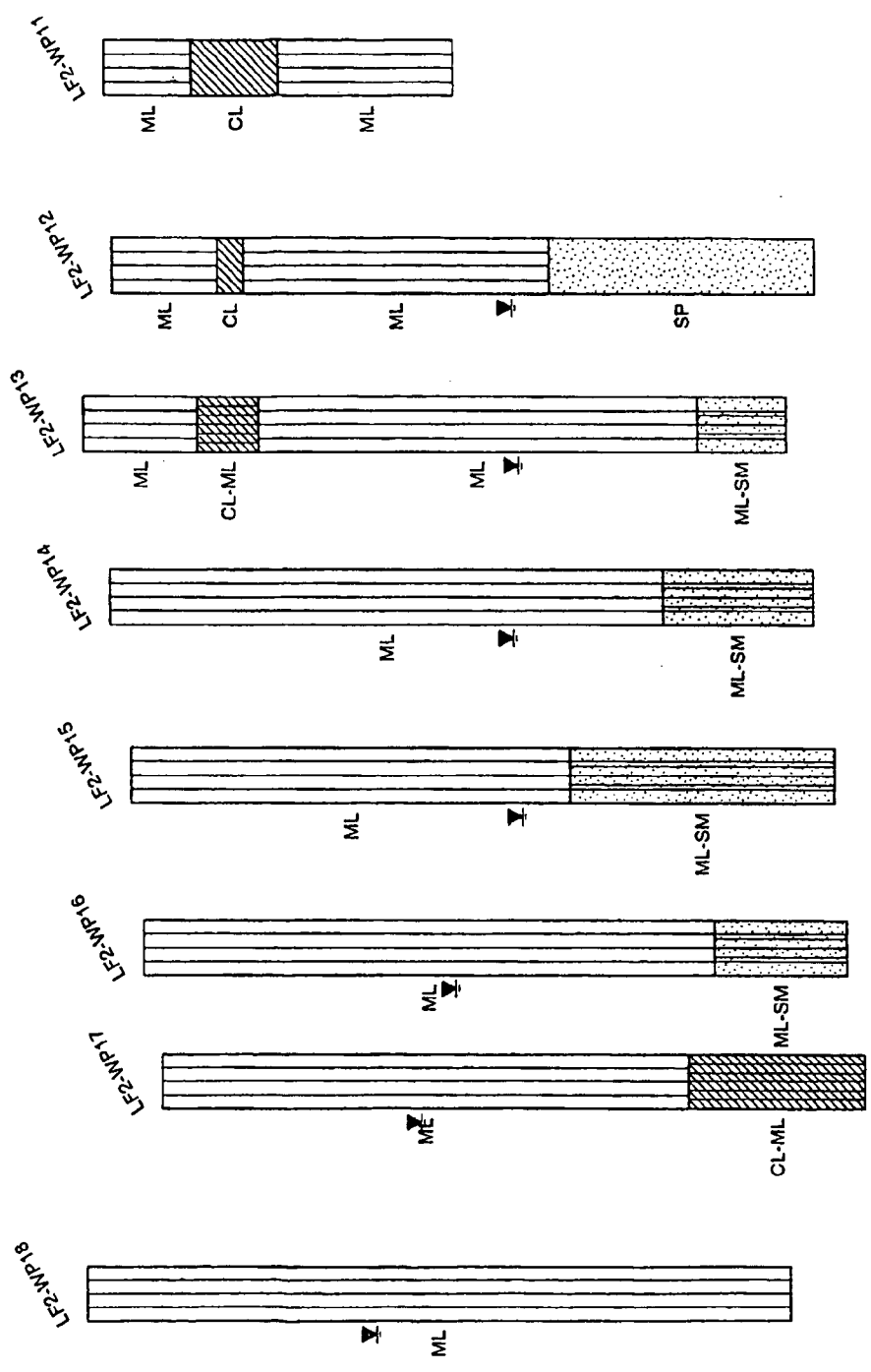
SITE INVESTIGATION



A'

ELEVATION (feet)
68
67
66
65
64
63
62
61
60
59
58
57

01800



HoltraChem Manufacturing Company
 Landfill #2 Investigation
 Orrington, Maine
 Cross Section A-A'



Figure 4

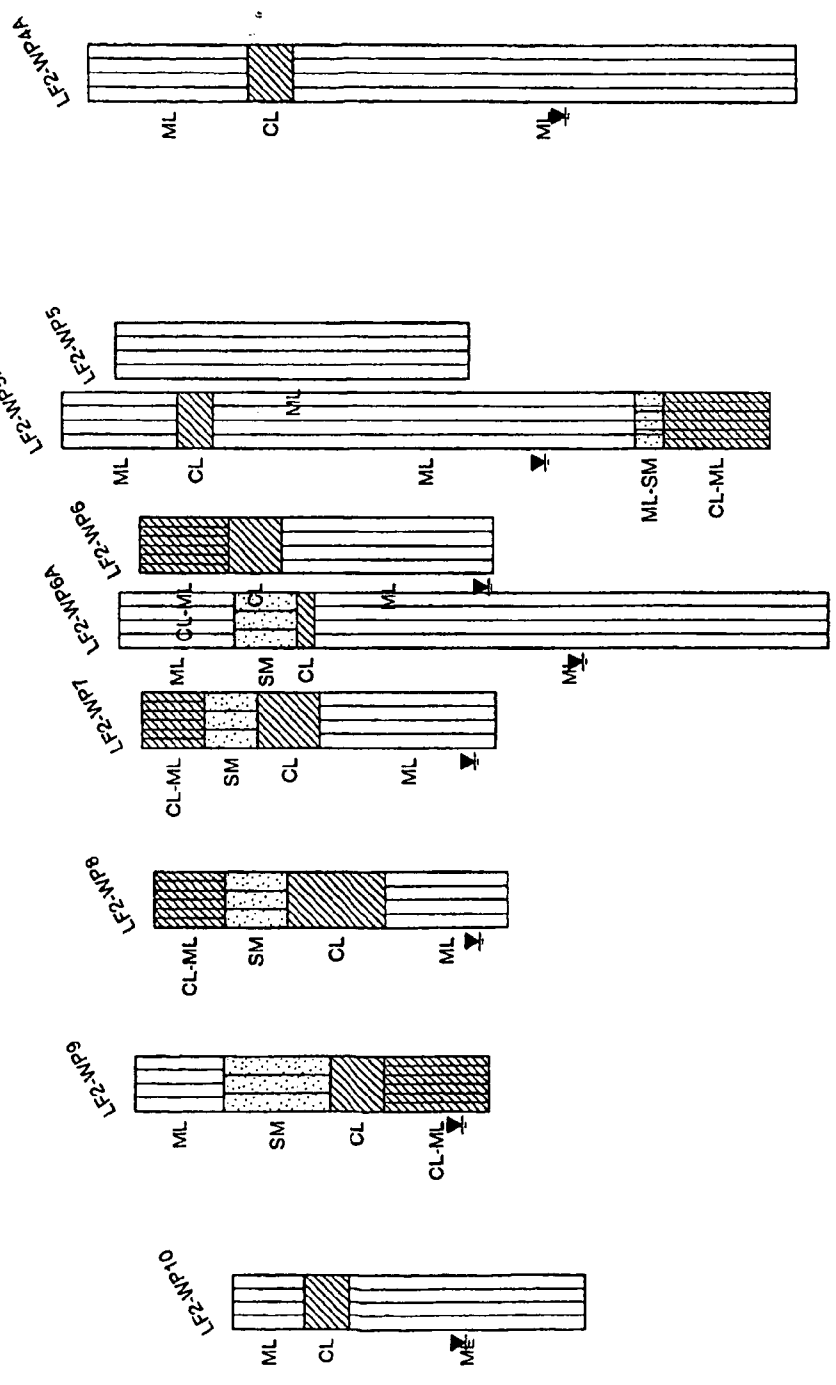
LEGEND

- USCS Silt
- USCS Low Plasticity Clay
- USCS Low Plasticity Silty Clay
- USCS Poorly-graded Sand
- USCS Silt and Sand
- Water Level



Camp Dresser & McKee

B'

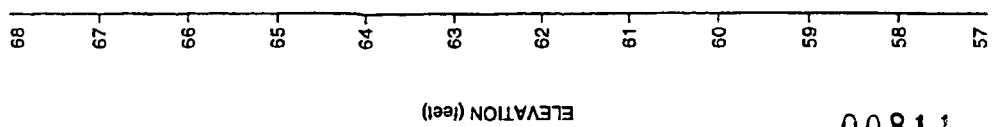


HoltraChem Manufacturing Company
 Landfill #2 Investigation
 Orrington, Maine
 Cross Section B-B'



Figure 5

B



11800

LEGEND

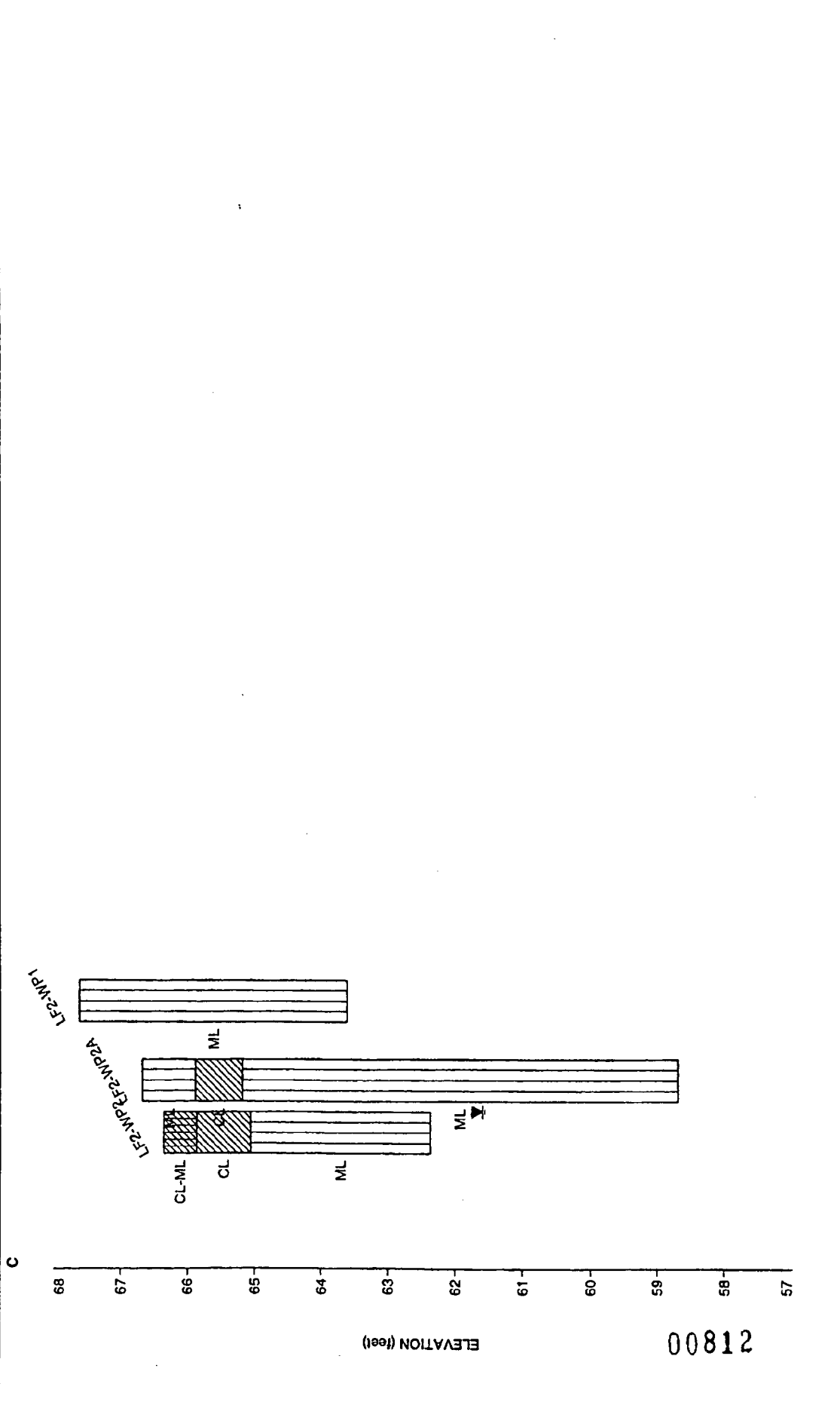
	USCS Silt		USCS Low Plasticity Silty Clay
	USCS Low Plasticity Clay		USCS Silty Sand
	USCS Silt and Sand		

Water Level

CDM

Camp Dresser & McKee

C



HoltraChem Manufacturing Company
 Landfill #2 Investigation
 Orrington, Maine
 Cross Section C-C'



Figure 6

Water Level



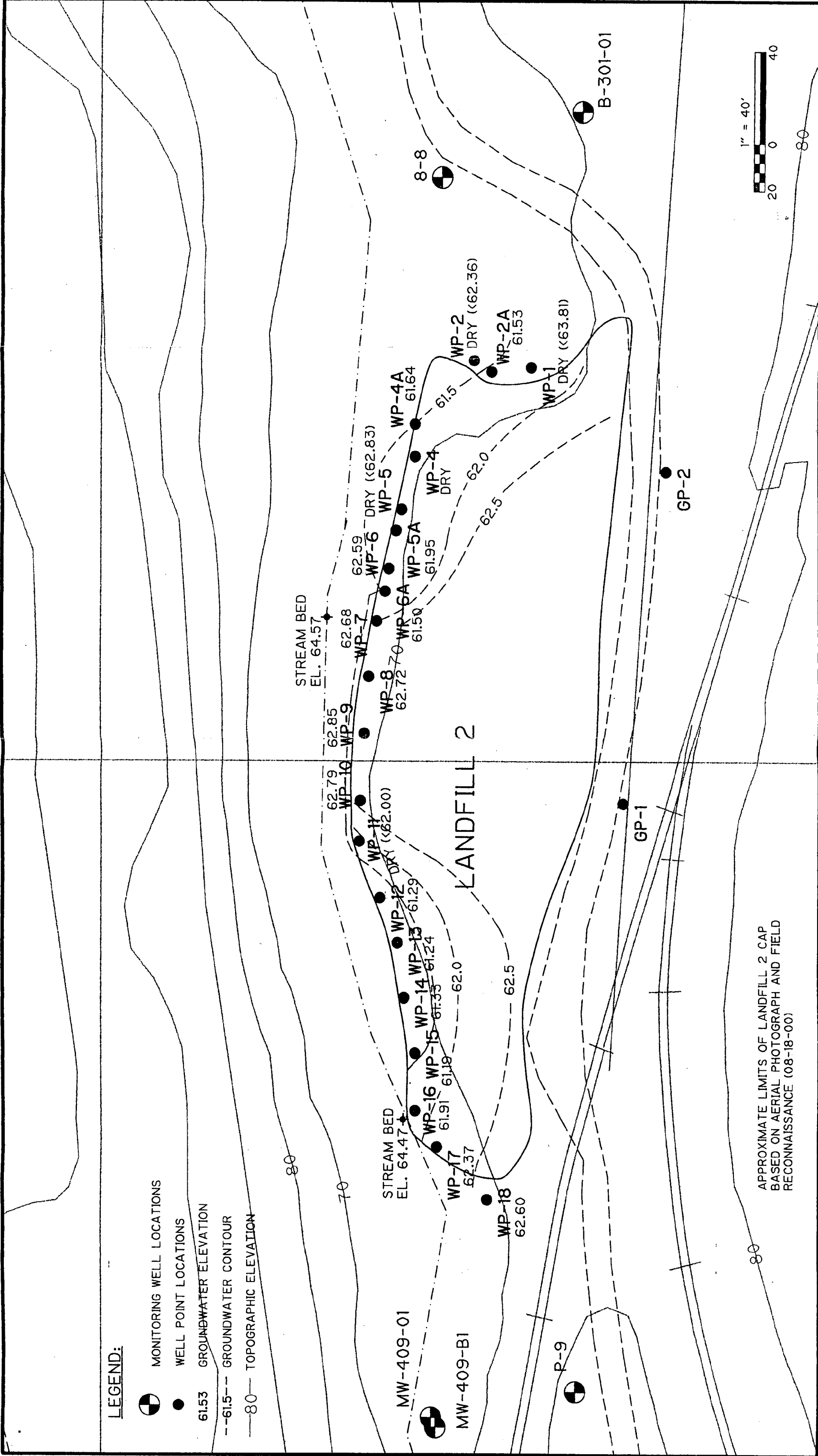
LEGEND

- USCS Silt
- USCS Low Plasticity Silty Clay
- USCS Low Plasticity Clay

Camp Dresser & McKee

21800

ELEVATION (feet)



HOLTRACHEM MANUFACTURING
ORRINGTON, MAINE

SITE INVESTIGATION

**GROUNDWATER CONTOUR PLAN
LANDFILL #2**

00813

FIGURE 7

